Appendix A Quality Assurance/Quality Control

Appendix A-1 Analytical Services and Procedures

Appendix A-2 2007 RFI Quality Assurance/Quality Control Evaluation

Appendix A-3 2007 RFI Validation Reports and Form 1s

Appendix A-4 2013 Supplemental RFI Validation Reports and Form 1s

ANALYTICAL SERVICES AND PROCEDURES

ANALYTICAL SERVICES

The analytical services for the field investigation program were provided by the following USACE and National Environmental Laboratory Accreditation Conference (NELAC) validated laboratories:

- Accutest Laboratories, Inc. (Accutest), Orlando, FL: Accutest used *USEPA Office of Soil Waste and Emergency Response Test Methods for Evaluating Soil Waste Physical and Chemical Methods, Update IIIB.* (SW-846) (USEPA, 2004) methodologies in providing analytical support for this investigation. Chemical analyses included: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), metals, pesticides, polychlorinated biphenyls (PCBs), herbicides, explosives, full toxicity characteristic leaching procedure (TCLP) analysis, ignitability, reactive sulfide, reactive cyanide, and corrosivity as pH. Accutest used *USEPA Methods for Chemical Analysis of Water and Wastes* (MCAWW) (USEPA, 1983) for chemical oxygen demand (COD) and biological oxygen demand (BOD) analysis.
- Datachem Laboratories, Inc. (Datachem), Salt Lake City, UT: Datachem was subcontracted by Accutest to perform analytical support for perchlorates. Datachem used *USEPA Office of Soil Waste and Emergency Response Test Methods for Evaluating Soil Waste Physical and Chemical Methods, Update IIIB* (SW-846) (USEPA, 2004) methodologies for this analysis.
- SGS Environmental Services, Inc. (SGS), Wilmington, NC: SGS was subcontracted by Accutest to perform analytical support for dioxins/furans. SGS used *USEPA Office of Soil Waste and Emergency Response Test Methods for Evaluating Soil Waste Physical and Chemical Methods, Update IIIB* (SW-846) (USEPA, 2004) methodologies for this analysis.

ANALYTICAL PROCEDURES

Analytical protocols used were in accordance with USEPA-approved methods for the analysis of environmental (i.e., organic, and inorganic parameters) and waste characterization samples. All methods performed were within the *DoD Quality Systems Manual for Environmental Laboratories, Final Version 3* (DoD, 2006) and the *DoD Perchlorate Handbook* (DoD, 2006) guidelines. The methodologies for environmental samples are summarized in **Table A-1** and for waste characterization samples in **Table A-2**. A brief discussion of the methodologies is presented in the following sections below.

Organics

Target compound list (TCL) VOCs, TCL SVOCs, TCL pesticides, TCL PCBs, herbicides, explosives, including nitroglycerin (NG) and pentaerythritol tetranitrate (PETN), PAHs, and dioxins/furans were analyzed using USEPA-approved methodologies. The laboratory procedures and methodologies for organic compounds are summarized below.

Table A-1
Summary of Analytical Methods for Environmental Samples

Parameter	Matrix	Analytical Method
Chemical Parameters		
TCL VOCs	Aqueous	USEPA SW-846 5030B/8260B
	Soil	USEPA SW-846 5035/8260B
TCL SVOCs	Aqueous	USEPA SW-846 3510C/8270C
	Soil	USEPA SW-846 3550B/8270C
TCL Pesticides	Aqueous	USEPA SW-846 3510C/8081A
	Soil	USEPA SW-846 3550B/8081A
TCL PCBs	Aqueous	USEPA SW-846 3510C/8082
	Soil	USEPA SW-846 3550B/8082
Herbicides	Aqueous	USEPA SW-846 3510C/8151A
	Soil	USEPA SW-846 3550B/8151A
Explosives	Aqueous	USEPA SW-846 3535A/8330A Modified
	Soil	USEPA SW-846 8330B/8330A Modified
Nitroglycerin & PETN	Aqueous	USEPA SW-846 3535A/8332
	Soil	USEPA SW-846 8330B/8332
Polynuclear Aromatic Hydrocarbons	Aqueous	USEPA SW-846 3510C/8270C SIM
	Soil	USEPA SW-846 3550B/8270C SIM
Perchlorates	Aqueous	USEPA SW-846 LC-MS-CLO_4/6850 SIM
Dioxins/furans	Aqueous	USEPA SW-846 8290
	Soil	USEPA SW-846 8290
TAL Metals	Aqueous	USEPA SW-846 3010A/6010B & 7470A
	Soil	USEPA SW-846 3050B/6010B & 7471A

Table A-2
Summary of Analytical Methods for Waste Characterization Samples

Parameter	Matrix	Analytical Method
TCLP VOCs	Solid	USEPA SW-846 1311/5030B/8260B
TCLP SVOCs	Solid	USEPA SW-846 1311/3510C/8270C
TCLP Pesticides	Solid	USEPA SW-846 1311/3510C/8081A
TCLP Herbicides	Solid	USEPA SW-846 1311/3510C/8151A
TCLP Metals	Solid	USEPA SW-846 1311/3010A/6010B & 1311/7470A
TCL PCBs	Solid	USEPA SW-846 3550B/8082
Explosives	Solid	USEPA SW-846 8330B/8330A Modified
Nitroglycerin & PETN	Solid	USEPA SW-846 8330B/8332
Ignitability	Solid	USEPA SW-846 1010
Reactive Cyanide	Solid	USEPA SW-846 Chapter 7.3.3
Reactive Sulfide	Solid	USEPA SW-846 Chapter 7.3.4
Biological Oxygen Demand	Aqueous	USEPA MCAWW 405.1
Chemical Oxygen Demand	Aqueous	USEPA MCAWW 410.1
Corrosivity as pH	Aqueous	USEPA SW-846 9040C

TCL VOCs: Aqueous and solid samples were analyzed for TCL VOCs using USEPA SW-846 Method 5030B/8260B for aqueous samples and USEPA SW-846 5035/8260B for solid matrices using purge and trap technology. TCLP extracts were analyzed according to USEPA SW-846 Method 1311/5030B/8260B for investigative-derived material (IDM) solid samples. Soil samples were collected using field preservation techniques. Approximately 5 grams of soil sample was added to pre-tarred vials containing methanol and/or de-ionized ultra filtered water (DIUF); then sent to the laboratory for analysis. Aqueous samples were sent to the laboratory in zero headspace vials. An inert gas was bubbled through a mixture of reagent water and 5 gram soil sample or through a 25 mL aqueous sample contained in a specifically designed purging chamber at 40°C for soil and ambient temperature for water. The vapor was swept through a sorbent column where the purgeable compounds were trapped. After purging was completed for both solid and aqueous samples, the sorbent column was heated and backflushed with the inert gas to desorb the purgeable compounds onto a gas chromatograph programmed to separate the purgeable compounds, which were then detected with a mass spectrometer. The gas chromatography/mass spectroscopy (GC/MS) instrument was calibrated for a series of target analytes using chemical standards of known concentration and purity. Quantification of these target analytes was performed against specific internal standards as identified in the respective method. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time and mass spectra.

TCL SVOCs/PAHs: Aqueous and solid samples were analyzed for TCL SVOCs and PAHs using USEPA SW-846 Method 8270C. The use of selective ion monitoring (SIM) using USEPA SW-846 Method 8270C SIM was employed for PAH analysis to achieve lower quantitation and detection limits in order to meet screening criteria. Soil samples were extracted using ultrasonic extraction according to USEPA SW-846 Method 3550B and aqueous samples were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 3510C. TCLP SVOC extracts were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 1311/3510C for solid IDM samples. The extracts were injected into a gas chromatograph programmed to separate the compounds, which are then detected with a mass spectrometer. The gas chromatograph/mass spectrometer instrument was calibrated for a series of target analytes using chemical standards of known concentration and purity. Quantification of these target analytes was performed against specific internal standards as identified in the respective method. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time and mass spectra.

TCL Pesticides/PCBs: Aqueous and solid samples were analyzed for TCL pesticides using USEPA SW-846 Method 8081A and for TCL PCBs using USEPA SW-846 Method 8082. Samples were prepared for analysis using extraction techniques. Soil samples were extracted using ultrasonic extraction according to USEPA SW-846 Method 3550B and aqueous samples were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 3510C. TCLP pesticide extracts were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 1311/3510C for solid IDM samples. The extracts were injected onto a gas chromatography programmed to separate the compounds, which are then detected with an electronic capture device (ECD). Sulfur cleanups were employed to aid in the quantification based upon the matrix interferences. Sample concentrations were confirmed on dissimilar columns.

Herbicides: Aqueous and solid samples were analyzed for herbicides according to USEPA SW-846 Method 8151A. Samples were prepared for analysis using extraction techniques. Soil samples were extracted using ultrasonic extraction according to USEPA SW-846 Method 3550B and aqueous samples were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 3510C. TCLP herbicide extracts were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 1311/3510C for solid IDM samples. Aqueous and solid samples were extracted with diethyl ether and then esterified with diazomethane. The derivatives were determined by gas chromatography with an electron capture detector (GC/ECD). The results were reported as acid equivalents. Sample concentrations were confirmed on dissimilar columns.

Explosives: Aqueous and solid (including IDM) samples were analyzed for explosives using USEPA SW-846 Method 8330A Modified. Aqueous samples were extracted using a Solid-phase Extraction (SPE) procedure USEPA SW-846 3535A. A measured volume of sample was adjusted to a specified pH and then extracted using a SPE device. Target analytes were eluted from the solid-phase media using methylene chloride. The resulting solvent extract was dried using sodium sulfate and concentrated. The concentrated extract were exchanged into a solvent compatible with subsequent cleanup procedures and then measurement of the target analytes separated on a C-18 reverse phase column. The wavelength was set at 254 nanometers and confirmed on a cyanide reverse column. For soil samples, they were homogenized and analyzed using USEPA SW-846 Method 8330B/8330A Modified. Because only a small 2-g portion (sub-sample) of the 10-g or larger sample was taken for analysis, the bulk sample was thoroughly mixed to allow for representative sub-sampling. This was achieved by air-drying at room temperature for 24 hours, sieving through a 30-mesh sieve, grinding, and mixing the bulk sample, after subjectively removing vegetation (organic debris) and pebbles. Soil samples were extracted using acetonitirile in an ultrasonic bath, then filtered and determined similarly to aqueous samples. Sample concentrations were confirmed on dissimilar columns.

Nitroglycerin/PETN: Aqueous and solid (including IDM) samples were analyzed for nitroglycerin and PETN using USEPA SW-846 Method 8332. For soil samples, they were homogenized and analyzed using USEPA SW-846 Method 8330B/8330A Modified. Solid samples were extracted with acetonitrile in an ultrasonic bath, then filtered and mixed with a calcium chloride solution. Aqueous samples were extracted using a Solid-phase Extraction (SPE) procedure USEPA SW-846 3535A, as described for explosives. The concentrations were quantified using an isocratic high pressure liquid chromatography (HPLC) system equipped with a column heater and ultraviolet (UV) detector. Sample concentrations were confirmed on dissimilar columns. Identification of these target analytes was based on a comparison of the analyte to the chemical standards used during calibration based on the analyte's retention time using primary and secondary columns.

Dioxins/Furans: Aqueous and solid samples were analyzed for dioxin/furans using USEPA SW-846 Method 8290. The analytical method used high-resolution gas chromatography and high-resolution mass spectrometry (HRGC/HRMS) on purified sample extracts. This method is specific for the analysis of 2,3,7,8-tetrachlorinated dibenzofuran (2,3,7,8-TCDD), substituted penta-, hexa-, hepta- and octachlorinated dibenzo-p-dioxins and substituted penta-, hexa-, hepta- and octachlorinated dibenzofurans in aqueous and solid samples. The extracts were injected onto a high-resolution gas chromatograph programmed to separate the compounds, which are then detected with a high-resolution mass spectrometer as confirmation.

Inorganics

Target analyte list (TAL) metals and perchlorate were analyzed using USEPA SW-846 methodologies. The laboratory procedures for inorganic compounds are summarized below.

TAL Metals: Aqueous and solid samples were analyzed for TAL metals using a combination of the following methodologies: inductively coupled plasma (ICP) and cold vapor atomic absorption (CVAA). Trace metals were analyzed using USEPA SW-846 3010A/6010B for aqueous samples and USEPA SW-846 Method 3050B/6010B for solid samples. TCLP extracts were digested according to USEPA SW-846 Method 1311/3010A/6010B for the solid IDM samples. The ICP method involved the simultaneous or sequential multi-element determination of trace elements in solution. The basis of the method is the measurement of atomic emission by optical spectrometry. Samples were nebulized and the aerosol that was produced was transported to the plasma torch where excitation occurs. Characteristic atomic-line emission spectra are produced by a radio-frequency ICP. A background correction technique was utilized to compensate for variable background contribution for the determination of trace elements.

Aqueous and solid samples were analyzed for mercury using CVAA according to USEPA SW-846 Method 7470A for aqueous samples and Method 7471A for solid samples. TCLP extracts were digested according to USEPA SW-846 Method 1311/7470A for solid IDM samples. A sample aliquot was initially digested with nitric acid to free combined mercury. The mercury was then reduced to its elemental state and aerated from the solution into a closed system. The mercury vapor was passed through a cell positioned in the path of the mercury light source and the measured abundance was proportional to the concentration of mercury in the sample.

Perchlorate: Perchlorate was analyzed for aqueous samples by using either USEPA SW-846 Method 6850 SIM by HPLC/MS following the *DoD Perchlorate Handbook* (DoD, 2006b) requirements. The HPLC-MS method 6850 uses a second order external standard approach using laboratory ChemStation software. The method provides HPLC-MS conditions for the detection of perchlorate in SIM mode at m/z 83 and 85, which corresponds to the loss of one oxygen atom from the perchlorate molecule. In general, water samples were extracted at a neutral pH with methylene chloride, using LC-MS-CLO_4 method. Sample extracts were injected into the HPLC-MS and the ion ratio of m/z 83 to 85 was used to positively identify the response peak as perchlorate. Quantitation was performed using the m/z 83 peak area. An internal standard of ^{18}O labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in the quantitation. Confirmation was obtained by the use of the mass spectrometer.

Waste Characterization

Samples collected to characterize IDM were analyzed for hazardous waste characteristics using USEPA-approved methodologies, including TCLP VOCs, TCLP SVOCs, TCLP metals, TCLP pesticides, TCLP herbicides, ignitability, reactive cyanide, reactive sulfide, TCL PCBs, explosives, chemical oxygen demand (COD), biological oxygen demand (BOD), and corrosivity as pH. The laboratory procedures and methodologies are summarized below and in the prior section.

TCLP Extraction: Solid IDM samples were collected for full TCLP waste characterization and extracted using the USEPA SW-846 Method 1311. Aqueous IDM samples were collected for TCLP metals analysis. The final liquid extract was separated from the sample material and combined with the initial liquid phase (if applicable). The sample TCLP extract was then treated as an aqueous sample for analysis for TCLP VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, and TCLP metals. Brief discussions of the procedures and methodologies are presented below and in the prior section.

Explosives/PETN/NG: Solid IDM samples were analyzed for explosives and PETN using USEPA SW-846 Method 8330B/8330A Modified and for NG using USEPA SW-846 Method 8330B/8332 Modified. Brief discussions of these procedures and methodologies are presented in the prior section.

Reactive Cyanide: Solid IDM samples were analyzed for reactive cyanide using USEPA SW-846 Method Chapter 7.3.3. The cyanide as hydrocyanic acid (HCN) was released from cyanide complexes by means of a reflux-distillation operation and absorbed in a scrubber containing sodium hydroxide solution. The cyanide ion in the absorbing solution was then determined colorimetrically. In the colorimetric measurement, the cyanide was converted to cyanogen chloride, CNCl, by reaction with chloramine-T at a pH less than 8.0 without hydrolyzing the cyanate. After the reaction was completed, color was formed on the addition of pyridine-pyrazolone or pyridine-barbituric acid reagent. The absorbance was read at 578 nm for pyridine-barbituric acid. To obtain colors of comparable intensity, the sample and the standards contain the same salt content. The titrimetric measurement uses a standard solution of silver nitrate to titrate cyanide in the presence of a silver sensitive indicator.

Reactive Sulfide: Solid IDM samples were analyzed for reactive sulfide using USEPA SW-846 Method Chapter 7.3.4. This procedure is a colorimetric determination. Sulfide reacts with dimethyl-p-phenylenediamine in the presence of ferric chloride to produce methylene blue.

Flashpoint: Solid IDM samples were analyzed for flashpoint or ignitability using USEPA SW-846 Method 1010. A sample was heated at a slow, constant rate with continual stirring. A small flame was directed into the cup at regular intervals with simultaneous interruption of stirring. The flash point is the lowest temperature at which application of the test flame ignites the vapor above the sample.

TCL PCBs: Solid IDM samples were analyzed for TCL PCBs using USEPA SW-846 Method 3550B/8082. A brief discussion of this procedure and methodology is presented in the prior section.

TCLP VOCs: Solid IDM samples were analyzed for TCLP VOCs using USEPA SW-846 Method 1311/8260B. A brief discussion of this procedure and methodology is presented in the prior section.

TCLP SVOCs: Solid IDM samples were analyzed for TCLP SVOCs using USEPA SW-846 Method 1311/8270C. A brief discussion of this procedure and methodology is presented in the prior section.

TCLP Pesticides: Solid IDM samples were analyzed for TCLP pesticides using USEPA SW-846 Method 1311/8081A. The samples were prepared for analysis using extraction techniques. TCLP pesticide extracts were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 1311/3510C for solid IDM samples. The extracts were injected onto a gas chromatography programmed to separate the compounds, which are then detected with an electronic capture device (ECD). Sulfur cleanups were employed to aid in the quantification based upon the matrix interferences. Sample concentrations were confirmed on dissimilar columns.

TCLP Herbicides: Solid IDM samples were analyzed for TCLP herbicides according to USEPA SW-846 Method 1311/8151A. Samples were prepared for analysis using extraction techniques. TCLP herbicide extracts were extracted using a separatory funnel liquid-liquid extraction technique according to USEPA SW-846 Method 1311/3510C for solid IDM samples. The samples were extracted with diethyl ether and then esterified with diazomethane. The derivatives were determined by gas chromatography with an electron capture detector (GC/ECD). The results were reported as acid equivalents. Sample concentrations were confirmed on dissimilar columns.

TCLP Metals: Aqueous and solid IDM samples were analyzed for TCLP metals using a combination of the following methodologies: inductively coupled plasma (ICP) and cold vapor atomic absorption (CVAA). Aqueous IDM samples were extracted using the USEPA SW-846 Method 1311. The final liquid extract was separated from the sample material and combined with the initial liquid phase (if applicable). The sample TCLP extract was then treated as an aqueous sample for analysis for TCLP metals. Brief discussions of these procedures and methodologies are presented in the prior section.

Corrosivity as pH: Aqueous IDM samples were analyzed for corrosivity as pH using USEPA SW-846 Method 9040C. A sample pH was directly measured electrometrically using either a glass electrode in combination with a reference potential or a combination electrode.

BOD: Aqueous IDM samples were analyzed for BOD using USEPA MCAWW Method 405.1. A seeded sample, or an appropriate dilution, was incubated for 5 days at 20 degrees Celsius in the dark. The dilution water or seeded dilution water was added as a buffered salt solution to minimize oxygen uptake. The reduction in dissolved oxygen concentration during the incubation period yields a measure of the biological oxygen demand.

COD: Aqueous IDM samples were analyzed for COD using USEPA MCAWW Method 410.1. Organic and oxidizable inorganic substances were oxidized by potassium dichromate in 50% sulfuric acid solution at reflux temperature. Silver sulfate was used as a catalyst and mercuric sulfate was added to remove chloride interference. The excess dichromate was titrated with standard ferrous ammonium sulfate using orthophenanthroline ferrous complex as an indicator.

QUALITY ASSURANCE/QUALITY CONTROL EVALUATION

The project quality assurance and quality control criteria to perform characterization and remediation activities at eleven Solid Waste Management Units (SWMUs) and Areas of Concern at Radford Army Ammunition Plant (RFAAP) are based on *RFAAP Final Master Work Plan* (MWP) (URS, 2003) as specified in MWP Addendum 019 (Shaw, 2007). The MWP and Addendum 019 were implemented through the integration of well-defined quality control elements for activities associated with the task assignment. The quality control criteria defined for sampling and analysis activities were developed in conjunction with specifications contained in *USACE EM200-1-3, Requirements for the Preparation of Sampling and Analysis Plans*, (USACE, 2001), *DoD Quality Systems Manual for Environmental Laboratories, Final Version 3* (DoD, 2006a), *USEPA Office of Solid Waste and Emergency Response Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), Update IIIB* (November, 2004), *USEPA Methods for the Chemical Analysis of Water and Wastes* (March, 1983), and *DoD Perchlorate Handbook* (March, 2006b).

Table A-3 outlines the data quality indicators as to their definitions, project goals, sampling and analytical assessments. Data quality was assessed through the evaluation of sampling activities and field measurements associated with the chemical analytical data in order to assess the reliability of the chemical analyses and the accuracy and precision of information acquired from the laboratory.

Table A-3
RFI Data Quality Indicators

Data Quality Indicator	Definition	Goal	Sampling Assessment	Analytical Assessment
Precision	Quantitative measure of the variability of a group of measurements in comparison to the average value	Low relative percent difference	Duplicate samples	MS/MSD or lab sample duplicate; Field sample duplicate
Accuracy	Bias in a measurement system	Low bias	Blank contamination	Analysis spike results (LCS, MS, MSD)
Representativeness	Degree to which the measured results accurately reflect the medium being sampled	100%	Holding times, blanks, associated documentation	Inferred from accuracy, precision, and completeness evaluation
Completeness	Percentage of measurements which are judged to be usable	≥90%	Records review	Data validation
Comparability	Qualitative parameter expressing the confidence with which one data set can be compared with another	High	Work plans, quality documents	Analytical methods
Sensitivity	Quantitative measure of the level of detection and quantitation.	High	Review of analytical method or procedures and instrumentation	Analysis of MDLs and MRLs per analyte, analytical method, and matrix

Review of Documentation

The following documentation was required by the field investigation program in order to provide a quality assessment of data collected during routine investigative activities:

- **Field Logbooks:** Hardback logbooks with numbered pages were used to log daily activities, and data collected during the course of field activities. Designated logbooks were also used to record calibration records and equipment maintenance as they were performed. Entries into field logbooks were evaluated for completeness and accuracy.
- **Field Parameter Table:** Documentation of collected samples was provided to the laboratory on a spreadsheet developed by Shaw specifically for USACE investigations. Field Parameter Tables were electronically generated based on information recorded in field logbooks and Chain-of-Custody for every sample, including QC samples. The completed forms contained the required information for encoding chemical data into Environmental Restoration Information System (ERIS) database.
- **Chain-of-Custody:** Samples were collected and relinquished under stringent Chain-of-Custody protocols as specified in the project MWP. A review of the Chain-of-Custodies identified transcription errors that were corrected by drawing a single line through the incorrect information and subsequently correct information was supplied, dated, and initialed.
- **Sample Tracking Table:** Documentation of collected samples was recorded in an electronic sample tracking table as a tool to track project status. Field entries included the field sample identification, sample depth (where applicable), date collected, laboratory ID, deliverable due dates, and requested laboratory analyses. The status of completeness was tracked from work planning stage through data validation completion.

Sampling activities were performed in compliance with standard operating procedures (SOPs) and each individual performing sampling was aware of the requisite protocols for collection of environmental samples.

Data Reporting

Data packages were provided to Shaw in Shaw Alliance Level 4 CLP-like deliverables with electronic data deliverable files from the laboratory. Detected target compound values above the reporting limit and within the acceptable calibration range were reported as determined to no more than three significant figures. Target analytes detected below the lower calibration standard or the reporting limit (whichever was greater) and above the method detection limit were reported as estimated values "J." Appropriate data qualifiers were applied during validation process and recorded in an electronic database.

Data Reduction and Validation

Data validation determines the acceptability or unacceptability of the data quality based on a set of pre-defined criteria. Data validation is defined as the systematic process for reviewing a data package against a set of criteria to provide assurance that the data is adequate for its intended uses. These criteria depend upon the type(s) of data involved and the purpose for which data are collected. The intended use of the data and the associated acceptance criteria for data quality was identified before the data collection effort began. Both the organic and inorganic chemical data (except for the waste characterization and natural attenuation data) were validated. The data were validated in accordance with *RFAAP Final Master Work Plan* (URS, 2003) QAP requirements, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 3* (DoD, 2006a), *USEPA Office of Solid Waste and Emergency Response Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), Update IIIB* (November, 2004), *USEPA Methods for the Chemical Analysis of Water and Wastes* (March, 1983), *DoD Perchlorate Handbook* (March, 2006b), and laboratory SOPs. The data qualifier scheme was consistent with USEPA Region III conventions using the *USEPA Region III Modifications to National Functional Guidelines for Inorganic Data Review* (USEPA, 1993b), *USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review Multi-media, Multi-concentration* (USEPA, 1994c), and the *USEPA Region III Dioxin/Furan Data Validation Guidance* (USEPA, 1999d) as appropriate.

Data packages were validated to ensure compliance with specified analytical, Quality Assurance/Quality Control (QA/QC) requirements, data reduction procedures, data reporting requirements, and required accuracy, precision, and completeness criteria. This includes (as applicable), but is not limited to:

- Sample temperature, preservation, and holding times.
- Instrument performance check (for GC, GC/MS, LC/MS).
- Calibration (initial and continuing).
- Blanks (calibration, preparatory, rinse, trip).
- Matrix spike and spike duplicate recoveries.
- Laboratory and field sample duplicate pairs.
- Surrogate spike recoveries (for organics).
- Laboratory control samples.
- Interference check sample (for metals).
- Serial dilution (for metals).
- Internal standards and retention times (for GC, GC/MS, LC/MS).
- Quantitative verification.

Results were assessed for accuracy and precision of laboratory analysis to identify the limitations and quantity of data. The data validation reports are contained in **Appendix A-3**. The quality of the data collected in support of the sampling activity was considered acceptable, unless qualified rejected "R" during the validation process. Samples qualified "B" for blank contamination were considered non-detect at the MRL or level of blank contamination, whichever was greater. Samples qualified "J", "UJ", "L", "UL", or "K" were considered acceptable as estimated or non-detect estimated.

Data Review

Data obtained from both the laboratory and data validation were reviewed by the Shaw Project Chemist to assess whether the project-specific data quality objectives, as defined in the associated MWP, were met.

Data Quality Objectives

Data quality objectives were developed concurrently with the Work Plan to ensure: (1) the reliability of field sampling, chemical analyses, and physical analyses; (2) the collection of sufficient data; (3) the quality of data generated was acceptable for its intended use; and (4) valid assumptions could be inferred from the data. Attainment of data quality objectives was assessed through evaluation of data collected using the following data quality indicators:

- **Precision** - a quantitative measure of the variability of a group of measurements in comparison to the average value.
- **Accuracy** - the bias in a measurement system.
- **Representativeness** - the degree to which the measured results accurately reflect the medium being sampled. Representativeness will be assessed based on accuracy, precision, and completeness.
- **Completeness** - the percentage of measurements which are judged to be useable.
- **Comparability** - defined as a qualitative parameter expressing the confidence with which one data set can be compared with another.
- **Sensitivity** - describes the method detection, quantitation, and reporting limits. It also may be expressed as the slope of the analytical curve (intensity verses concentration).

Data quality was assessed through the evaluation of sampling activities and field measurements associated with the chemical data in order to verify the reliability of the chemical analyses and the accuracy and precision of information acquired from the laboratory.

Precision: Method or laboratory precision performed by the laboratory was evaluated during the validation process. Overall sampling or field precision was evaluated during the data review process. Precision is measured by calculating and evaluating the relative percent difference (RPD) between the results of field or laboratory duplicate pairs. The RPD is calculated by the following equation:

$$RPD = \frac{/XA-XB/ * 100}{XM}$$

Where:
XA and XB are duplicate analyses, and
XM is the average value [(XA + XB)/2] of the duplicate analyses.

The RPD was calculated for those analytes which were detected at levels exceeding the method detection limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Analytical results were qualified as estimated (J) for RPDs exceeding criteria for both the sample and its duplicate pair.

Laboratory duplicate sample determinations were used to demonstrate acceptable method precision by the laboratory at the time of analysis and evaluated. Laboratory precision was performed either on the sample and its duplicate pair or the matrix spike and its spike duplicate pair. Duplicate analyses were performed to generate data in order to assess the long-term precision of the analytical method on various matrices. RPDs must be within established control limits.

- **Laboratory Duplicate Analysis:** Laboratory duplicate pairs (dupe) or laboratory spiked duplicate pairs (MSDs) were evaluated for the SWMU 48 and SWMU 49 samples. Laboratory duplicate pairs or laboratory spiked duplicate pairs were within specified precision criteria for each parameter and/or compound except for those compounds listed in the **Table A-4**. Analytical results were qualified as estimated (J) for RPDs exceeding criteria for where the associated compounds were detected, unless qualified for other QC non-conformances. While these parameters were qualified estimated due to the high RPDs, the data was still considered useable, the precision data quality goal was met, and the qualified data did not impact the data quality for the RFI. Further discussion may be found in the data validation reports located in **Appendix A-3**.

Table A-4
Laboratory Duplicate Analysis

Field ID	Analyte	QC Type	Val Qual.	Comments
49SS04	Delta-BHC	MSD	UJ	High RPD in MS/MSD
49SS04	4,4'-DDT	MSD	UJ	High RPD in MS/MSD
49SS04	Methoxychlor	MSD	UJ	High RPD in MS/MSD

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

- **Field Duplicate Analysis:** Field duplicates were collected during the RFI on a 10% frequency per matrix to identify the cumulative precision of the sampling and analytical process, which includes the homogenization of soil samples. The RPD was calculated for those analytes that were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. For where values exceeding calibration range, the diluted values were evaluated. If one of the duplicate pair was non-detect and other <MRL, then the field duplicate was not evaluated. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD (35% RPD for metals) for the aqueous and solid matrix sample pairs. Field precision frequency was conducted on a site-wide basis. Field duplicate pairs were within specified precision criteria for each parameter and/or compound except for those compounds listed in the **Table A-5**. Analytical results were qualified as estimated "J" for exceeding criteria. While these noted parameters were qualified estimated due to the high RPDs, the data was still considered useable, the precision data quality goal was met, and the qualified data did not impact the data quality for the RFI.

Table A-5
Field Duplicate Analysis

Field ID	Duplicate Pair	Analyte	Val Qual.	Comments
49SS05	TMSS05	Aroclor 1254	J	High RPD
49MW01A	TMMW01AD	OCDF	J	High RPD

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise.

Accuracy: Accuracy is the measure of bias in a system. The accuracy of the results is measured by percent recovery (%R). Laboratory analytical accuracy was assessed through the use of laboratory blanks (method and calibration), rinse blanks, trip blanks, laboratory control samples (LCSs), and matrix spike samples (MSs). Trip blanks were not required for soil samples, but were collected with associated rinse blank samples and evaluated. Laboratory analytical accuracy was reviewed during the validation of data. Sampling accuracy was assessed by evaluating blank contamination and the impact of contaminant contributions originating from non-point sources, such as field sampling equipment decontamination procedures, or laboratory contamination. QC samples evaluated for this assessment included equipment blanks and laboratory method or preparatory blanks. The data validation qualifiers would be applied for analytical non-conformances as outlined in the USEPA Region III validation guidance. Accuracy was measured as percent recovery by the following equation:

$$\%R = \frac{(\text{test value} - \text{spiked value}) * 100}{(\text{true value amount spiked})}$$

The test value is the concentration of the LCS, MS, or MSD determined from analysis. The spiked value for the MS and MSD is the original un-spiked sample concentration and for the LCS is zero. The true value is the concentration of amount spiked into the MS or MSD and the true concentration for the LCS.

Method and calibration blanks, rinse blanks, trip blanks, laboratory control samples, and matrix spikes were evaluated and discussion follows.

Method and Calibration Blanks: A method blank also known as a preparatory blank is a volume of analyte-free water or soil that is processed through the entire analytical scheme (i.e., extraction, digestion, concentration, and analysis) as with the actual samples. Method blanks monitor potential laboratory-induced contamination. Results were qualified "B" for blank contamination by the laboratory and/or through the data validation process. In accordance with USEPA Region III data validation guidelines, reported sample results were considered "non-detect" and qualified with the letter "B" if the detected sample concentration was within 5 times (10 times for common laboratory contaminants: methylene chloride, acetone, 2-butanone, OCDD, OCDF, and common phthalate esters) the concentration in the associated method blank. The method blank contamination assessment was evaluated during the data validation process and may be found in the data validation reports located in **Appendix A-3**. Method blanks were calculated and compared against the same matrix environmental samples on a batch specific basis. Method (preparatory) blanks were reported in ng/L, mg/L, or µg/L units for aqueous matrices and pg/g, mg/kg, or µg/kg for solid matrices. No unit conversions were necessary for method blanks since they were treated in the same manner as the samples. Calibration blanks were also compared against the environmental samples for select parameters. Calibration blanks are aqueous samples and were reported in aqueous units. Performing blank assessments for solid matrix samples, action levels were calculated and expressed in soil units pg/g, µg/kg, or mg/kg from the given aqueous rinse blank or calibration blanks concentrations to be compared against actual solid sample concentrations. This conversion is dependent upon the method performed, sample amounts used, and final digestate or extract volumes used during the analytical analysis. Action levels were based upon 100% solids and 1x dilution factor and adjusted for each sample as appropriate.

- **Method and Calibration Blank Analysis:** For aqueous matrices, the method and calibration blanks were non-detect for all target parameters and/or compounds of interest except for aluminum, antimony, copper, iron, magnesium, nickel, potassium, selenium, sodium, thallium, lead, mercury, chloroform, methylene chloride, 1,2,3,4,6,7,8-HpCDD, OCDD, 2,3,7,8-TCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, 2,3,4,7,8-PeCDF, OCDF, Total HpCDDs, Total TCDFs, Total HxCDFs, and Total HpCDFs for select sample delivery groups (SDGs). For solid matrices, the method blanks were non-detect for all target parameters and/or compounds of interest except for antimony, copper, lead, nickel, potassium, selenium, sodium, silver, thallium, zinc, mercury, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF for select SDGs. The "B" flagged sample data from the evaluation of QC blanks is presented in **Table A-6**. Analytical results qualified "B" were considered non-detect at the MRL or level of contamination, whichever was greater. Samples meeting the USEPA Region III condition were qualified. While these noted parameters were qualified "B" due to the blank contamination, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. For each of the other noted analytes not presented in **Table A-6**, the samples were either non-detect for that compound or greater than the blank action level. Further discussion as to method and calibration blanks may be found in the data validation reports located in **Appendix A-3**.

Rinse Blanks: The blank contamination assessment was performed to assess the impact of contaminant contributions originating from non-point sources, such as field sampling equipment decontamination procedures. Rinse blanks were intended to identify cross-contamination between samples as a result of sampling equipment decontamination procedures. Rinse blanks were collected by pouring the required volume of de-ionized, organic-free water over the equipment and collecting the water in the appropriate sample containers. Rinse blanks were performed at a rate of one per 20 samples collected or 5% per matrix per sampling technique. The rinse blank results were evaluated to ascertain the efficiency of decontamination and assess the potential for cross-contamination. Rinse blanks were analyzed for the analytes of concern for the RFI. In accordance with USEPA Region III data validation guidelines, the detected concentration in the sample were qualified "B" for blank contamination and was considered non-detect if the sample concentration was within five times (10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride, OCDD, OCDF, and phthalate esters) the concentration in the associated equipment blank. Rinse blanks are aqueous samples and were reported in ng/L, µg/L, or mg/L units. Performing blank assessments for solid matrix samples, action levels were calculated and expressed in soil units pg/g, µg/kg, or mg/kg from the given aqueous rinse blank concentrations to be compared against actual solid sample concentrations. This conversion is dependent upon the method performed, sample amounts used, and final digestate or extract volumes used during the analytical analysis. Action levels were based upon 100% solids and 1x dilution factor and adjusted for each sample as appropriate.

Table A-6
B-Qualified Data Summary

Field ID	Analyte	Result	LQ	Units	Field ID	Analyte	Result	LQ	Units
49MW01A	1,2,3,4,6,7,8-HpCDF	1.00	A	PG/G	49SS05	Potassium	776		MG/KG
49MW01A	OCDF	1.90	A	PG/G	49SS05	Antimony	0.73	J	MG/KG
49MW01A	Sodium	460	J	MG/KG	49SS05	Mercury	0.072	J	MG/KG
49MW01B	1,2,3,4,6,7,8-HpCDF	1.40	A	PG/G	49SS04	2,3,7,8-TCDF	0.413	A	PG/G
49MW01B	OCDF	3.60	A	PG/G	49SS04	2,3,4,7,8-PeCDF	0.252	A, EMPC	PG/G
49MW01B	Sodium	288	J	MG/KG	48MW1	Potassium	1950	J	UG/L
49MW01C	1,2,3,4,6,7,8-HpCDF	0.883	A	PG/G	48MW3	Lead	3.5	J	UG/L
49MW01C	OCDF	2.00	A	PG/G	48MW3	Sodium	3660	J	UG/L
49MW01C	Sodium	238	J	MG/KG	48MW4	Lead	2.1	J	UG/L
49SS02	Potassium	597		MG/KG	48MW05	Antimony	6.3		UG/L
49SS02	Sodium	78.4	J	MG/KG	48MW06	Lead	8.4		UG/L
49SS02	Antimony	0.86	J	MG/KG	48MW06	Antimony	6.9		UG/L
49SS03	Potassium	538		MG/KG	48MW07	Lead	2.1	J	UG/L
49SS03	Sodium	73.4	J	MG/KG	48MW07	Potassium	2910	J	UG/L
49SS03	Antimony	0.63	J	MG/KG	48MW07	Sodium	2470	J	UG/L
49SS04	Antimony	1.5	J	MG/KG	48MW07	Copper	1.2	J	UG/L
49SS04	Mercury	0.058	J	MG/KG					

J = A = Indicates an estimated value for estimating a concentration <MRL and ≥ MDL.
EMPC = Estimated Maximum Possible Concentration.

- **Rinse Blank Analysis:** Rinse blank RB083007 (low-flow pump) applies to the groundwater samples collected at SWMU 48 and SWMU 49. Rinse blank 072407R and 072507R apply to the surface soil samples collected at the SWMU 48 and SWMU 49. These rinse blanks were taken from the stainless steel bowl and trowel used to collect the field soil samples. For rinse blank RB083007, all analytes were non-detect for all target parameters and/or compounds of concern except for potassium and sodium. For rinse blank 072407R, all analytes were non-detect for all target parameters and/or compounds of concern except for lead, magnesium, potassium, and sodium. For rinse blank 072507R, all analytes were non-detect for all target parameters and/or compounds of concern except for potassium, sodium , mercury, 1,2,3,4,6,7,8-HpCDF, OCDF, and Total HpCDFs. The "B" flagged sample data from the evaluation of QC blanks is presented in **Table A-6**. Analytical results qualified "B" were considered non-detect at the MRL or level of contamination, whichever was greater. Samples meeting the USEPA Region III condition were qualified. While these noted parameters were qualified "B" due to the blank contamination, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. For each of the other noted analytes not presented in **Table A-6**, the samples were either non-detect for that compound or greater than the blank action level. Further discussion as to rinse blanks may be found in the data validation reports located in **Appendix A-3**.

Trip Blanks: Trip blanks were prepared by the project contract laboratory and accompanied the samples requiring VOC analysis. One trip blank was transported with each VOC sample cooler to the laboratory for each day of sampling. The trip blanks were prepared by pouring the required volume of de-ionized, organic-free water into appropriate sample containers in the laboratory. The trip blanks were analyzed for the TCL VOCs. The trip blank results were used to assess the potential incidental contamination due to sample transport before, during, and after field operations (i.e., exposure to air) and/or contamination due to the sample container. In accordance with USEPA Region III data validation guidelines, the detected concentration in the sample was considered a "non-detect" (i.e., qualified "B" for blank contamination) and was excluded from consideration if the sample concentration was within five times (10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride) the concentration in the associated trip blank. Trip blanks are aqueous samples and were reported in µg/L units. Performing blank assessments for solid matrix samples, action levels were calculated and expressed in soil units µg/kg from the given aqueous rinse blank VOC concentrations to be compared against actual solid sample concentrations. This conversion is dependent upon the method performed, sample amounts used, and final volumes used during the analytical analysis. Action levels were based upon 100% solids and 1x dilution factor and adjusted for each sample as appropriate.

- **Trip Blank Analysis:** The trip blank TB082907 applies to the ground water samples collected on 08/29/07. The trip blank TB083007 applies to the ground water samples collected on 08/30/07. The trip blank TB080907S applies to the surface soil samples collected on 08/09/07. The trip blanks TB072407S, TB072407W, TB072507S, and TB072507W apply to the surface soil samples collected on 07/19/07. For trip blanks TB082907, TB083007, TB080907S, TB072407S, TB072407W, TB072507S, and TB072507W all target analytes were non-detect for all parameters and/or compounds of concern. The "B" flagged sample data from the evaluation of QC blanks is presented in **Table A-6**. Analytical results qualified "B" were considered non-detect at the MRL or level of contamination, whichever was greater. Samples meeting the USEPA Region III condition were qualified. While these noted parameters were qualified "B" due to the blank contamination, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. For each of the other noted analytes not presented in **Table A-6**, the samples were either non-detect for that compound or greater than the blank action level. Further discussion as to trip blanks may be found in the data validation reports located in **Appendix A-3**.

Laboratory Control Samples: The LCSs were analyzed to assess general method performance by the ability of the laboratory to successfully recover the target analytes from a control matrix. The LCS is similar in composition to the method blank. For aqueous analyses, spiked analyte-free reagent water was used. For soil analyses, a purified solid matrix (e.g., sand, sodium sulfate, or other purified solid) was used. The LCSs were spiked with single-component target analytes before it is carried through the preparation, cleanup, and determinative procedures. LCSs were performed at a rate of one per preparation batch per matrix. When samples were not subjected to a separate preparatory procedure (i.e., purge and trap VOC analyses, or aqueous Hg analysis), the CCV may have been used as the LCS, provided the CCV acceptance limits were used for evaluation.

- **Laboratory Control Sample Analysis:** The results of the LCS were evaluated, in conjunction with other QC information during the data validation process to ascertain the acceptability of the data generated for that batch of samples. The LCS samples were evaluated for each SDG and are matrix specific. For LCS samples, USACE DoD QSM and laboratory criteria limits were used for each method in the validation process. The aqueous LCS samples were within specified criteria for all target parameters and/or compounds of concern except for dalapon, 1,3-dichlorobenzene, 1,4-dichlorobenzene, endin aldehyde for select SDGs. The solid LCS samples were within specified criteria for all target parameters and/or compounds of concern except for chloromethane, vinyl chloride, endrin aldehyde, and dicamba for select SDGs. Data qualifiers were applied as appropriate to associated samples based upon these outliers. Further details may be found in the data validation reports located on a CD at the back of this report. While qualification was applied due to high or low LCS recoveries, the data was still considered useable (except for dalapon – see completeness discussion), the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI.

Matrix Spikes: The MS was used to assess the performance of the method as applied to a particular project matrix. A MS is an environmental sample to which known concentrations of certain target analytes have been added before sample manipulation from the preparation, cleanup, and determinative procedures have been implemented. The original field sample was mixed or shaken to ensure homogeneous fractions when allowed by the method. MSs were performed at a rate of one per preparation batch or 5% whichever was more frequent per matrix. The results of the MS are evaluated, in conjunction with other QC information during the validation process to assess the effect of the matrix on the bias of the analysis. If a matrix spike duplicate (MSD) was analyzed, it was also evaluated.

- **Matrix Spike and Matrix Spike Duplicate Analysis:** The results of the MS/MSD were evaluated, in conjunction with other QC information during the data validation process to ascertain the acceptability of the data generated for that batch of samples. Only spiked project site SWMU 48 and SWMU49 samples were evaluated. For MS/MSD samples, USACE DoD QSM and laboratory criteria limits were used for each method in the validation process. For aqueous matrices, MS and MSD samples were within specified criteria for all target parameters and/or compounds of interest except for endrin aldehyde for spiked samples 48MW07 and 48MW3 for select SDGs. For solid matrices, MS and MSD samples were within specified criteria for all target parameters and/or compounds of interest except for alpha chlordane, gamma chlordane, dieldrin, 4,4'-DDE, endrin, endrin ketone, endosulfan II, and methoxychlor for spiked sample 49SS04; antimony, arsenic, cadmium, and selenium for sample 48MW3; 1,2-dichlorobenzene, 1,3-dichlorobenzene, and hexachloroethane for sample 49MW01A; and endrin aldehyde for spiked sample TMMW01AD. The spiked samples were qualified as applicable to USEPA Region III guidance. In some cases, the sample amount was greater than the amount spiked or the associated sample was non-detect for a high recovery; therefore, no qualifiers were required. Further details may be found in the data validation reports located on a CD at the back of this report. While qualification was applied due to high or low MS or MSD recoveries in some cases, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI.

Completeness: Completeness is a measure of the amount of information that must be collected during the field investigation to allow for successful achievement of the objectives. An adequate amount and type of data must be collected for conclusions to be valid. Missing data may reduce the precision of estimates or introduce bias, thus lowering the confidence level of the conclusions. While completeness has been historically presented as a percentage of the data that is considered usable, this does not take into account critical sample locations or critical analytical parameters.

The amount and type of data that may be lost due to sampling or analytical error cannot be predicted or evaluated in advance. The importance of lost or suspect data will be evaluated in terms of the sample location, analytical parameter, nature of the problem, decision to be made, and the consequence of an erroneous decision. Critical locations or parameters for which data is found to be inadequate will either be re-sampled and re-analyzed or the data will be appropriately qualified based on the decision of the project QA manager. The completeness goal percentage of usable data is set at 90%.

Sampling completeness was assessed through evaluation of the total number of samples proposed for collection in the work plan versus the actual number of samples collected and analyzed. Analytical completeness was assessed by comparing the number of useable data points collected to the total number of data points generated. Completeness is calculated using the following equations:

$$\%\,\text{Sampling Completeness} = \frac{\text{No. of actual samples collected}}{\text{No. of proposed samples}}$$

$$\%\,\text{Analytical Completeness} = \frac{\text{No. of usable data}}{\text{No. of requested analyses}}$$

For the purposes of this report, unusable data are defined to include rejected data points ("R" qualifier).

- **Completeness Analysis:** Seven surface soil samples, eight groundwater samples, three field duplicate samples (two surface soil and one groundwater), two project wide IDM samples (one aqueous and one solid), eight trip blanks, and three rinse blanks were proposed for collection at the SWMU 48 and SWMU 49 as specified in MWP Addendum 019 (Shaw, 2007). The field duplicates, rinse blanks, and IDM samples were collected on a site-wide basis. All samples were collected and analyzed for the parameters as specified in MWP Addendum 019. The resulting sampling completeness quotient is 100% and meets the pre-defined goals of 90% for the sampling program. The overall analytical percent completeness was assessed by parameter group and matrix for the samples collected. Analysis of the all samples resulted in the generation of 4506 out of 4,511 data points deemed to be useable, generating an overall analytical completeness quotient of 99.9%. Dalapon was rejected for the samples 48MW05, 48MW06, and 48MW07 based upon no recovery found in the LCS resulting in an analytical completeness percentage of 98.7% (219 out of 222 data points) for chlorinated herbicides. All other completeness scenarios for all other parameter groups and/or matrices were 100%. The completeness percentages met the pre-defined goal of 90% for all SWMU 48 and SWMU 49 sampling events and did not impact the overall RFI.

Representativeness: Representativeness is a measure of the degree to which the measured results accurately reflect the medium being sampled. It is a qualitative parameter that is addressed through the proper design of the sampling program in terms of sample location, number of samples, and actual material collected as a "sample" of the whole.

Sampling protocols were developed to assure that samples collected are representative of the media. Field handling protocols (e.g., storage, handling in the field, and shipping) were designed to protect the representativeness of the collected samples. Proper field documentation and QC inspections were used to establish that protocols were followed and that sample identification and integrity was maintained and met pre-defined goals.

Comparability: Comparability is the confidence with which one data set can be compared to another. Comparability was controlled through the use of SOPs that have been developed to standardize the collection of measurements and samples and approved analytical technique with defined QC criteria. USEPA-approved methodologies were used in providing laboratory analytical support for this project. Laboratory SOPs were developed from these methods. Consistent and proper calibration of equipment throughout the field exercises, as described in MWP Addendum 019 and the MWP (URS, 2003), will assist in the comparability of measurements. Field documentation and QA audits were used to establish that protocols for sampling and measurement follow appropriate SOPs and met pre-defined goals.

Levels of Concern

An integral part of the identification of DQOs is the establishment of LOCs. These levels were compared with analytical PQLs and MDLs prior to analytical method selection to ensure the method was capable of addressing project DQOs, preclude occurrence of false negative issues, and assess best available technology limitations. Although LOCs selected as potential concerns may not necessarily reflect RFI-specific objectives, they were developed to ensure that the chosen analytical methods have detection limits sensitive enough to achieve compliance with appropriate site-specific screening levels or other specified criteria for soil. The LOCs for the SWMU 48 and SWMU 49 are based on soil applicable or relevant and appropriate requirements (ARARs) and To-Be-Considered (TBC) guidance and are as follows:

The soil and sediment ARAR/TBC guidance includes:

- RFAAP Facility-Wide Background inorganic soil concentrations (IT, 2001).
- USEPA Region III industrial and residential soil risk based concentrations (October, 2007).

The groundwater and surface water ARAR/TBC guidance includes:

- USEPA Region III tap water risk based concentrations (October, 2007).
- USEPA Drinking Water Maximum Contaminant Levels (August, 2006).

Sensitivity (quantitation, reporting, and detection limits): The term sensitivity is used broadly to describe the method detection, quantitation, and reporting limits established to meet project-specific data quality objectives; and not limited to the definition which describes the capability of a method or instrument to discriminate between measurement responses. The method detection limits (MDLs) and the practical quantitation limits (PQLs) published within USEPA methods are based upon a reagent water matrix, and are not necessarily reflective of typical sample matrices; therefore, care was taken in establishing limits for laboratory analysis. Methods were selected based upon their sensitivity, technological, and economical considerations while keeping the screening values and available methodology in mind and were sufficient in meeting the given levels of concern (LOCs).

The laboratory generated PQLs and MDLs were compared at the onset of the project. The MDL is the minimum concentration of an analyte that can be measured and reported with a 99% confidence that the analyte is above zero and is identified from the analysis of a sample in a given matrix containing the analyte. The MDLs were derived by the method based upon 40 CFR Chapter 136 Appendix B. The MDL values differ and change periodically because each MDL is laboratory, instrument, analyst, matrix, and method specific. Therefore, the more conservative MDLs were reported where there were multiple instruments and or studies performed. The PQLs are the values at which the laboratory has demonstrated the ability to reliably quantitate the target value of an analyte for the method performed and are based upon the lowest calibration standard used for the initial calibration curve or the lowest verification standard performed. PQLs must be at least 3 times the MDL.

The laboratory used a method reporting limit (MRL) or sample quantitation limit to report non-detects for each sample. The MRL is the threshold value below which the laboratory reports non-detected values as "U," "ND," or "<" and will vary for each sample based upon matrix, dilution, sample volumes, percent moistures (for solids), and the method performed.

Data was calculated over a linear range and the resulting highest concentration within the linear range represents the upper quantitation limit. Each target compound for every sample was reported at a specific level. Any target analytes detected above the MDL, but less than the MRL or 3 times the MDL (whichever was greater), were reported as estimated values "J." Target analytes detected above the upper calibration standard were diluted and analyzed within established calibration windows or qualified. The units used for aqueous samples were ng/L, µg/L, or mg/L and for solid samples were pg/g, µg/kg, or mg/kg.

- **SWMU 48 and SWMU 49 Sensitivity Analysis:** The method sensitivities (i.e., MDLs) were compared to the levels of concern for the samples collected. Comparing the groundwater samples against the USEPA Region III tap water RBCs, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2-dichloroethane, bromodichloromethane, carbon tetrachloride, chloroform, dibromochloromethane, tetrachloroethene, trichloroethene, vinyl chloride, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, 1,4-dichlorobenzene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, bis(2-chloroethyl)ether, bis(chloroisopropyl)ether, hexachlorobenzene, hexachlorobutadiene, nitrobenzene, n-nitrosodi-n-propylamine, pentachlorophenol, aldrin, dieldrin, heptachlor epoxide, toxaphene, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, PCB-1260, nitroglycerine, MCPA, MCPP, aluminum, antimony, arsenic, selenium, and thallium had MDLs greater than the given tap water RBCs for select samples. Comparing the groundwater samples against the Drinking Water MCLs, hexachlorobenzene, pentachlorophenol, aluminum, selenium, and thallium had MDLs greater than the given MCLs for select samples. The samples had higher sensitivity levels due to the given available USEPA method sensitivity capabilities as well as any required sample dilutions and/or sample volume adjustments due to either high analyte concentration and/or matrix interferences. Though an uncertainty may be present with these sensitivity gaps between the MCLs and tap water RBCs to the MDLs for these compounds, it is unlikely that they present an impact to the decisions regarding the RFI.

- Comparing the surface soil samples against the USEPA Region III residential RBCs, cadmium and thallium had MDLs greater than the given residential RBCs for select samples. Comparing the surface soil samples against the USEPA Region III industrial RBCs, all target compound MDLs were less than the given industrial RBCs for all samples. Comparing the surface soil samples against site-wide metals background concentrations, cadmium had MDLs greater than the given site-wide metals background for select samples. The samples had higher sensitivities due to the given available USEPA method sensitivity capabilities as well as percent solid adjustments for dryness, and any required sample dilutions or sample volume adjustments due to either high analyte concentration and/or matrix interferences. Though an uncertainty may be present with these sensitivity gaps between the residential RBCs, industrial RBCs, and background concentrations to the MDLs for these compounds, it is unlikely that they present an impact to the decisions regarding the RFI.

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F52208

DATE: October 29, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3510C/8270C. The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Surrogate Spikes
	X	Internal Standards
X		Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

10/29/07
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F52208

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For semivolatile (SVOC) and polynuclear aromatic hydrocarbons (PAH) compounds, the samples are cooled @4°C ± 2°C for aqueous samples with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 8/30/07, extracted for SVOCs on 9/6/07, extracted for PAHs by SIM on 9/6/07, analyzed for SVOCs on 9/15/07, and analyzed for PAHs by SIM on 9/20/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 9/14/07 using instrument GCMSR. Target compounds hexachlorocyclopentadiene (18.08%), 2,4-dinitrophenol (38.83%), and 4,6-dinitro-2-methylphenol (18.05%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using second order regression, and had correlation coefficients >0.995; therefore no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- Initial calibration for the PAHs-SIM was performed on 9/20/07 using instrument GCMSR, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Naphthalene (r=0.9986) and dibenzo(a,h)anthracene (r=0.9993) were quantified using second order regression with correlation coefficients >0.995. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the SVOC initial calibration verification performed on 9/14/07 @1502 using instrument GCMSR, bis(2-chloroethoxy)methane (24.6%), 4-chloroaniline (26.6%), and 3-nitroaniline (29.7%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 9/15/07 @1225 using instrument GCMSR, all criteria were met for all target compounds. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the PAH-SIM initial calibration verification performed on 9/20/07 @1436 using instrument GCMSR, all criteria were met for all target compounds. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PAH-SIM continuing calibration performed on 9/20/07 @1520 using instrument GCMSR, all criteria were met for all target compounds. No qualifiers were applied. All samples were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/15/07	OP22221-MB	All SVOC target <½MRL	NA	NA	None
9/20/07	OP22222-MB	All PAH SIM target <½MRL	NA	NA	None
9/15/07	RB083007	All SVOC target <½MRL	NA	NA	None
9/20/07	RB083007	All PAH SIM target <½MRL	NA	NA	None

NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-2 and Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:
2-Fluorophenol (14-62%) – (DoD QSM = 20-110%)
Phenol – d5 (10-40%) – (DoD QSM = 10-115%)
2,4,6-Tribromophenol (33-118%) – (DoD QSM = 40-125%)
Nitrobenzene-d5 (42-108%) – (DoD QSM = 40-110%)
2-Fluorobiphenyl (40-106%) – (DoD QSM = 50-110%)
p-Terphenyl – d14 (39-121%) – (DoD QSM = 50-135%)

- The MS had a high 2-fluorophenol (63.0%) recovery, while the MS and MSD had high phenol-d5 (56.0%, 56.0%) recoveries. The unspiked sample surrogate recoveries met criteria, no qualifiers were applied.

- All other field samples met surrogate recovery criteria. No qualifiers were applied.

VII-Internal Standards
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table D-2 and Table D-6 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22221-BS was used as the aqueous LCS for the SVOC analysis on 9/15/07. 1,3-Dichlorobenzene (37%) and 1,4-dichlorobenzene (39%) had recoveries below criteria. The results for these two compounds in the associated samples have been qualified "L/UL" as estimated. All other compounds were within criteria. All samples were analyzed in conjunction with this LCS.

- Sample OP22222-BS was used as the aqueous LCS for the PAH-SIM analysis on 9/20/07. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-6 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 50MW01 was used for the aqueous MS/MSD during SVOC analysis on 9/15/07. 4-Nitrophenol (60%, 60%) had high recoveries in the MS & MSD. All other compounds met criteria. The associated LCS met criteria for 4-nitrophenol, and it was not detected in any samples so no qualifiers were applied. All samples were analyzed in conjunction with this MS/MSD.

- Sample F52202-1 was used for the MS/MSD for the solid PAH SIM analysis on 9/20/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this MS/MSD.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 50MW02, bis(2-ethylhexyl)phthalate

Conc. (µg/L) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_o)*(V_i)}

where:	$Conc_{sample}$	=	Sample concentration in µg/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (µL).
	DF	=	Dilution Factor

Conc. µg/L = (69077 * 40 * 1000 * 1) / (424945 * 0.797 * 1020 * 1) = 8 ng/mL
= 8 µg/L

Reported Value = 8 µg/L
% Difference = 0.0%
Values were within 10% difference.

Sample: OP22222-BS, bezno(a)pyrene

Conc. (µg/L) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_o)*(V_i)}

where:	$Conc_{sample}$	=	Sample concentration in µg/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (µL).
	DF	=	Dilution Factor

Conc. µg/L = (80494 * 4 * 1000 * 1) / (116277 * 1.238 * 1000 * 1) = 2.2 ng/mL
= 2.2 µg/L

Reported Value = 2.2 µg/L
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10641.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	UL
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	UL
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	36%		14-62%
4165-62-2	Phenol-d5	27%		10-40%
118-79-6	2,4,6-Tribromophenol	68%		33-118%
4165-60-0	Nitrobenzene-d5	61%		42-108%
321-60-8	2-Fluorobiphenyl	59%		40-106%
1718-51-0	Terphenyl-d14	92%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10777.D	1	09/20/07	NJ	09/06/07	OP22222	SR502
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10642.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	26	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.1	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.1	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	26	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.1	1.0	ug/l	
	3&4-Methylphenol	ND	5.1	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	26	10	ug/l	
87-86-5	Pentachlorophenol	ND	26	10	ug/l	
108-95-2	Phenol	ND	5.1	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.1	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l	
86-74-8	Carbazole	ND	5.1	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.6	ug/l	UL
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.5	ug/l	UL
121-14-2	2,4-Dinitrotoluene	ND	5.1	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.1	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.1	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.1	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.1	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.1	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.1	1.9	ug/l	
78-59-1	Isophorone	ND	5.1	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	37%		14-62%
4165-62-2	Phenol-d5	29%		10-40%
118-79-6	2,4,6-Tribromophenol	82%		33-118%
4165-60-0	Nitrobenzene-d5	60%		42-108%
321-60-8	2-Fluorobiphenyl	61%		40-106%
1718-51-0	Terphenyl-d14	84%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10778.D	1	09/20/07	NJ	09/06/07	OP22222	SR502
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.51	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.51	ug/l	
120-12-7	Anthracene	ND	1.0	0.51	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.051	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.051	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.051	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.26	ug/l	
86-73-7	Fluorene	ND	1.0	0.26	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.051	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-20-3	Naphthalene	ND	1.0	0.26	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.51	ug/l	
129-00-0	Pyrene	ND	1.0	0.26	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R10645.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.3

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10645.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	UL
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	UL
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	35%		14-62%
4165-62-2	Phenol-d5	25%		10-40%
118-79-6	2,4,6-Tribromophenol	73%		33-118%
4165-60-0	Nitrobenzene-d5	60%		42-108%
321-60-8	2-Fluorobiphenyl	61%		40-106%
1718-51-0	Terphenyl-d14	86%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10779.D	1	09/20/07	NJ	09/06/07	OP22222	SR502
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.98	0.49	ug/l	
120-12-7	Anthracene	ND	0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.098	ug/l	
218-01-9	Chrysene	ND	0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.98	0.25	ug/l	
86-73-7	Fluorene	ND	0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND	0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND	0.98	0.49	ug/l	
129-00-0	Pyrene	ND	0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R10646.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.4

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10646.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	UL
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	UL
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	8.0	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	27%		14-62%
4165-62-2	Phenol-d5	23%		10-40%
118-79-6	2,4,6-Tribromophenol	79%		33-118%
4165-60-0	Nitrobenzene-d5	46%		42-108%
321-60-8	2-Fluorobiphenyl	55%		40-106%
1718-51-0	Terphenyl-d14	58%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10780.D	1	09/20/07	NJ	09/06/07	OP22222	SR502
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.98	0.49	ug/l	
120-12-7	Anthracene	ND	0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.098	ug/l	
218-01-9	Chrysene	ND	0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.98	0.25	ug/l	
86-73-7	Fluorene	ND	0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND	0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND	0.98	0.49	ug/l	
129-00-0	Pyrene	ND	0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R10647.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.5

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10647.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	26	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.1	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.1	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	26	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.1	1.0	ug/l	
	3&4-Methylphenol	ND	5.1	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	26	10	ug/l	
87-86-5	Pentachlorophenol	ND	26	10	ug/l	
108-95-2	Phenol	ND	5.1	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.1	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l	
86-74-8	Carbazole	ND	5.1	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.6	ug/l	UL
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.5	ug/l	UL
121-14-2	2,4-Dinitrotoluene	ND	5.1	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.1	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.1	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.1	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.1	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.1	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.1	1.9	ug/l	
78-59-1	Isophorone	ND	5.1	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	42%		14-62%
4165-62-2	Phenol-d5	31%		10-40%
118-79-6	2,4,6-Tribromophenol	78%		33-118%
4165-60-0	Nitrobenzene-d5	67%		42-108%
321-60-8	2-Fluorobiphenyl	66%		40-106%
1718-51-0	Terphenyl-d14	77%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10781.D	1	09/20/07	NJ	09/06/07	OP22222	SR502
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.51	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.51	ug/l	
120-12-7	Anthracene	ND	1.0	0.51	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.051	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.051	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.051	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.26	ug/l	
86-73-7	Fluorene	ND	1.0	0.26	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.051	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-20-3	Naphthalene	ND	1.0	0.26	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.51	ug/l	
129-00-0	Pyrene	ND	1.0	0.26	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R10648.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10648.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	UL
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	UL
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10648.D	1	09/15/07	NJ	09/06/07	OP22221	SR497
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	J
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	J
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	38%		14-62%
4165-62-2	Phenol-d5	28%		10-40%
118-79-6	2,4,6-Tribromophenol	75%		33-118%
4165-60-0	Nitrobenzene-d5	66%		42-108%
321-60-8	2-Fluorobiphenyl	65%		40-106%
1718-51-0	Terphenyl-d14	80%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R10782.D	1	09/20/07	NJ	09/06/07	OP22222	SR502
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.98	0.49	ug/l	
120-12-7	Anthracene	ND	0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.098	ug/l	
218-01-9	Chrysene	ND	0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.98	0.25	ug/l	
86-73-7	Fluorene	ND	0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND	0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND	0.98	0.49	ug/l	
129-00-0	Pyrene	ND	0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F52208

DATE: October 30, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. Samples were analyzed for pesticides and PCBs using USEPA Methods 510C/8081A and 3510C/8082, respectively. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken

Richard McCracken, Chemist

10/31/07

Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F52208

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, pesticide and PCB compounds are shipped @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/30/07, extracted for pesticides and PCBs on 9/6/07, analyzed for pesticides on 9/24/07, and analyzed for PCBs on 9/14/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- For analysis performed on 9/24/07 @1450, endrin and 4,4'-DDT percent breakdowns were 9.6% and 4.8% on signal #1 and 8.4% and 4.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- During the pesticide initial calibration performed on 9/24/07 on instrument ECD5, all criteria were met. No qualifiers were applied. All samples were analyzed following this initial calibration.

- During the PCB initial calibration performed on 9/14/07 on instrument ECD3, all criteria were met. No qualifiers were applied. All samples were analyzed following this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the calibration should be no greater than ±20%.

- During the pesticide initial calibration verification performed on 9/24/07 @1713 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples RB083007, 50MW01, and 50MW02 were analyzed after this initial calibration verification.

- During the pesticide continuing calibration performed on 9/24/07 @2007 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples RB083007, 50MW01, and 50MW02 were analyzed prior to this continuing calibration, while samples 48MW07, 48MW05, and 48MW06 were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 9/24/07 @2158 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 48MW07, 48MW05, and 48MW06 were analyzed prior to this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 9/14/07 @1309 on instrument ECD3, peak #1 (21.1%) of aroclor 1016 had a %D >20% on signal #1, but the average of all 6 peaks was 13.8%. All other PCBs met criteria on signal #1, and all PCBs met criteria on signal #2. No qualifiers were applied. All samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 9/14/07 @1817 on instrument ECD3, all criteria were met. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 9/14/07 @2148 on instrument ECD3, all criteria were met. No qualifiers were applied. All samples were analyzed prior to this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	9/24/07	OP22237-MB	All target <½MRL	NA	NA	None
Pesticides	9/24/07	RB083007	All target <½MRL	NA	NA	None
PCBs	9/14/07	OP22238-MB	All target <½MRL	NA	NA	None
PCBs	9/14/07	RB083007	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Tetrachloro-m-xylene:	Pesticides: 42-127% (DoD QSM 25-140%)
	Decachlorobiphenyl:	Pesticides: 27-127% (DoD QSM 30-135%)
	Tetrachloro-m-xylene:	PCBs: 38-127% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 25-137% (DoD QSM 40-135%)

- Sample 50MW02 had low decachlorobiphenyl recoveries (27.8%, 27.6%) from both signals during pesticide analysis. The pesticide results from 50MW02 have been qualified "J/UJ" as estimated.

- All other samples met surrogate recovery criteria during pesticide analysis.

- Sample 50MW01 had a low decachlorobiphenyl recovery (37.4%) from signal #1 during PCB analysis. Tetrachloro-m-xylene was within criteria on both signals. No qualifiers are required when only one surrogate is outside criteria.

- Sample 50MW02 had low decachlorobiphenyl recoveries (25.5%, 28.3%) from both signals during PCB analysis. The PCB results from 50MW02 have been qualified "J/UJ" as estimated.

- Sample 48MW05 had low decachlorobiphenyl recoveries (33.9%, 37.9%) from both signals during PCB analysis. The PCB results from 48MW05 have been qualified "J/UJ" as estimated.

- All other samples met surrogate recovery criteria during PCB analysis.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22237-BS was used as the LCS during 9/24/07 pesticide analysis. Endrin aldehyde (16%) had a low recovery and was not detected in any field samples – the results have been qualified "UL" as estimated. All other pesticides met recovery criteria. All samples were analyzed in conjunction with this LCS.

- Sample OP22238-BS was used as the LCS during the 9/14/07 PCB analysis. All criteria were met. No qualifiers were applied.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 48MW07 was used for the pesticide MS/MSD analysis. Endrin aldehyde (15%, 14%) had a low recovery in the MS and MSD, as well as having a low recovery in the associated LCS. All sample results have already been qualified "UL", no further qualification is required. All other pesticides met criteria. All samples were analyzed in conjunction with this MS/MSD.

- Sample RB083007 was used for the PCB MS/MSD analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

Sample: 48MW07MSD, dieldrin

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs *1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Vs = Volume of the sample extracted (mL)

Conc. µg/L = (5863511 * 1 * 10000) / (115500 * 510 * 1 * 1000)
= 1.0 ng/mL = 1.0 ug/L

Reported Conc. = 1.0 µg/L
%D = 0.0%
Values were within 10% difference

Sample: RB083007MS, Aroclor 1260

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs * 1000)

where: Conc. = Sample concentration in µg/L
Ax = Area response for compound being measured.
Vt = Total volume of extract, taking into account dilutions (µL)
DF = Dilution factor
CF = Calibration factor from ICAL (area/pg)
Vi = Volume of extract injected (µL).
Vs = Volume of sample extracted (mL).

Signal #1
Conc1 µg/L = (3749063 * 10000* 1) / (9420 * 1 * 500 * 1000) = 7.96 µg/L
Conc2 µg/L = (4578443 * 10000* 1) / (11530 * 1 * 500 * 1000) = 7.94 µg/L
Conc3 µg/L = (4780110 * 10000* 1) / (12050 * 1 * 500 * 1000) = 7.93 µg/L
Conc4 µg/L = (3201148 * 10000* 1) / (8700 * 1 * 500 * 1000) = 7.36 µg/L
Conc5 µg/L = (7782711 * 10000* 1) / (20690 * 1 * 500 * 1000) = 7.52 µg/L
Conc6 µg/L = (4259347 * 10000* 1) / (12120 * 1 * 500 * 1000) = 7.03 µg/L
Average concentration = 7.6 µg/L

Reported Value = 7.6 µg/L (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK21923.D	1	09/24/07	FS	09/06/07	OP22237	GKK792
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		42-127%
2051-24-3	Decachlorobiphenyl	83%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66576.D	1	09/14/07	JB	09/06/07	OP22238	GST1731
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	82%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK21924.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.2

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK21924.D	1	09/24/07	FS	09/06/07	OP22237	GKK792
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		42-127%
2051-24-3	Decachlorobiphenyl	36%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66572.D	1	09/14/07	JB	09/06/07	OP22238	GST1731
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		38-127%
2051-24-3	Decachlorobiphenyl	37%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK21928.D	1	09/24/07	FS	09/06/07	OP22237	GKK792
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.0098	ug/l	
319-84-6	alpha-BHC	ND	0.049	0.0098	ug/l	
319-85-7	beta-BHC	ND	0.049	0.011	ug/l	
319-86-8	delta-BHC	ND	0.049	0.0098	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.0098	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.0098	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.0098	ug/l	
60-57-1	Dieldrin	ND	0.049	0.0098	ug/l	
72-54-8	4,4'-DDD	ND	0.098	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.098	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.098	0.020	ug/l	
72-20-8	Endrin	ND	0.098	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.098	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.098	0.029	ug/l	UL
53494-70-5	Endrin ketone	ND	0.098	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.049	0.0098	ug/l	
33213-65-9	Endosulfan-II	ND	0.098	0.0098	ug/l	
76-44-8	Heptachlor	ND	0.049	0.0098	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.0098	ug/l	
72-43-5	Methoxychlor	ND	0.098	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		42-127%
2051-24-3	Decachlorobiphenyl	74%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66579.D	1	09/14/07	JB	09/06/07	OP22238	GST1731
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.49	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l	
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l	
53469-21-9	Aroclor 1242	ND	0.49	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.49	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.49	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.49	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	74%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK21925.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK21925.D	1	09/24/07	FS	09/06/07	OP22237	GKK792
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.0098	ug/l	UJ
319-84-6	alpha-BHC	ND	0.049	0.0098	ug/l	
319-85-7	beta-BHC	ND	0.049	0.011	ug/l	
319-86-8	delta-BHC	ND	0.049	0.0098	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.0098	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.0098	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.0098	ug/l	
60-57-1	Dieldrin	ND	0.049	0.0098	ug/l	
72-54-8	4,4'-DDD	ND	0.098	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.098	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.098	0.020	ug/l	
72-20-8	Endrin	ND	0.098	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.098	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.098	0.029	ug/l	
53494-70-5	Endrin ketone	ND	0.098	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.049	0.0098	ug/l	
33213-65-9	Endosulfan-II	ND	0.098	0.0098	ug/l	
76-44-8	Heptachlor	ND	0.049	0.0098	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.0098	ug/l	
72-43-5	Methoxychlor	ND	0.098	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		42-127%
2051-24-3	Decachlorobiphenyl	28%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66573.D	1	09/14/07	JB	09/06/07	OP22238	GST1731
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

PCB List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
12674-11-2	Aroclor 1016	ND	0.49	0.25	ug/l		UJ
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l		
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l		
53469-21-9	Aroclor 1242	ND	0.49	0.25	ug/l		
12672-29-6	Aroclor 1248	ND	0.49	0.25	ug/l		
11097-69-1	Aroclor 1254	ND	0.49	0.25	ug/l		
11096-82-5	Aroclor 1260	ND	0.49	0.25	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		38-127%
2051-24-3	Decachlorobiphenyl	26%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK21931.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.5

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK21931.D	1	09/24/07	FS	09/06/07	OP22237	GKK792
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		42-127%
2051-24-3	Decachlorobiphenyl	35%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.5

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66574.D	1	09/14/07	JB	09/06/07	OP22238	GST1731
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l		UJ
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l		
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l		
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l		
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l		
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l		
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	34%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK21932.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.6

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK21932.D	1	09/24/07	FS	09/06/07	OP22237	GKK792
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%		42-127%
2051-24-3	Decachlorobiphenyl	41%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66575.D	1	09/14/07	JB	09/06/07	OP22238	GST1731
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		38-127%
2051-24-3	Decachlorobiphenyl	41%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-3728968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Perchlorate
Datachem Laboratories, Inc. SDG 07E-0792-01
(Accutest Laboratories, Inc., SDG F52208)

DATE: November 1, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP August 30, 2007. The aqueous samples were analyzed for perchlorate analysis using liquid chromatography mass spectroscopy (LC/MS) SW-846 method LC-MS-CLO4/6850 in selective ion monitoring (SIM) mode. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006), *DoD Perchlorate Handbook August, Rev1, Change 1, 2007* (DoD, 2007), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
X		Initial and Continuing Calibration
	X	Blank Analysis
X		Internal Standards
	X	Laboratory Control Sample (LCS)
	X	Matrix Spike (MS) and Spike Duplicate (MSD)
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

11/1/07
Date

RFAAP VALIDATION REPORT
PERCHLORATE REVIEW
SDG 07E-0792-01 (F52208)

I-Holding Times and Preservation

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. For perchlorate analysis, aqueous samples are shipped and stored at @4°C±2°C with a maximum holding time of 28 days from collection (DoD Perchlorate Handbook criteria).

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. Accutest shipped the perchlorate aliquot to DataChem Laboratories on 9/4/07, they were received by DataChem on 9/5/07 at 4°C. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 8/30/07, prepped on 9/18/07, and analyzed on 9/18/07 and 9/19/07. All holding time criteria were met. No qualifiers were applied.

II-Instrument Performance Check

LC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check target compounds - $^{35}Cl^{16}O_3$, $^{37}Cl^{16}O_3$, and $^{35}Cl^{18}O_3$ - met the mass calibration criteria. No qualification was applied.

III-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

Perchlorate:
1- blank (<1/2MRL DoD Perchlorate Handbook)
5 – standards (r≥0.995 DoD Perchlorate Handbook)
ICV (±15%D DoD Perchlorate Handbook)
CCV (±15%D DoD Perchlorate Handbook)
ICS, LODV (±30%D DoD Perchlorate Handbook)

- The perchlorate samples were analyzed on 9/18/07 and 9/19/07.

- Perchlorate was calibrated using a second order equation on 9/18/07, and had a correlation coefficient of 0.9998.

- The perchlorate recovery in LODV2 (74.2%) was above criteria, which the lab attributed to a positive interference at m/z 83. The six samples in this data set were analyzed immediately after LODV2, and the perchlorate results from all samples have been qualified "J/UJ" as estimated.

- All other ICVs, CCVs, ICSs, and LODVs were within criteria.

IV-Blanks

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be detected in any of the associated blanks >MDL. The DoD Perchlorate Handbook criterion specifies all concentrations should be less than ½ MRL for method blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/18/07	Perchlorate	BL-259711-1	<½MRL	NA	None
9/18/07	Perchlorate	RB083007	<½MRL	NA	None

MRL = Method Reporting Limit.
NA = Not Applicable.

V-Internal Standards

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The DoD Handbook specifies relative retention times (RRT) of 1.0 ± 2% of last calibration standard. The mass ratio of ions 83:85 for each sample and standard should be 3.06, and must fall between 2.3 and 3.8 to confirm the presence of perchlorate. The laboratory 83:85 mass ratio limit range is 2.21 to 4.10.

- LODV1, LODV3, 50MW01, 48MW07, and 48MW06 did not meet the 83:85 mass ratio criteria. All results for these three samples have been qualified "J/UJ".

- All samples met area and RRT criteria, and all samples other than the three listed above met 83:85 mass ratio criteria.

VI-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. DoD Perchlorate Handbook and laboratory aqueous limits are 85-115%.

- Sample QC-259711-1 was used as the aqueous LCS for perchlorate analysis on 9/18/07. All criteria were met. No qualifiers were applied.

VII-Matrix Spike (MS) and Spike Duplicate (MSD)

MS and MSD are generated to determine long-term accuracy and precision of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. MS/MSD recoveries and relative percent differences between MS recoveries should be within the specified limits. DoD Perchlorate Handbook aqueous limits are 75-125%; RPD≤20%. The laboratory limits are 80-120%; RPD≤15%.

- Sample 48MW03 (F52170-5) was used for the MS/MSD analysis. All criteria were met. All samples were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

IX-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, "J." The following calculations were performed for verification.

Sample: 48MW07 (F52208-3, 07E04544), Perchlorate

y (area ratio) = (Sample Area/Area EIC89) = (5222.35/77952) = 0.0670 = ax^2 + bx + c

solve for x
x = [-b ± SQRT(b^2-4ac)] / (2a)

where: x is the amount ratio

a = 0.0225735 b = 1.36878 c = - 0.0186592 - 0.0670 = -0.0856592

amount ratio ={-1.36878± [SQRT{(1.36878^2) – (4*0.0225735*-0.0856592)}] / (2*0.0225735)
={-1.36878± [SQRT (1.8735587+0.0077345)]}/0.045147
={-1.36878±[SQRT 1.881293]} / 0.045147
={ -1.36878±1.3716 }/0.045147
=0.066246

Conc. µg/L = (Amount ratio * Is * DF)

where: Conc. = Sample concentration in ug/L
Is = Amount of internal standard (µg/L).
DF = Dilution factor

Conc. µg/L = (Amount ratio * Is * DF)
= (0.066246* 5 µg/L * 1) = 0.312 µg/L

Reported concentration = 0.313 µg/L
%D = 0.3%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
09210716035338
Page 3

S0785003

Date Printed.....: 21-SEP-07 16:03

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52208
Release Number.....: Not Provided

Date Received.....: 05-SEP-07 00:00

Client Sample Name: F52208-1
DCL Sample Name...: 07M04542
DCL Report Group..: 07M-0792-01

Matrix.....: WATER
Date Sampled.....: 30-AUG-07 06:45
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

DATA VAL QUALIFIER UJ

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 22:31	0.0663	ND		U	1	0.200

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 21-SEP-07 16:03

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52208
Release Number.....: Not Provided

Date Received.....: 05-SEP-07 00:00

Client Sample Name: F52208-2
DCL Sample Name...: 07E04543
DCL Report Group..: 07E-0792-01

Matrix.....: WATER
Date Sampled.....: 30-AUG-07 08:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 22:51	0.0663	0.203			1	0.200

DATA VAL QUALIFIER J

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0705005

Date Printed.....: 21-SEP-07 16:03

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52208
Release Number.....: Not Provided

Date Received.....: 05-SEP-07 00:00

Client Sample Name: F52208-3
DCL Sample Name...: 07E04544
DCL Report Group..: 07E-0792-01

Matrix.....: WATER
Date Sampled.....: 30-AUG-07 09:10
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIER J

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 23:10	0.0663	0.313			1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
09210716035338

80785006

Date Printed.....: 21-SEP-07 16:03

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52208
Release Number.....: Not Provided

Date Received.....: 05-SEP-07 00:00

Client Sample Name: F52208-4
DCL Sample Name...: 07E04545
DCL Report Group..: 07E-0792-01

Matrix.....: WATER
Date Sampled.....: 30-AUG-07 09:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIED J

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 23:30	0.0663	0.288			1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
09210716035338

S0785007

Date Printed.....: 21-SEP-07 16:03

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52208
Release Number.....: Not Provided

Date Received.....: 05-SEP-07 00:00

Client Sample Name: F52208-5
DCL Sample Name...: 07E04546
DCL Report Group..: 07E-0792-01

Matrix.....: WATER
Date Sampled.....: 30-AUG-07 11:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIER J

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 23:50	0.0663	0.186		J	1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0785008

Date Printed.....: 21-SEP-07 16:03

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52208
Release Number.....: Not Provided

Date Received.....: 05-SEP-07 00:00

Client Sample Name: F52208-6
DCL Sample Name...: 07E04547
DCL Report Group..: 07E-0792-01

Matrix.....: WATER
Date Sampled.....: 30-AUG-07 11:45
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIER J

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	19-SEP-07 00:09	0.0663	0.236			1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F52208

DATE: October 31, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. The samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3010A/6010B for ICP metals and SW-846 7470A for mercury. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Sample Duplicate
	X	Matrix Spike and Spike Duplicate
	X	ICP Serial Dilution
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

10/31/07

Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F52208

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: For aqueous matrices, the samples are shipped cool @4°C±2°C and preserved to pH<2 with HNO_3 with a maximum holding time is 180 days for ICP metals and 28 days for mercury.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected 8/30/07 for metals analysis, digested for mercury on 9/5/07, analyzed for mercury on 9/5/07, digested for ICP metals on 9/14/07, and analyzed for ICP metals on 9/17/07 & 9/18/07. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:
1- blank (DoD QSM <½ MRL)
3 – standards (r≥0.995)
ICV/CCV (90-110%) (DoD QSM 90-110%)
MRL (70-130%) (DoD QSM 80-120%)
High Std. (95-105%)

Hg:
1 – blank (DoD QSM <½ MRL)
5 – standards (r≥0.995)
ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%)
MRL (80-120%) (DoD QSM 80-120%)
High Std. (95-105%)

- The samples were analyzed for ICP metals on 9/17/07 & 9/18/07. Mercury analysis was performed on 9/5/07, with a correlation coefficient of 0.9999. Iron (94%) had a low recovery during the High Standard analysis, and all iron results have been qualified "L". All ICVs and CCVs, and all other High Standards were met recovery criteria. **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL (µg/L)	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
9/5/07	Hg	0.2	Met criteria	None	None
9/17/07	ICP-Be	10	122.0%	50MW01, 48MW05, 48MW06	K
9/17/07	ICP-Pb	10	136.0%	48MW07, 48MW06	K
9/17/07	ICP-Se	20	130.0%	48MW06	K
9/17/07	ICP-Tl	20	76.0%	All	L/UL

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/17/07	Antimony	ICB/CCBs	7.7 J	38.5	48MW05, 48MW06
9/17/07	Copper	ICB/CCBs	5.4 J	27.0	50MW01, 48MW07, 50MW02,
9/17/07	Potassium	ICB/CCBs	1710 J	8550	48MW07, 50MW02
9/17/07	Sodium	ICB/CCBs	1860 J	9300	48MW07
9/5/07	Mercury	ICB/CCBs	<2*MDL	NA	None
9/5/07	Mercury	MP12873-MB	<½MRL	NA	None
9/14/07	Lead	MP12936-MB	3.0 J	15.0	48MW07, 48MW06
9/17/07	Potassium	RB083007	1740 J	8700	48MW07, 50MW02
9/17/07	Sodium	RB083007	1860 J	9300	48MW07
09/05/07	Mercury	RB083007	<2*MDL	NA	None

J = Estimated value <MRL and >MDL.

IV-ICP Interference Check Sample (ICS)

The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. All aqueous LCS results must fall within the control limits. The DoD QSM aqueous LCS recovery limits are specified in Table D-18 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12936-BS was used as the LCS during ICP metals analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

- Sample MP12873-BS was used as the LCS during mercury analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

VI-Laboratory Duplicate Sample Analysis

Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample 48MW3 (F52170-5) was analyzed in duplicate during ICP metals analysis. All metals met RPD criteria. No data qualifiers were applied.

- Sample 48MW3 (F52170-5) was used analyzed in duplicate during mercury analysis, and met RPD criteria. No qualifiers were applied.

VII-Matrix Spike/Spike Duplicate
MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-18 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample 48MW3 (F52170-5) was used as the MS/MSD during ICP metals analysis. All metals met recovery and RPD criteria. No data qualifiers were applied.

- Sample 48MW3 (F52170-5) was used as the MS/MSD during mercury analysis, and met recovery & RPD criteria. No data qualifiers were applied.

VIII-ICP Serial Dilution
An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- Sample 48MW3 (F52170-5) was used as the serial dilution during ICP metals analysis. All metals met criteria. No data qualifiers were applied.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

X-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 50MW01, Manganese

Conc. (μg/L) = (conc. μg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (μg/L) = (1226 μg/L)*(50 mL)*(1) / (50 mL) = 1230 μg/L

Reported concentration = 1230 μg/L
%D = 0.0%
Values were within 10% difference.

CVAA Sample: 50MW01, Mercury

Conc. (μg/L) = (conc. μg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (μg/L) = (0.129 μg/L)*(50 mL)*(1) / (50 mL) = 0.13 μg/L

Reported concentration = 0.13 μg/L
%D = 0.0%.
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	79 U	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	5.0 U	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	100 U	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.92 U	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	100 U	5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.0 U	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.0 U	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	1740 J J	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	1860 J J	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	38600	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Antimony [a]	12 U J	24	12	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Arsenic	9.1 J J	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Barium	357	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Beryllium	1.8 J K	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Cadmium	3.0 J J	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Calcium	2770000	10000	1000	ug/l	10	09/14/07	09/18/07	RS	SW846 6010B [3]	SW846 3010A [5]
Chromium	78.7	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Cobalt	19.6 J J	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Copper	17.8 J J B	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Iron	40900	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Lead	237	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Magnesium	1720000	50000	1000	ug/l	10	09/14/07	09/18/07	RS	SW846 6010B [3]	SW846 3010A [5]
Manganese	1230	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Mercury	0.13 J J	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [4]
Nickel	49.8	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Potassium	19300	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Selenium [a]	200 U	400	200	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Silver	0.77 U	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Sodium	19900	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Vanadium	138	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Zinc	223	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Instrument QC Batch: MA5983
(4) Prep QC Batch: MP12873
(5) Prep QC Batch: MP12936

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	457	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	76.8 J J	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	22200	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	11.9	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 J JB	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	861	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 J KB	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	12100	5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	32.3	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	6.9 J J	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	2910 J JB	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	2470 J JB	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8210	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	191 J J	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	146000	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	18.2	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	3.8 J J	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	9.3 J J B	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	8850	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	65.7	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	59100	5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	245	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	22.3 J J	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	6940 J J B	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium [a]	16 U	20	16	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	14500	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	18.5 J J	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	137	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	61500	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Antimony	6.3 B	6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Arsenic	16.3	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Barium	5560	2000	50	ug/l	10	09/14/07	09/18/07	RS	SW846 6010B [3]	SW846 3010A [5]
Beryllium	3.8 J K	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Cadmium	5.0	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Calcium	1560000	10000	1000	ug/l	10	09/14/07	09/18/07	RS	SW846 6010B [3]	SW846 3010A [5]
Chromium	397	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Cobalt	135	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Copper	53.7	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Iron	137000	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Lead	29.7	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Magnesium	762000	50000	1000	ug/l	10	09/14/07	09/18/07	RS	SW846 6010B [3]	SW846 3010A [5]
Manganese	4980	150	10	ug/l	10	09/14/07	09/18/07	RS	SW846 6010B [3]	SW846 3010A [5]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [4]
Nickel	325	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Potassium	18200	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Selenium [a]	100 U	200	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Silver	8.8 J J	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Sodium	19600	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Vanadium	73.9	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]
Zinc	93.6	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [5]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Instrument QC Batch: MA5983
(4) Prep QC Batch: MP12873
(5) Prep QC Batch: MP12936

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	26600 B	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	6.9	6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	11.9	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	335	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.5 J K	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	157000	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	140	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	42.8 J J	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	119	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	89800	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	8.4 KB	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	119000	5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	2550	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	117	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	9740 J J	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	10 K	10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	60500	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	46.3 J J	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	41.8	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Richard McCracken, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F52208

DATE: October 31, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. Aqueous samples were analyzed for chlorinated herbicides using USEPA SW846 Method 3510C/8151A. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
X		Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The dalapon results have been rejected in all samples due to a 0% recovery in the LCS. The quality of all other data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

10/31/07
Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F52208

I-Holding Times

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, chlorinated herbicides compounds are shipped @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/30/07, extracted on 9/6/07, and analyzed on 9/10/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration data was provided for MCPP or MCPA. During discussions with the laboratory, they indicated that they perform a one-point calibration each day that analysis for MCPP or MCPA is conducted. A five-point initial calibration was not performed, therefore all data for these two compounds has been qualified "J/UJ".

- During the initial calibration performed on 9/9/07 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

III-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A one-point daily calibration was provided for MCPP and MCPA, indicating that the lab is able to detect and quantitate both compounds. %D data was not supplied since a five-point initial calibration was not performed. All MCPP and MCPA data has already been qualified (see initial calibration), no additional qualification is required.

- During continuing calibration performed on 9/10/07 @0750 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During continuing calibration performed on 9/10/07 @1424 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed prior to this continuing calibration.

IV-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/10/07	OP8030-MB	All target compounds <½MRL	NA	NA	None
9/10/07	RB083007	All target compounds <½MRL	NA	NA	None

V-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Control Limit: 2,4-DCAA (34-179%)

- All samples met recovery criteria.

VI-Laboratory Control Samples

Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-8 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP8030-BS was used as the LCS during the 9/10/07 run. 2,4,5-TP (Silvex) (118%) had a high recovery, but no 2,4,5-TP was detected in any samples so no qualifiers were applied. Dalapon met recovery criteria in the LCS, but had a 0% recovery in the LCS duplicate. No dalapon was detected in any samples, all dalapon results have been rejected "R". Five compounds (besides dalapon) had RPDs above the laboratory criteria, but all recoveries for these compounds met criteria, no action is taken on RPD alone. All other herbicides were within criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-8 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- MS/MSD analysis was not performed due to insufficient sample volume. No data qualifiers were applied.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

IX-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL is qualified as estimated, "J." All criteria were met. No qualifiers were applied.

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: OP8030-BS duplicate, 2,4,5-TP (Silvex)

Conc. µg/L = (A * DF * Vt) / (CF * Vo)

where: A = Area response of the sample
CF = Calibration Factor from initial calibration (area/(ug/L))
Vt = volume of final extract (mL)
DF = dilution factor
Vo = volume of the sample extracted (mL)

Conc. µg/L = (3898147 * 1 * 10 mL) / (83090 * 1000 mL)
= 0.47 ng/mL = 0.47 µg/L

Reported Conc. = 0.47 µg/L
%D = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: GG37492.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37492.D	1	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		R
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	50%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG37493.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37493.D	1	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	R
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND	50		ug/l	UJ
94-74-6	MCPA	ND	50		ug/l	UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	59%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG37494.D

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.3

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37494.D	1	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		R
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	52%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37495.D	1	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		R
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	51%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37496.D	1	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	R
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND	50		ug/l	UJ
94-74-6	MCPA	ND	50		ug/l	UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	65%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37499.D	1	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164
Run #2 [a]	GG37500.D	5	09/10/07	ATX	09/06/07	T:OP8030	T:GGG1164

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		R
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	0.65 [b]	0.25	0.20	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	70%	67%	34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F52208

DATE: November 1, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. The samples were analyzed for explosives, nitroglycerin, and PETN using USEPA SW-846 3535A/8330A. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

11/1/07
Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F52208

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, explosive compounds are shipped @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/30/07, extracted on 9/5/07, analyzed for PETN and nitroglycerine on 9/7/07, and analyzed for all other explosives on 9/12/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/11/07	OP22200-MB	All target explosives <½MRL	NA	NA	None
9/12/07	OP22200-MB	All target explosives <½MRL	NA	NA	None
9/7/07	OP22200-MB	PETN & NG <½MRL	NA	NA	None
9/11/07	RB083007	All target explosives <½MRL	NA	NA	None
9/07/07	RB083007	PETN & NG <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient (r^2) must be ≥0.990 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration performed on 9/11/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- During the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration verification performed on 9/11/07 @2153 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples RB083007, 50MW01, 48MW07, 50MW02, and 48MW05 were analyzed after this initial calibration verification.

- During the explosives continuing calibration verification performed on 9/12/07 @0256 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples RB083007, 50MW01, 48MW07, 50MW02, and 48MW05 were analyzed prior to this continuing calibration, while 48MW06 was analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 9/12/07 @0446 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 48MW06 was analyzed prior to this continuing calibration.

- During the PETN and nitroglycerin initial calibration verification performed on 3/15/07 @1235 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed in conjunction with this initial calibration verification.

- During the PETN and nitroglycerin continuing calibration performed on 9/7/07 @1417 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples RB083007, 50MW01, 48MW07, 50MW02, and 48MW05 were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 9/7/07 @1600 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples RB083007, 50MW01, 48MW07, 50MW02, and 48MW05 were analyzed prior to this continuing calibration, while 48MW06 was analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 9/7/07 @1638 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 48MW06 was analyzed prior to this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria: 3,4-dinitrotoluene (70-136%)

- All criteria were met for explosives, PETN, and nitroglycerin. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-12 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22200-BS was used as the LCS for PETN, nitroglycerin, and explosives analysis on 9/11/07. HMX (116%) had a high recovery, but no HMX was detected in any samples so no qualifiers were applied. All other compounds met recovery criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-12 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 48MW07 was used as the MS/MSD for the explosive analysis. All compounds met criteria. No qualifiers were applied. All samples were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all detected explosives, PETN, and nitroglycerin.

Sample: RB083007MS,HMX

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured
Vt = Volume of total extract (mL)
DF = Dilution factor
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL)

Conc. µg/L = (1474974 * 10 * 1) / (2921 * 500) = 10.1 µg/L

Reported Value = 10.1 µg/L
% Difference = 0.0%
Values were within 10% difference

Sample: RB083007MS, nitroglycerin

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
DF = Dilution factor
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL).

Conc. µg/L = (3118401 * 10 * 1) / (1228 * 500) = 50.8 µg/L

Reported Value = 50.8 µg/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG024003.D	1	09/11/07	NAF	09/05/07	OP22200	GGG1021
Run #2	PP022840.D	1	09/07/07	MRE	09/05/07	OP22200	GPP795

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2	1020 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.050	ug/l	
121-82-4	RDX	ND	0.20	0.059	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.055	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.070	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.095	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.064	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.055	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.072	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.11	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.076	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.099	ug/l	
479-45-8	Tetryl	ND	0.20	0.067	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.064	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.049	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.49	ug/l	
78-11-5	PETN	ND [a]	2.0	0.49	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	122%	97%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG024006.D	1	09/12/07	NAF	09/05/07	OP22200	GGG1021
Run #2	PP022841.D	1	09/07/07	MRE	09/05/07	OP22200	GPP795

	Initial Volume	Final Volume
Run #1	970 ml	10.0 ml
Run #2	970 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.21	0.053	ug/l	
121-82-4	RDX	ND	0.21	0.062	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.21	0.058	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.21	0.073	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.21	0.10	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.21	0.067	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.21	0.058	ug/l	
98-95-3	Nitrobenzene	ND	0.21	0.075	ug/l	
88-72-2	o-Nitrotoluene	ND	0.21	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.21	0.080	ug/l	
99-99-0	p-Nitrotoluene	ND	0.21	0.10	ug/l	
479-45-8	Tetryl	ND	0.21	0.070	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.21	0.067	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.21	0.052	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.1	0.52	ug/l	
78-11-5	PETN	ND [a]	2.1	0.52	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	103%	114%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG024007.D	1	09/12/07	NAF	09/05/07	OP22200	GGG1021
Run #2	PP022842.D	1	09/07/07	MRE	09/05/07	OP22200	GPP795

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.051	ug/l	
121-82-4	RDX	ND	0.20	0.060	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.071	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.097	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.065	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.073	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.078	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.10	ug/l	
479-45-8	Tetryl	ND	0.20	0.068	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.065	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.050	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.50	ug/l	
78-11-5	PETN	ND [a]	2.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	102%	114%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG024008.D	1	09/12/07	NAF	09/05/07	OP22200	GGG1021
Run #2	PP022845.D	1	09/07/07	MRE	09/05/07	OP22200	GPP795

	Initial Volume	Final Volume
Run #1	850 ml	10.0 ml
Run #2	850 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.24	0.060	ug/l	
121-82-4	RDX	ND	0.24	0.071	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.24	0.066	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.24	0.084	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.24	0.11	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.24	0.076	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.24	0.066	ug/l	
98-95-3	Nitrobenzene	ND	0.24	0.086	ug/l	
88-72-2	o-Nitrotoluene	ND	0.24	0.14	ug/l	
99-08-1	m-Nitrotoluene	ND	0.24	0.092	ug/l	
99-99-0	p-Nitrotoluene	ND	0.24	0.12	ug/l	
479-45-8	Tetryl	ND	0.24	0.080	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.24	0.076	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.24	0.059	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.4	0.59	ug/l	
78-11-5	PETN	ND [a]	2.4	0.59	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	99%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG024009.D	1	09/12/07	NAF	09/05/07	OP22200	GGG1021
Run #2	PP022846.D	1	09/07/07	MRE	09/05/07	OP22200	GPP795

	Initial Volume	Final Volume
Run #1	950 ml	10.0 ml
Run #2	950 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.21	0.054	ug/l	
121-82-4	RDX	ND	0.21	0.063	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.21	0.059	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.21	0.075	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.21	0.10	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.21	0.068	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.21	0.059	ug/l	
98-95-3	Nitrobenzene	ND	0.21	0.077	ug/l	
88-72-2	o-Nitrotoluene	ND	0.21	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.21	0.082	ug/l	
99-99-0	p-Nitrotoluene	ND	0.21	0.11	ug/l	
479-45-8	Tetryl	ND	0.21	0.072	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.21	0.068	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.21	0.053	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.1	0.53	ug/l	
78-11-5	PETN	ND [a]	2.1	0.53	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	110%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG024012.D	1	09/12/07	NAF	09/05/07	OP22200	GGG1021
Run #2	PP022849.D	1	09/07/07	MRE	09/05/07	OP22200	GPP795

	Initial Volume	Final Volume
Run #1	980 ml	10.0 ml
Run #2	980 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.052	ug/l	
121-82-4	RDX	ND	0.20	0.061	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.057	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.072	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.099	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.066	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.057	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.074	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.080	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.10	ug/l	
479-45-8	Tetryl	ND	0.20	0.069	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.066	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.051	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.51	ug/l	
78-11-5	PETN	ND [a]	2.0	0.51	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	92%	100%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. Project G383-602
(Accutest SDG F52208)

DATE: November 2, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. The samples were analyzed for Dioxin and Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	50MW02	F52208-4
50MW01	F52208-2	48MW05	F52208-5
48MW07	F52208-3	48MW06	F52208-6

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

11/2/07
Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-602
(Accutest SDG F52208)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, dioxin and furans are shipped @4°C ± 2°C, with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. Accutest shipped the dioxin aliquot to SGS Paradigm Analytical Laboratories on 9/4/07, they were received by DataChem on 9/5/07 at 4.3°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/30/07, extracted on 9/6/07, and analyzed on 9/8/07 & 9/9/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. ng/L	Action Level ng/L	B qualified samples
9/8/07	LMB14381	All congeners <EDL	NA	NA	None
9/09/07	RB083007	All congeners <EDL	NA	NA	None

J = Estimated value <MRL and >EDL.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

- The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
- The signal to noise ratio ≥10% for all target ions;
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During initial calibration performed on 07/10/07 using instrument HRMS1, all compounds met criteria. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

- The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
- The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During the continuing calibration performed on 9/8/07 @1115 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 48MW07, 50MW02, and 48MW05 were analyzed following this continuing calibration.

- During the continuing calibration performed on 9/8/07 @2236 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 48MW07, 50MW02, and 48MW05 were analyzed before this continuing calibration, while samples RB083007, 50MW01, and 48MW06 were analyzed following this continuing calibration.

- During the continuing calibration performed on 9/9/07 @0958 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples RB083007, 50MW01, and 48MW06 were analyzed before this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within ±35% when spiked at the method quantitation limit and within ±30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within ±20% when spiked above 20 times the method quantitation limit.

- Sample OPR14457 was used as LCS and LCSD on 9/8/07 analytical run. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD ≤20%.

- No project specific MS/MSD was performed; therefore, it was not evaluated.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data set.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". For where presence of quantitation interference (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- The OCDD result in 50MW01 (F52208-2) has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

- The OCDD result in 48MW07 (F52208-3) has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

- The 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, OCDD, 2,3,7,8-TCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in 50MW02 (F52208-4) have been qualified "J" as estimated since the amount of each compound detected was less than the Lower Method Calibration Limit. Note that the ion abundance ratio for 1,2,3,7,8,9-HxCDD did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The OCDD and 1,2,3,4,6,7,8-HpCDF results in 48MW06 (F52208-6) have been qualified "J" as estimated since the amount of each compound detected was less than the Lower Method Calibration Limit.

Sample: 50MW01 (F52208-2), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
V = volume in mL of the aqueous sample; and
Avg. RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/L)} = \frac{(A(x))\ *Q(is)*1000}{A(is)\ *\ V\ *\ \text{Avg. RRF}} = \frac{(305000)*4.0*1000}{(66900000)\ *\ 919\ *\ 1.0783} = 0.0184 \text{ ng/L}$$

Reported Value = 0.0184 ng/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Method 8290
F52208-1
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00260				
1,2,3,7,8-PeCDD	ND	0.00525				
1,2,3,4,7,8-HxCDD	ND	0.00525				
1,2,3,6,7,8-HxCDD	ND	0.00525				
1,2,3,7,8,9-HxCDD	ND	0.00525				
1,2,3,4,6,7,8-HpCDD	ND	0.00687				
OCDD	ND	0.0118				
2,3,7,8-TCDF	ND	0.00194				
1,2,3,7,8-PeCDF	ND	0.00525				
2,3,4,7,8-PeCDF	ND	0.00525				
1,2,3,4,7,8-HxCDF	ND	0.00525				
1,2,3,6,7,8-HxCDF	ND	0.00525				
2,3,4,6,7,8-HxCDF	ND	0.00525				
1,2,3,7,8,9-HxCDF	ND	0.00525				
1,2,3,4,6,7,8-HpCDF	ND	0.00525				
1,2,3,4,7,8,9-HpCDF	ND	0.00525				
OCDF	ND	0.0105				
Total TCDDs	ND	0.00260				
Total PeCDDs	ND	0.00525				
Total HxCDDs	ND	0.00525				
Total HpCDDs	ND	0.00687				
Total TCDFs	ND	0.00194				
Total PeCDFs	ND	0.00525				
Total HxCDFs	ND	0.00525				
Total HpCDFs	ND	0.00525				
WHO-2005 TEQ (ND=0)	ND		ND			
WHO-2005 TEQ (ND=½)	0.00682		0.00682			

Client Information			**Sample Information**	
Project Name:	F52208		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52208-1		Weight / Volume:	952 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14457
Project ID:	G383-602		Instrument:	HRMS1
Sample ID:	G383-602-1B		Filename:	a07sep07a_5-11
Collection Date/Time:	08/30/07	6:45	Retchk:	a07sep07a_4-14
Receipt Date/Time:	09/05/07	10:30	Begin ConCal:	a07sep07a_4-14
Extraction Date:	09/06/07		End ConCal:	a07sep07a_5-14
Analysis Date/Time:	09/09/07	7:33	Initial Cal:	m8290-071007a

Method 8290
F52208-2
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00222				
1,2,3,7,8-PeCDD	ND	0.00544				
1,2,3,4,7,8-HxCDD	ND	0.00544				
1,2,3,6,7,8-HxCDD	ND	0.00544				
1,2,3,7,8,9-HxCDD	ND	0.00544				
1,2,3,4,6,7,8-HpCDD	ND	0.00544				
OCDD	0.0184			45:00	0.90	A
2,3,7,8-TCDF	ND	0.00165				
1,2,3,7,8-PeCDF	ND	0.00544				
2,3,4,7,8-PeCDF	ND	0.00544				
1,2,3,4,7,8-HxCDF	ND	0.00544				
1,2,3,6,7,8-HxCDF	ND	0.00544				
2,3,4,6,7,8-HxCDF	ND	0.00544				
1,2,3,7,8,9-HxCDF	ND	0.00544				
1,2,3,4,6,7,8-HpCDF	ND	0.00544				
1,2,3,4,7,8,9-HpCDF	ND	0.00544				
OCDF	ND	0.0109				
Total TCDDs	ND	0.00222				
Total PeCDDs	ND	0.00544				
Total HxCDDs	ND	0.00544				
Total HpCDDs	ND	0.00544				
Total TCDFs	ND	0.00165				
Total PeCDFs	ND	0.00544				
Total HxCDFs	ND	0.00544				
Total HpCDFs	ND	0.00544				
WHO-2005 TEQ (ND=0)	0.00000552		0.00000552			
WHO-2005 TEQ (ND=½)	0.00680		0.00680			

DATA VAL QUALIFIER

J

Client Information			**Sample Information**	
Project Name:	F52208		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52208-2		Weight / Volume:	919 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14457
Project ID:	G383-602		Instrument:	HRMS1
Sample ID:	G383-602-2B		Filename:	a07sep07a_5-12
Collection Date/Time:	08/30/07	8:00	Retchk:	a07sep07a_4-14
Receipt Date/Time:	09/05/07	10:30	Begin ConCal:	a07sep07a_4-14
Extraction Date:	09/06/07		End ConCal:	a07sep07a_5-14
Analysis Date/Time:	09/09/07	8:21	Initial Cal:	m8290-071007a

Method 8290
F52208-3
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00369				
1,2,3,7,8-PeCDD	ND	0.00494				
1,2,3,4,7,8-HxCDD	ND	0.00494				
1,2,3,6,7,8-HxCDD	ND	0.00494				
1,2,3,7,8,9-HxCDD	ND	0.00494				
1,2,3,4,6,7,8-HpCDD	ND	0.00801				
OCDD	0.0146			45:00	0.98	A
2,3,7,8-TCDF	ND	0.00253				
1,2,3,7,8-PeCDF	ND	0.00494				
2,3,4,7,8-PeCDF	ND	0.00494				
1,2,3,4,7,8-HxCDF	ND	0.00494				
1,2,3,6,7,8-HxCDF	ND	0.00494				
2,3,4,6,7,8-HxCDF	ND	0.00494				
1,2,3,7,8,9-HxCDF	ND	0.00494				
1,2,3,4,6,7,8-HpCDF	ND	0.00494				
1,2,3,4,7,8,9-HpCDF	ND	0.00594				
OCDF	ND	0.0127				
Total TCDDs	ND	0.00369				
Total PeCDDs	ND	0.00494				
Total HxCDDs	ND	0.00494				
Total HpCDDs	ND	0.00801				
Total TCDFs	ND	0.00253				
Total PeCDFs	ND	0.00494				
Total HxCDFs	ND	0.00494				
Total HpCDFs	ND	0.00594				
WHO-2005 TEQ (ND=0)	0.00000438		0.00000438			
WHO-2005 TEQ (ND=½)	0.00708		0.00708			

DATA VAL QUALIFIER

J

Client Information			**Sample Information**	
Project Name:	F52208		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52208-3		Weight / Volume:	1012 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14457
Project ID:	G383-602		Instrument:	HRMS1
Sample ID:	G383-602-3B		Filename:	a07sep07a_4-4
Collection Date/Time:	08/30/07	9:10	Retchk:	a07sep07a_3-14
Receipt Date/Time:	09/05/07	10:30	Begin ConCal:	a07sep07a_3-14
Extraction Date:	09/06/07		End ConCal:	a07sep07a_4-14
Analysis Date/Time:	09/08/07	14:33	Initial Cal:	m8290-071007a

Method 8290
F52208-4
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio		Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.00389						
1,2,3,7,8-PeCDD	ND	0.00546						
1,2,3,4,7,8-HxCDD	ND	0.00546						
1,2,3,6,7,8-HxCDD	ND	0.00546						
1,2,3,7,8,9-HxCDD	EMPC	0.00548	0.00501	37:19	0.89	*	A	J
1,2,3,4,6,7,8-HpCDD	0.0338			40:31	0.99		A	J
OCDD	1.10			45:01	0.90			
2,3,7,8-TCDF	0.00337			30:57	0.80		A	J
1,2,3,7,8-PeCDF	ND	0.00546						
2,3,4,7,8-PeCDF	ND	0.00546						
1,2,3,4,7,8-HxCDF	0.00376			36:15	1.23		A	J
1,2,3,6,7,8-HxCDF	ND	0.00546						
2,3,4,6,7,8-HxCDF	ND	0.00546						
1,2,3,7,8,9-HxCDF	ND	0.00546						
1,2,3,4,6,7,8-HpCDF	0.0238			39:13	1.03		A	J
1,2,3,4,7,8,9-HpCDF	ND	0.00691						
OCDF	0.0513			45:16	0.95		A	J
Total TCDDs	ND	0.00389						
Total PeCDDs	ND	0.00546						
Total HxCDDs	0.0197							
Total HpCDDs	0.0802							
Total TCDFs	0.00509							
Total PeCDFs	ND	0.00546						
Total HxCDFs	0.00704							
Total HpCDFs	0.0238							
WHO-2005 TEQ (ND=0)	0.00163		0.00214					
WHO-2005 TEQ (ND=½)	0.00889		0.00912					

Client Information			**Sample Information**		
Project Name:	F52208		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F52208-4		Weight / Volume:	915 mL	
			Solids / Lipids:	NA	%
			Original pH :	7	
Laboratory Information			Batch ID:	WG14457	
Project ID:	G383-602		Instrument:	HRMS1	
Sample ID:	G383-602-4B		Filename:	a07sep07a_4-5	
Collection Date/Time:	08/30/07	9:00	Retchk:	a07sep07a_3-14	
Receipt Date/Time:	09/05/07	10:30	Begin ConCal:	a07sep07a_3-14	
Extraction Date:	09/06/07		End ConCal:	a07sep07a_4-14	
Analysis Date/Time:	09/08/07	15:21	Initial Cal:	m8290-071007a	

Method 8290
F52208-5
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00344				
1,2,3,7,8-PeCDD	ND	0.00538				
1,2,3,4,7,8-HxCDD	ND	0.00538				
1,2,3,6,7,8-HxCDD	ND	0.00538				
1,2,3,7,8,9-HxCDD	ND	0.00538				
1,2,3,4,6,7,8-HpCDD	ND	0.00816				
OCDD	ND	0.0180				
2,3,7,8-TCDF	ND	0.00246				
1,2,3,7,8-PeCDF	ND	0.00538				
2,3,4,7,8-PeCDF	ND	0.00538				
1,2,3,4,7,8-HxCDF	ND	0.00538				
1,2,3,6,7,8-HxCDF	ND	0.00538				
2,3,4,6,7,8-HxCDF	ND	0.00538				
1,2,3,7,8,9-HxCDF	ND	0.00538				
1,2,3,4,6,7,8-HpCDF	ND	0.00538				
1,2,3,4,7,8,9-HpCDF	ND	0.00584				
OCDF	ND	0.0129				
Total TCDDs	ND	0.00344				
Total PeCDDs	ND	0.00538				
Total HxCDDs	ND	0.00538				
Total HpCDDs	ND	0.00816				
Total TCDFs	ND	0.00246				
Total PeCDFs	ND	0.00538				
Total HxCDFs	ND	0.00538				
Total HpCDFs	ND	0.00584				
WHO-2005 TEQ (ND=0)	ND		ND			
WHO-2005 TEQ (ND=½)	0.00741		0.00741			

Client Information			**Sample Information**	
Project Name:	F52208		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52208-5		Weight / Volume:	929 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14457
Project ID:	G383-602		Instrument:	HRMS1
Sample ID:	G383-602-5B		Filename:	a07sep07a_4-6
Collection Date/Time:	08/30/07	11:00	Retchk:	a07sep07a_3-14
Receipt Date/Time:	09/05/07	10:30	Begin ConCal:	a07sep07a_3-14
Extraction Date:	09/06/07		End ConCal:	a07sep07a_4-14
Analysis Date/Time:	09/08/07	16:10	Initial Cal:	m8290-071007a

Method 8290
F52208-6
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00196				
1,2,3,7,8-PeCDD	ND	0.00508				
1,2,3,4,7,8-HxCDD	ND	0.00508				
1,2,3,6,7,8-HxCDD	ND	0.00508				
1,2,3,7,8,9-HxCDD	ND	0.00508				
1,2,3,4,6,7,8-HpCDD	ND	0.00508				
OCDD	0.00859			45:01	1.00	A
2,3,7,8-TCDF	ND	0.00148				
1,2,3,7,8-PeCDF	ND	0.00508				
2,3,4,7,8-PeCDF	ND	0.00508				
1,2,3,4,7,8-HxCDF	ND	0.00508				
1,2,3,6,7,8-HxCDF	ND	0.00508				
2,3,4,6,7,8-HxCDF	ND	0.00508				
1,2,3,7,8,9-HxCDF	ND	0.00508				
1,2,3,4,6,7,8-HpCDF	0.00177			39:13	1.06	A
1,2,3,4,7,8,9-HpCDF	ND	0.00508				
OCDF	ND	0.0102				
Total TCDDs	ND	0.00196				
Total PeCDDs	ND	0.00508				
Total HxCDDs	ND	0.00508				
Total HpCDDs	ND	0.00508				
Total TCDFs	ND	0.00148				
Total PeCDFs	ND	0.00508				
Total HxCDFs	ND	0.00508				
Total HpCDFs	0.00177					
WHO-2005 TEQ (ND=0)	0.0000203		0.0000203			
WHO-2005 TEQ (ND=½)	0.00628		0.00628			

DATA VAL QUALIFIER

J

J

Client Information			**Sample Information**	
Project Name:	F52208		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52208-6		Weight / Volume:	985 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14457
Project ID:	G383-602		Instrument:	HRMS1
Sample ID:	G383-602-6B		Filename:	a07sep07a_5-13
Collection Date/Time:	08/30/07	11:45	Retchk:	a07sep07a_4-14
Receipt Date/Time:	09/05/07	10:30	Begin ConCal:	a07sep07a_4-14
Extraction Date:	09/06/07		End ConCal:	a07sep07a_5-14
Analysis Date/Time:	09/09/07	9:09	Initial Cal:	m8290-071007a

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F52170

DATE: November 5, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B. A total of nine aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	TMMW3	F52170-6
48MW1	F52170-2	48MW4	F52170-7
TMMW01	F52170-3	49MW1	F52170-8
48MW2	F52170-4	TB082907	F52170-9
48MW3	F52170-5		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

11/5/07

Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F52170

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples cooled @ 4°C±2°C; pH<2 HCl, the maximum holding time is 14 days (7 days if no HCl added) from sample collection to analysis. For soil samples cooled @ 4°C±2°C; the maximum holding time is 14 days from sample collection to analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected for VOCs on 08/29/07 and analyzed on 9/10/07 and 9/12/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the 9/7/07 initial calibration performed on instrument MSVOA4, target compounds acetone (15.12%), chloroethane (15.55%), 2-hexanone (20.41%), 4-methyl-2-pentanone (24.74%), methylene chloride (33.22%), and styrene (17.15%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration verification performed on 9/7/07 @1307 on instrument MSVOA4, acetone (31.6%) had a %drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification, therefore no qualifiers were applied.

- During the continuing calibration performed on 9/10/07 @1158 on instrument MSVOA4, acetone (28.8%) and methylene chloride (33.7%) had %drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No acetone or methylene chloride was detected in any of the associated samples, so no data qualification was required. Samples 59MW01, 48MW1, and TMMW01 were analyzed following this continuing calibration.

- During the continuing calibration performed on 9/12/07 @1010 on instrument MSVOA4, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No data qualification was required. Samples 48MW2, 48MW3, TMMW3, 48MW4, 49MW01, and TB082907 were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/10/07	VB2032-MB	All target <½MRL	NA	NA	None
9/12/07	VB2034-MB	Chloroform	0.62 J	3.1	None
9/12/07	VB2034-MB	Methylene chloride	4.7 J	47	None
9/12/07	TB083007	All target <½MRL	NA	NA	None
9/13/07	RB083007	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample
Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. The DoD aqueous LCS recovery limits are specified in Table D-4 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample VB2032-BS was used as the aqueous LCS for the VOC analysis on 9/10/07. All target compound recoveries were within criteria. No data qualifiers were applied. Samples 59MW01, 48MW1, and TMMW01 were analyzed in conjunction with this LCS.

- Sample VB2034-BS was used as the aqueous LCS for the VOC analysis on 9/12/07. Methyl chloride (135%) was above the DoD QSM criteria. No methyl chloride was detected in any samples, therefore no data qualifiers were applied. All other target compound recoveries were within criteria. Samples 48MW2, 48MW3, TMMW3, 48MW4, 49MW01, and TB082907 were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table D-4 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 48MW3 was used for the aqueous MS/MSD analysis on 9/12/07. Methyl chloride (147%, 143%) was above the DoD QSM criteria. No methyl chloride was detected in any samples, therefore no data qualifiers were applied. All other target compound recoveries were within criteria. All samples were analyzed in conjunction with this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria: Dibromofluoromethane (87-116%) (DoD QSM = 85-115%)
1,2-Dichloroethane-d4 (76-127%) (DoD QSM = 70-120%)
Toluene-d8 (86-112%) (DoD QSM = 85-120%)
4-Bromofluorobenzene (84-120%) (DoD QSM = 75-120%)

- All samples met criteria. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- All samples met criteria. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 & TMMW01, and 48MW3 & TMMW3. All compounds detected above the MDL met RPD criteria. No data qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 48MW3, carbon tetrachloride

Conc. (μg/L) = (Ax * Is * DF)/(Ais * RRF * Vo)

where: Ax is the compound area
Is is the amount of internal standard added (ng)
DF is the dilution factor
Ais is the internal standard area
RRF is the relative response factor
Vo is the volume of water purged (ml)

Conc. μg/L = (768096 * 250 * 1) / (1677869 * 0.379 * 5) = 60.4 μg/L

Reported Conc. = 60.3 μg/L
%D = 0.17%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048359.D	1	09/10/07	LD	n/a	n/a	VB2032
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	105%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	112%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048360.D	1	09/10/07	LD	n/a	n/a	VB2032
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	ND	25	10	ug/l		
71-43-2	Benzene	ND	1.0	0.20	ug/l		
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l		
75-25-2	Bromoform	ND	1.0	0.28	ug/l		
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l		
75-00-3	Chloroethane	ND	2.0	0.46	ug/l		
67-66-3	Chloroform	ND	1.0	0.21	ug/l		
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l		
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l		
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l		
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l		
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l		
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l		
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l		
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l		
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l		
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l		
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l		
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l		
591-78-6	2-Hexanone	ND	10	2.9	ug/l		
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l		
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l		
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l		
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l		
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l		
100-42-5	Styrene	ND	1.0	0.20	ug/l		
71-55-6	1,1,1-Trichloroethane	0.46	1.0	0.29	ug/l	J	J
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l		
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l		
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l		
108-88-3	Toluene	ND	1.0	0.27	ug/l		
79-01-6	Trichloroethylene	1.6	1.0	0.38	ug/l		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	106%		76-127%
2037-26-5	Toluene-D8	103%		86-112%
460-00-4	4-Bromofluorobenzene	113%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048361.D	1	09/10/07	LD	n/a	n/a	VB2032
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	104%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	111%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048407.D	1	09/12/07	LD	n/a	n/a	VB2034
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	94.6	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	11.2	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	107%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	108%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048408.D	1	09/12/07	LD	n/a	n/a	VB2034
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	60.3	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	10.1	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	108%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	110%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048409.D	1	09/12/07	LD	n/a	n/a	VB2034
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	59.6	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	10.3	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	106%		76-127%
2037-26-5	Toluene-D8	103%		86-112%
460-00-4	4-Bromofluorobenzene	112%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048410.D	1	09/12/07	LD	n/a	n/a	VB2034
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	107%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	108%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048411.D	1	09/12/07	LD	n/a	n/a	VB2034
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	3.8	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		87-116%
17060-07-0	1,2-Dichloroethane-D4	108%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	109%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB082907		
Lab Sample ID:	F52170-9	**Date Sampled:**	08/29/07
Matrix:	AQ - Trip Blank Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048412.D	1	09/12/07	LD	n/a	n/a	VB2034
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB082907		
Lab Sample ID:	F52170-9	**Date Sampled:**	08/29/07
Matrix:	AQ - Trip Blank Water	**Date Received:**	08/30/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	110%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F52170

DATE: November 5, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3510C/8270C. The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Surrogate Spikes
	X	Internal Standards
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

11/5/07
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F52170

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For semivolatile (SVOC) and polynuclear aromatic hydrocarbons (PAH) compounds, the samples are cooled @4°C ± 2°C for aqueous samples with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 8/29/07, extracted for SVOCs on 9/5/07, extracted for PAHs by SIM on 9/5/07, analyzed for SVOCs on 9/11/07 & 9/12/07, and analyzed for PAHs by SIM on 9/21/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 9/11/07 using instrument GCMSU. Target compounds 2,4-dinitrophenol (45.04%) and 4,6-dinitro-2-methylphenol (21.03%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using second order regression, and had correlation coefficients >0.995; therefore no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- Initial calibration for the PAHs-SIM was performed on 9/20/07 using instrument GCMSW, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the SVOC initial calibration verification performed on 9/11/07 @1630 using instrument GCMSU, bis(2-chloroethoxy)methane (24.5%), 4-chloroaniline (34.3%), and 3-nitroaniline (29.7%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 9/11/07 @1741 using instrument GCMSU, all criteria were met for all target compounds. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the PAH-SIM initial calibration verification performed on 9/20/07 @1643 using instrument GCMSW, all criteria were met for all target compounds. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PAH-SIM continuing calibration performed on 9/20/07 @1811 using instrument GCMSW, all criteria were met for all target compounds. No qualifiers were applied. All samples were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/11/07	OP22198-MB	All SVOC target <½MRL	NA	NA	None
9/21/07	OP22199-MB	All PAH SIM target <½MRL	NA	NA	None
9/15/07	RB083007	All SVOC target <½MRL	NA	NA	None
9/20/07	RB083007	All PAH SIM target <½MRL	NA	NA	None

NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-2 and Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:
2-Fluorophenol (14-62%) – (DoD QSM = 20-110%)
Phenol – d5 (10-40%) – (DoD QSM = 10-115%)
2,4,6-Tribromophenol (33-118%) – (DoD QSM = 40-125%)
Nitrobenzene-d5 (42-108%) – (DoD QSM = 40-110%)
2-Fluorobiphenyl (40-106%) – (DoD QSM = 50-110%)
p-Terphenyl – d14 (39-121%) – (DoD QSM = 50-135%)

- The MS had a high phenol-d5 (50.0%) recovery, while the MSD had a low high 2-fluorobiphenyl (48.0%) recovery. The unspiked sample surrogate recoveries met criteria, no qualifiers were applied.

- All other field samples met surrogate recovery criteria. No qualifiers were applied.

VII-Internal Standards
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table D-2 and Table D-6 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22198-BS was used as the aqueous LCS for the SVOC analysis on 9/11/07. All compounds met recovery criteria. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

- Sample OP22199-BS was used as the aqueous LCS for the PAH-SIM analysis on 9/20/07. All compounds met recovery criteria. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-6 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 52160-2 was used for the aqueous MS/MSD during SVOC analysis on 9/11/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this MS/MSD.

- Sample 48MW3 was used for the MS/MSD for the solid PAH SIM analysis on 9/21/07. All compounds met recovery criteria. No qualifiers were applied. All samples were analyzed in conjunction with this MS/MSD.

X-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 & TMMW01, and 48MW3 & TMMW3. All compounds detected above the MDL met RPD criteria. No data qualifiers were applied.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: OP22198-BS, benzoic acid

Conc. (µg/L) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_o)*(V_i)}

where:	$Conc_{sample}$	=	Sample concentration in µg/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (µL).
	DF	=	Dilution Factor

Conc. µg/L = (95631 * 40 * 1000 * 1) / (780594 * 0.323 * 1000 * 1) = 15.2 ng/mL
= 15.2 µg/L

Reported Value = 15.2 µg/L
% Difference = 0.0%
Values were within 10% difference.

Sample: OP22199-BS, bezno(a)pyrene

Conc. (µg/L) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_o)*(V_i)}

where:	$Conc_{sample}$	=	Sample concentration in µg/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (µL).
	DF	=	Dilution Factor

Conc. µg/L = (68314 * 4 * 1000 * 1) / (98767 * 1.335 * 1000 * 1) = 2.1 ng/mL
= 2.1 µg/L

Reported Value = 2.1 µg/L
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: U004532.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004532.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	38%		14-62%
4165-62-2	Phenol-d5	29%		10-40%
118-79-6	2,4,6-Tribromophenol	77%		33-118%
4165-60-0	Nitrobenzene-d5	73%		42-108%
321-60-8	2-Fluorobiphenyl	75%		40-106%
1718-51-0	Terphenyl-d14	78%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W037000.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037000.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004533.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	26	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.1	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.1	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	26	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.1	1.0	ug/l	
	3&4-Methylphenol	ND	5.1	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	26	10	ug/l	
87-86-5	Pentachlorophenol	ND	26	10	ug/l	
108-95-2	Phenol	ND	5.1	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.1	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l	
86-74-8	Carbazole	ND	5.1	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.1	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.1	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.1	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.1	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.1	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.1	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.1	1.9	ug/l	
78-59-1	Isophorone	ND	5.1	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	39%		14-62%
4165-62-2	Phenol-d5	30%		10-40%
118-79-6	2,4,6-Tribromophenol	77%		33-118%
4165-60-0	Nitrobenzene-d5	70%		42-108%
321-60-8	2-Fluorobiphenyl	71%		40-106%
1718-51-0	Terphenyl-d14	81%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037001.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.51	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.51	ug/l	
120-12-7	Anthracene	ND	1.0	0.51	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.051	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.051	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.051	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.26	ug/l	
86-73-7	Fluorene	ND	1.0	0.26	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.051	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-20-3	Naphthalene	ND	1.0	0.26	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.51	ug/l	
129-00-0	Pyrene	ND	1.0	0.26	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U004534.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004534.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	34%		14-62%
4165-62-2	Phenol-d5	26%		10-40%
118-79-6	2,4,6-Tribromophenol	75%		33-118%
4165-60-0	Nitrobenzene-d5	67%		42-108%
321-60-8	2-Fluorobiphenyl	69%		40-106%
1718-51-0	Terphenyl-d14	82%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037002.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004535.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	34%		14-62%
4165-62-2	Phenol-d5	26%		10-40%
118-79-6	2,4,6-Tribromophenol	71%		33-118%
4165-60-0	Nitrobenzene-d5	62%		42-108%
321-60-8	2-Fluorobiphenyl	65%		40-106%
1718-51-0	Terphenyl-d14	67%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W037003.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037003.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004536.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	30%		14-62%
4165-62-2	Phenol-d5	23%		10-40%
118-79-6	2,4,6-Tribromophenol	69%		33-118%
4165-60-0	Nitrobenzene-d5	57%		42-108%
321-60-8	2-Fluorobiphenyl	59%		40-106%
1718-51-0	Terphenyl-d14	79%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037004.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.98	0.49	ug/l	
120-12-7	Anthracene	ND	0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.098	ug/l	
218-01-9	Chrysene	ND	0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.98	0.25	ug/l	
86-73-7	Fluorene	ND	0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND	0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND	0.98	0.49	ug/l	
129-00-0	Pyrene	ND	0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004537.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	37%		14-62%
4165-62-2	Phenol-d5	27%		10-40%
118-79-6	2,4,6-Tribromophenol	73%		33-118%
4165-60-0	Nitrobenzene-d5	67%		42-108%
321-60-8	2-Fluorobiphenyl	68%		40-106%
1718-51-0	Terphenyl-d14	76%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037007.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.98	0.49	ug/l	
120-12-7	Anthracene	ND	0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.098	ug/l	
218-01-9	Chrysene	ND	0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.98	0.25	ug/l	
86-73-7	Fluorene	ND	0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND	0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND	0.98	0.49	ug/l	
129-00-0	Pyrene	ND	0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004538.D	1	09/11/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	33%		14-62%
4165-62-2	Phenol-d5	24%		10-40%
118-79-6	2,4,6-Tribromophenol	67%		33-118%
4165-60-0	Nitrobenzene-d5	62%		42-108%
321-60-8	2-Fluorobiphenyl	63%		40-106%
1718-51-0	Terphenyl-d14	73%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037008.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.98	0.49	ug/l	
120-12-7	Anthracene	ND	0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.098	ug/l	
218-01-9	Chrysene	ND	0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.98	0.25	ug/l	
86-73-7	Fluorene	ND	0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND	0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND	0.98	0.49	ug/l	
129-00-0	Pyrene	ND	0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004539.D	1	09/12/07	NJ	09/05/07	OP22198	SU216
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	36%		14-62%
4165-62-2	Phenol-d5	27%		10-40%
118-79-6	2,4,6-Tribromophenol	77%		33-118%
4165-60-0	Nitrobenzene-d5	65%		42-108%
321-60-8	2-Fluorobiphenyl	69%		40-106%
1718-51-0	Terphenyl-d14	64%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W037009.D	1	09/21/07	RB	09/05/07	OP22199	SW1906
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F52170

DATE: November 6, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. Samples were analyzed for pesticides and PCBs using USEPA Methods 510C/8081A and 3510C/8082, respectively. A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

11/6/07

Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F52170

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, pesticide and PCB compounds are shipped @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/29/07, extracted for pesticides and PCBs on 9/4/07, analyzed for pesticides on 9/17/07 & 9/18/07, and analyzed for PCBs on 9/19/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- During analysis performed on 9/13/07 @1124, endrin and 4,4'-DDT percent breakdowns were 7.5% and 3.3% on signal #1, and 6.8% and 2.7% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During analysis performed on 9/17/07 @1541, endrin and 4,4'-DDT percent breakdowns were 8.6% and 11.3% on signal #1, and 8.2% and 9.8% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- During the pesticide initial calibration performed on 9/13/07 on instrument ECD6, all criteria were met. No qualifiers were applied. All samples were analyzed following this initial calibration.

- During the PCB initial calibration performed on 9/17/07 on instrument ECD3, all criteria were met. No qualifiers were applied. All samples were analyzed following this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the calibration should be no greater than ±20%.

- During the pesticide initial calibration verification performed on 9/13/07 @1346 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples were analyzed in conjunction with this ICV.

- During the pesticide continuing calibration performed on 9/17/07 @2040 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples 59MW01, 48MW1, TMMW01, 48MW2, and 48MW3 were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 9/17/07 @2318 on instrument ECD6, endrin ketone (20.8%) had a high %D on signal #2. All endrin ketone results in associated samples have been qualified "J/UJ". All other compounds met criteria. Samples 59MW01, 48MW1, TMMW01, 48MW2, and 48MW3 were analyzed prior to this continuing calibration, while samples TMMW3, 48MW4, and 49MW01 were analyzed after to this continuing calibration.

- During the pesticide continuing calibration performed on 9/18/07 @0036 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples TMMW3, 48MW4, and 48MW01 were analyzed prior to this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 9/17/07 @1518 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 9/19/07 @1156 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 59MW01, 48MW1, TMMW01, and 48MW2 were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 9/19/07 @1509 on instrument ECD3, aroclor 1016 peak #1 had high %D on signal #1 (22.3%) and signal #2 (23.2%). The average %D from all six peaks was < 20% on signal #1 (9.0%) and signal #2 (9.3%), so no qualifiers were applied. The aroclor 1260 peaks met criteria. Samples 59MW01, 48MW1, TMMW01, and 48MW2 were analyzed prior to this continuing calibration, while samples 48MW3, TMMW3, 48MW4, and 49MW01 were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 9/19/07 @1734 on instrument ECD3, aroclor 1016 peak #1 had high %D on signal #1 (25.5%) and signal #2 (24.8%). The average %D from all six peaks was < 20% on signal #1 (11.0%) and signal #2 (9.9%), so no qualifiers were applied. The aroclor 1260 peaks met criteria. Samples 48MW3, TMMW3, 48MW4, and 49MW01 were analyzed prior to this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	9/17/07	OP22191-MB	All target <½MRL	NA	NA	None
Pesticides	9/24/07	RB083007	All target <½MRL	NA	NA	None
PCBs	9/19/07	OP22188-MB	All target <½MRL	NA	NA	None
PCBs	9/14/07	RB083007	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Tetrachloro-m-xylene:	Pesticides: 42-127% (DoD QSM 25-140%)
	Decachlorobiphenyl:	Pesticides: 27-127% (DoD QSM 30-135%)
	Tetrachloro-m-xylene:	PCBs: 38-127% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 25-137% (DoD QSM 40-135%)

- Sample 48MW2 had a low decachlorobiphenyl recovery (29.2%) from signal #2 during pesticide analysis. Decachlorobiphenyl met recovery criteria on signal #1, and tetrachloro-m-xylene was within criteria on both signals. No qualifiers are required when only one surrogate is outside criteria from one signal.

- All other samples met surrogate recovery criteria during pesticide analysis.

- Sample 48MW2 had low decachlorobiphenyl recoveries (28.7%, 29.6%) from both signals during PCB analysis. The PCB results from 48MW2 have been qualified "J/UJ" as estimated.

- All other samples met surrogate recovery criteria during PCB analysis.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22191-BS was used as the LCS during 9/17/07 pesticide analysis. Endrin aldehyde (24%) had a low recovery, and was not detected in any field samples – the results have been qualified "UL" as estimated. All other pesticides met recovery criteria.

- Sample OP22188-BS was used as the LCS during the 9/19/07 PCB analysis. All criteria were met. No qualifiers were applied.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 48MW3 was used for the pesticide MS/MSD analysis. Endrin aldehyde (20%, 27%) had a low recovery in the MS and MSD, as well as having a low recovery in the associated LCS. All sample results have already been qualified "UL", no further qualification is required. All other pesticides met criteria. All samples were analyzed in conjunction with this MS/MSD.

- Sample 48MW3 was used for the PCB MS/MSD analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 & TMMW01, and 48MW3 & TMMW3. All pesticides detected above the MDL met RPD criteria. No data qualifiers were applied.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

Sample: 48MW3MSD, dieldrin

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs *1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Vs = Volume of the sample extracted (mL)

Conc. µg/L = (2737226 * 1 * 10000) / (48810 * 520 * 1 * 1000)
= 1.1 ng/mL = 1.1 ug/L

Reported Conc. = 1.1 µg/L
%D = 0.0%
Values were within 10% difference

Sample: 48MW3MS, Aroclor 1260

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs * 1000)

where: Conc. = Sample concentration in µg/L
Ax = Area response for compound being measured.
Vt = Total volume of extract, taking into account dilutions (µL)
DF = Dilution factor
CF = Calibration factor from ICAL (area/pg)
Vi = Volume of extract injected (µL).
Vs = Volume of sample extracted (mL).

Signal #1
Conc1 µg/L = (3361004 * 10000* 1) / (8730 * 1 * 510 * 1000) = 7.55 µg/L
Conc2 µg/L = (3706286 * 10000* 1) / (10130 * 1 * 510 * 1000) = 7.17 µg/L
Conc3 µg/L = (4017626 * 10000* 1) / (10500 * 1 * 510 * 1000) = 7.50 µg/L
Conc4 µg/L = (2901174 * 10000* 1) / (7745 * 1 * 510 * 1000) = 7.34 µg/L
Conc5 µg/L = (6662020 * 10000* 1) / (18130 * 1 * 510 * 1000) = 7.20 µg/L
Conc6 µg/L = (3693262 * 10000* 1) / (10080 * 1 * 510 * 1000) = 7.18 µg/L
Average concentration = 7.3 µg/L

Reported Value = 7.3 µg/L (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: **TT09140.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09140.D	1	09/17/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	88%		42-127%
2051-24-3	Decachlorobiphenyl	86%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **ST66815.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66815.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		38-127%
2051-24-3	Decachlorobiphenyl	78%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **TT09141.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09141.D	1	09/17/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		42-127%
2051-24-3	Decachlorobiphenyl	62%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66816.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	91%		38-127%
2051-24-3	Decachlorobiphenyl	55%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09142.D	1	09/17/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	0.050	0.010	ug/l		
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l		
319-85-7	beta-BHC	ND	0.050	0.011	ug/l		
319-86-8	delta-BHC	ND	0.050	0.010	ug/l		
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l		
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l		
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l		
60-57-1	Dieldrin	ND	0.050	0.010	ug/l		
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l		
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l		
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l		
72-20-8	Endrin	ND	0.10	0.020	ug/l		
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l		
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l		UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l		UJ
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l		
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l		
76-44-8	Heptachlor	ND	0.050	0.010	ug/l		
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l		
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l		
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		42-127%
2051-24-3	Decachlorobiphenyl	90%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **ST66817.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66817.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		38-127%
2051-24-3	Decachlorobiphenyl	87%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **TT09143.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09143.D	1	09/17/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1050 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.048	0.0095	ug/l	
319-84-6	alpha-BHC	ND	0.048	0.0095	ug/l	
319-85-7	beta-BHC	ND	0.048	0.010	ug/l	
319-86-8	delta-BHC	ND	0.048	0.0095	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.048	0.0095	ug/l	
5103-71-9	alpha-Chlordane	ND	0.048	0.0095	ug/l	
5103-74-2	gamma-Chlordane	ND	0.048	0.0095	ug/l	
60-57-1	Dieldrin	ND	0.048	0.0095	ug/l	
72-54-8	4,4'-DDD	ND	0.095	0.019	ug/l	
72-55-9	4,4'-DDE	ND	0.095	0.019	ug/l	
50-29-3	4,4'-DDT	ND	0.095	0.019	ug/l	
72-20-8	Endrin	ND	0.095	0.019	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.095	0.019	ug/l	
7421-93-4	Endrin aldehyde	ND	0.095	0.029	ug/l	UL
53494-70-5	Endrin ketone	ND	0.095	0.019	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.048	0.0095	ug/l	
33213-65-9	Endosulfan-II	ND	0.095	0.0095	ug/l	
76-44-8	Heptachlor	ND	0.048	0.0095	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.048	0.0095	ug/l	
72-43-5	Methoxychlor	ND	0.095	0.019	ug/l	
8001-35-2	Toxaphene	ND	2.4	1.2	ug/l	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		42-127%
2051-24-3	Decachlorobiphenyl	31%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **ST66818.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66818.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1050 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.48	0.24	ug/l	
11104-28-2	Aroclor 1221	ND	0.48	0.38	ug/l	
11141-16-5	Aroclor 1232	ND	0.48	0.38	ug/l	
53469-21-9	Aroclor 1242	ND	0.48	0.24	ug/l	
12672-29-6	Aroclor 1248	ND	0.48	0.24	ug/l	
11097-69-1	Aroclor 1254	ND	0.48	0.24	ug/l	
11096-82-5	Aroclor 1260	ND	0.48	0.24	ug/l	

DATA VAL QUALIFIER UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	29%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **TT09144.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09144.D	1	09/17/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1030 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.0097	ug/l	
319-84-6	alpha-BHC	ND	0.049	0.0097	ug/l	
319-85-7	beta-BHC	ND	0.049	0.011	ug/l	
319-86-8	delta-BHC	ND	0.049	0.0097	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.0097	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.0097	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.0097	ug/l	
60-57-1	Dieldrin	ND	0.049	0.0097	ug/l	
72-54-8	4,4'-DDD	ND	0.097	0.019	ug/l	
72-55-9	4,4'-DDE	ND	0.097	0.019	ug/l	
50-29-3	4,4'-DDT	ND	0.097	0.019	ug/l	
72-20-8	Endrin	ND	0.097	0.019	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.097	0.019	ug/l	
7421-93-4	Endrin aldehyde	ND	0.097	0.029	ug/l	UL
53494-70-5	Endrin ketone	ND	0.097	0.019	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.049	0.0097	ug/l	
33213-65-9	Endosulfan-II	ND	0.097	0.0097	ug/l	
76-44-8	Heptachlor	ND	0.049	0.0097	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.0097	ug/l	
72-43-5	Methoxychlor	ND	0.097	0.019	ug/l	
8001-35-2	Toxaphene	ND	2.4	1.2	ug/l	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	83%		42-127%
2051-24-3	Decachlorobiphenyl	95%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **ST66821.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66821.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1030 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.49	0.24	ug/l	
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l	
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l	
53469-21-9	Aroclor 1242	ND	0.49	0.24	ug/l	
12672-29-6	Aroclor 1248	ND	0.49	0.24	ug/l	
11097-69-1	Aroclor 1254	ND	0.49	0.24	ug/l	
11096-82-5	Aroclor 1260	ND	0.49	0.24	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		38-127%
2051-24-3	Decachlorobiphenyl	91%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT09149.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09149.D	1	09/17/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.0098	ug/l	
319-84-6	alpha-BHC	ND	0.049	0.0098	ug/l	
319-85-7	beta-BHC	ND	0.049	0.011	ug/l	
319-86-8	delta-BHC	ND	0.049	0.0098	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.0098	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.0098	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.0098	ug/l	
60-57-1	Dieldrin	ND	0.049	0.0098	ug/l	
72-54-8	4,4'-DDD	ND	0.098	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.098	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.098	0.020	ug/l	
72-20-8	Endrin	ND	0.098	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.098	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.098	0.029	ug/l	UL
53494-70-5	Endrin ketone	ND	0.098	0.020	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.049	0.0098	ug/l	
33213-65-9	Endosulfan-II	ND	0.098	0.0098	ug/l	
76-44-8	Heptachlor	ND	0.049	0.0098	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.0098	ug/l	
72-43-5	Methoxychlor	ND	0.098	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.2	ug/l	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		42-127%
2051-24-3	Decachlorobiphenyl	88%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66824.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.49	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l	
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l	
53469-21-9	Aroclor 1242	ND	0.49	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.49	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.49	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.49	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	83%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **TT09150.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09150.D	1	09/18/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.0098	ug/l	
319-84-6	alpha-BHC	ND	0.049	0.0098	ug/l	
319-85-7	beta-BHC	ND	0.049	0.011	ug/l	
319-86-8	delta-BHC	ND	0.049	0.0098	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.0098	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.0098	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.0098	ug/l	
60-57-1	Dieldrin	ND	0.049	0.0098	ug/l	
72-54-8	4,4'-DDD	ND	0.098	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.098	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.098	0.020	ug/l	
72-20-8	Endrin	ND	0.098	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.098	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.098	0.029	ug/l	UL
53494-70-5	Endrin ketone	ND	0.098	0.020	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.049	0.0098	ug/l	
33213-65-9	Endosulfan-II	ND	0.098	0.0098	ug/l	
76-44-8	Heptachlor	ND	0.049	0.0098	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.0098	ug/l	
72-43-5	Methoxychlor	ND	0.098	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.2	ug/l	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	83%		42-127%
2051-24-3	Decachlorobiphenyl	90%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **ST66825.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66825.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.49	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l	
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l	
53469-21-9	Aroclor 1242	ND	0.49	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.49	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.49	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.49	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		38-127%
2051-24-3	Decachlorobiphenyl	93%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: **TT09151.D**

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT09151.D	1	09/18/07	FS	09/04/07	OP22191	GTT302
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	UJ
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		42-127%
2051-24-3	Decachlorobiphenyl	44%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST66826.D	1	09/19/07	JB	09/04/07	OP22188	GST1734
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		38-127%
2051-24-3	Decachlorobiphenyl	41%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-3728968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Perchlorate
Datachem Laboratories, Inc. SDG 07E-0785-01
(Accutest Laboratories, Inc., SDG F52170)

DATE: November 7, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP August 29, 2007. The aqueous samples were analyzed for perchlorate analysis using liquid chromatography mass spectroscopy (LC/MS) SW-846 method LC-MS-CLO4/6850 in selective ion monitoring (SIM) mode. A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006), *DoD Perchlorate Handbook August, Rev1, Change 1, 2007* (DoD, 2007), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
X		Initial and Continuing Calibration
	X	Blank Analysis
	X	Internal Standards
	X	Laboratory Control Sample (LCS)
	X	Matrix Spike (MS) and Spike Duplicate (MSD)
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

11/7/07
Date

RFAAP VALIDATION REPORT
PERCHLORATE REVIEW
SDG 07E-0785-01 (F52170)

I-Holding Times and Preservation

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. For perchlorate analysis, aqueous samples are shipped and stored at @4°C±2°C with a maximum holding time of 28 days from collection (DoD Perchlorate Handbook criteria).

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. Accutest shipped the perchlorate aliquot to DataChem Laboratories on 8/30/07, they were received by DataChem on 8/31/07 at 4°C. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 8/29/07, prepped on 9/18/07, and analyzed on 9/18/07. All holding time criteria were met. No qualifiers were applied.

II-Instrument Performance Check

LC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check target compounds - $^{35}Cl^{16}O_3$, $^{37}Cl^{16}O_3$, and $^{35}Cl^{18}O_3$ - met the mass calibration criteria. No qualification was applied.

III-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

Perchlorate:	1- blank (<1/2MRL DoD Perchlorate Handbook)
	5 – standards (r≥0.995 DoD Perchlorate Handbook)
	ICV (±15%D DoD Perchlorate Handbook)
	CCV (±15%D DoD Perchlorate Handbook)
	ICS, LODV (±30%D DoD Perchlorate Handbook)

- The perchlorate samples were analyzed on 9/18/07.

- Perchlorate was calibrated using a second order equation on 9/18/07, and had a correlation coefficient of 0.9998.

- The perchlorate recovery in LODV2 (74.2%) was above criteria, which the lab attributed to a positive interference at m/z 83. The eight samples in this data set were analyzed between LODV1 and LODV2, and the perchlorate results from all samples have been qualified "J/UJ" as estimated.

- All other ICVs, CCVs, ICSs, and LODVs were within criteria.

IV-Blanks

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be detected in any of the associated blanks >MDL. The DoD Perchlorate Handbook criterion specifies all concentrations should be less than ½ MRL for method blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/18/07	Perchlorate	BL-259711-1	<½MRL	NA	None
9/18/07	Perchlorate	RB083007	<½MRL	NA	None

MRL = Method Reporting Limit.
NA = Not Applicable.

V-Internal Standards

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The DoD Handbook specifies relative retention times (RRT) of 1.0 ± 2% of last calibration standard. The mass ratio of ions 83:85 for each sample and standard should be 3.06, and must fall between 2.3 and 3.8 to confirm the presence of perchlorate. The laboratory 83:85 mass ratio limit range is 2.21 to 4.10.

- LODV1 and LODV3 did not meet the 83:85 mass ratio criteria, but all eight samples and the associated MS/MSD met the 83:85 mass ratio criteria. No data qualifiers were applied.

- All samples met area and RRT criteria, and all samples other than the three listed above met 83:85 mass ratio criteria.

VI-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. DoD Perchlorate Handbook and laboratory aqueous limits are 85-115%.

- Sample QC-259711-1 was used as the aqueous LCS for perchlorate analysis on 9/18/07. All criteria were met. No qualifiers were applied.

VII-Matrix Spike (MS) and Spike Duplicate (MSD)

MS and MSD are generated to determine long-term accuracy and precision of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. MS/MSD recoveries and relative percent differences between MS recoveries should be within the specified limits. DoD Perchlorate Handbook aqueous limits are 75-125%; RPD≤20%. The laboratory limits are 80-120%; RPD≤15%.

- Sample 48MW03 (F52170-5) was used for the MS/MSD analysis. All criteria were met. All samples were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 (F52170-1) & TMMW01 (F52170-3), and 48MW3 (F52170-5) & TMMW3 (F52170-6). All compounds detected above the MDL met RPD criteria. No data qualifiers were applied.

IX-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, "J." The following calculations were performed for verification.

Sample: TMMW3 (F52170-6, 07E04505), Perchlorate

y (area ratio) = (Sample Area/Area EIC89) = (6924.26/49747.7) = 0.1392 = ax^2 + bx + c

solve for x
x = [-b ± SQRT(b^2-4ac)] / (2a)

where: x is the amount ratio

a = 0.0225735 b = 1.36878 c = - 0.0186592 - 0.1392 = -0.15786

amount ratio ={-1.36878± [SQRT{(1.36878^2) – (4*0.0225735*-0.15786)}] / (2*0.0225735)
={-1.36878± [SQRT (1.8735587+0.014254)]}/0.045147
={-1.36878±[SQRT 1.887813]} / 0.045147
={ -1.36878±1.37398 }/0.045147
=0.1152

Conc. µg/L = (Amount ratio * Is * DF)

where: Conc. = Sample concentration in ug/L
I_s = Amount of internal standard (µg/L).
DF = Dilution factor

Conc. µg/L = (Amount ratio * Is * DF)
= (0.1152* 5 µg/L * 1) = 0.576 µg/L

Reported concentration = 0.576 µg/L
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S077Z02F

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-1**
DCL Sample Name...: **07E04500**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 06:50
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIER

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 17:56	0.0663	0.283			1	0.200

J

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
09210710484034

S077Z02G

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-2**
DCL Sample Name...: **07E04501**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 08:20
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIER J

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 18:16	0.0663	0.190		J	1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S077Z02H

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-3**
DCL Sample Name...: **07E04502**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 06:50
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
☒ Primary
☐ Confirmation

DATA VAL QUALIFIER

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL	
Perchlorate	18-SEP-07 18:35	0.0663	0.239			1	0.200	J

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
09210710484034

S077Z02J

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-4**
DCL Sample Name...: **07E04503**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 08:40
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

DATA VAL QUALIFIER

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL	
Perchlorate	18-SEP-07 18:55	0.0663	0.548			1	0.200	J

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S077Z02K

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-5**
DCL Sample Name...: **07E04504**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 10:30
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

DATA VAL QUALIFIER

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 19:14	0.0663	0.407			1	0.200

J

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S077Z02N

Date Printed.....: 21-SEP-07 16:07

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-6**
DCL Sample Name...: **07E04505**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 10:30
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
☒ Primary
☐ Confirmation

DATA VAL QUALIFIER

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 20:13	0.0663	0.576			1	0.200

J

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S077Z02P

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-7**
DCL Sample Name...: **07E04506**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 14:10
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G078K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

DATA VAL QUALIFIED

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 20:33	0.0663	0.311			1	0.200

J

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S077Z02Q

Date Printed.....: 21-SEP-07 10:48

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F52170
Release Number.....: Not Provided

Date Received.....: 31-AUG-07 00:00

Client Sample Name: **F52170-8**
DCL Sample Name...: **07E04507**
DCL Report Group..: **07E-0785-01**

Matrix.....: WATER
Date Sampled.....: 29-AUG-07 14:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 18-SEP-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: GC78K00V
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
☒ Primary
☐ Confirmation

DATA VAL QUALIFIER

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	18-SEP-07 20:53	0.0663	0.193		J	1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F52170

DATE: November 6, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. The samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3010A/6010B for ICP metals and SW-846 7470A for mercury. A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Sample Duplicate
	X	Matrix Spike and Spike Duplicate
	X	ICP Serial Dilution
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

11/6/07
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F52170

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: For aqueous matrices, the samples are shipped cool @4°C±2°C and preserved to pH<2 with HNO_3 with a maximum holding time is 180 days for ICP metals and 28 days for mercury.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected 8/29/07 for metals analysis, digested for mercury on 9/5/07, analyzed for mercury on 9/5/07, digested for ICP metals on 9/12/07 & 9/14/07, and analyzed for ICP metals on 9/13/07 & 9/17/07. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (DoD QSM <½ MRL) 3 – standards (r≥0.995) ICV/CCV (90-110%) (DoD QSM 90-110%) MRL (70-130%) (DoD QSM 80-120%) High Std. (95-105%)	Hg:	1 – blank (DoD QSM <½ MRL) 5 – standards (r≥0.995) ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%) MRL (80-120%) (DoD QSM 80-120%) High Std. (95-105%)

- Mercury analysis was performed on 9/5/07, with a correlation coefficient of 0.9999.

- CCV20, CCV21, CCV22, and CCV23 from 9/12/07 had low nickel (88.0%, 89.0%, 88.5%, 88.5%) recoveries, but no samples from this data set were analyzed on 9/12/07 so no data qualifiers were applied. All CCVs from 9/13 & 9/17 met criteria.

- Aluminum (105.5%) and sodium (108.1%) had a high recoveries during the High Standard analysis on 9/12/07. No field samples were analyzed on 9/12/07, no data qualifiers were applied.

- All metals met recovery criteria during the 9/13/07 High Standard analysis.

- Calcium (94.3%) and iron (94.0%) had low recoveries, and sodium (106.3%) had a high recovery during the 9/17/07 High Standard analysis. The calcium and iron results have been qualified "L/UL", and the sodium detections have been qualified "K" in associated samples 48MW3, TMMW3, 48MW4, and 49MW01.

- All ICVs and CCVs met recovery criteria. **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL (µg/L)	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
9/5/07	Hg	0.2	Met criteria	None	None
9/12/07	ICP-Sb	5.0	124.0	None	None
9/12/07	ICP-As	10	122.0	None	None
9/12/07	ICP-Pb	5.0	130.0	None	None
9/13/07	ICP-Sb	5.0	122.0	None	None
9/17/07	ICP-Sb	5.0	130.0	None	None
9/17/07	ICP-Be	5.0	122.0	None	None
9/17/07	ICP-Pb	5.0	136.0	48MW3, 48MW4	K
9/17/07	ICP-Se	10	130.0	None	None
9/17/07	ICP-Tl	10	76.0	48MW3, TMMW3, 48MW4, 49MW01	UL

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/13/07	Antimony	ICB/CCBs	12.0	60.0	None
9/13/07	Potassium	ICB/CCBs	457 J	2285	59MW01, 48MW1, TMMW01
9/17/07	Antimony	ICB/CCBs	7.7	38.5	None
9/17/07	Copper	ICB/CCBs	5.4 J	27.0	None
9/17/07	Potassium	ICB/CCBs	1710 J	8550	All
9/17/07	Sodium	ICB/CCBs	1860 J	9300	48MW3, TMMW3
9/5/07	Mercury	ICB/CCBs	<2*MDL	NA	None
9/5/07	Mercury	MP12873-MB	<½MRL	NA	None
9/14/07	Lead	MP12936-MB	3.0 J	15.0	48MW3, 48MW4
9/17/07	Potassium	RB083007	1740 J	8700	All
9/17/07	Sodium	RB083007	1860 J	9300	48MW3, TMMW3
09/05/07	Mercury	RB083007	<2*MDL	NA	None

J = Estimated value <MRL and >MDL.

IV-ICP Interference Check Sample (ICS)

The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. All aqueous LCS results must fall within the control limits. The DoD QSM aqueous LCS recovery limits are specified in Table D-18 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12936-BS was used as the LCS during ICP metals analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

- Sample MP12873-BS was used as the LCS during mercury analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample 48MW3 was analyzed in duplicate during ICP metals analysis. All metals met RPD criteria. No data qualifiers were applied.

- Sample 48MW3 was used analyzed in duplicate during mercury analysis, and met RPD criteria. No qualifiers were applied.

VII-Matrix Spike/Spike Duplicate
MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-18 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample 48MW3 was used as the MS/MSD during ICP metals analysis. All metals met recovery and RPD criteria. No data qualifiers were applied.

- Sample 48MW3 was used as the MS/MSD during mercury analysis, and met recovery & RPD criteria. No data qualifiers were applied.

VIII-ICP Serial Dilution
An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- Sample 48MW3 was used as the serial dilution during ICP metals analysis. All metals met criteria. No data qualifiers were applied.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 & TMMW01, and 48MW3 & TMMW3. All metals detected above the MDL met RPD criteria. No data qualifiers were applied.

X-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 59MW01, Manganese

Conc. (µg/L) = (conc. µg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (20.5 µg/L)*(50 mL)*(1) / (50 mL) = 20.5 µg/L

Reported concentration = 20.5 µg/L
%D = 0.0%
Values were within 10% difference.

CVAA Sample: 48MW3 MSD, Mercury

Conc. (µg/L) = (conc. µg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (2.88 µg/L)*(50 mL)*(1) / (50 mL) = 2.9 µg/L

Reported concentration = 2.9 µg/L
%D = 0.0%.
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	725	200	79	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	214	200	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	30700	1000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	9.8 J J	10	0.92	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U	25	1.2	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	801	300	15	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U	5.0	2.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	23800	5000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	20.5	15	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	5.8 J J	40	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	2090 J J B	10000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	1460 J J	10000	500	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	10	6.5	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.8 J J	50	1.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U	20	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5974
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12917

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	79 U	200	79	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	75.5 J J	200	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	96400	1000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	9.9 J J	10	0.92	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U	25	1.2	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	36.0 J J	300	15	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U	5.0	2.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	44300	5000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	7.4 J J	15	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	5.7 J J	40	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	1950 J SB	10000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	2090 J J	10000	500	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	10	6.5	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 J J	50	1.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	6.3 J J	20	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5974
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12917

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	786	200	79	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	246	200	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	33200	1000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	10.2	10	0.92	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U	25	1.2	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	859	300	15	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U	5.0	2.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	25800	5000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	22.6	15	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	6.1 J J	40	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	2230 J J B	10000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	1250 J J	10000	500	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	10	6.5	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.6 J J	50	1.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U	20	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5974
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12917

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	14300	200	79	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	4.4 J J	10	3.7	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	607	200	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	185000	1000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	195	10	0.92	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	13.8 J J	50	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	19.7 J J	25	1.2	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	17200	300	15	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U	5.0	2.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	109000	5000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	286	15	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	132	40	1.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	6080 J J	10000	100	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	2240 J J	10000	500	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	10	6.5	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	35.6 J J	50	1.1	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	36.5	20	5.0	ug/l	1	09/12/07	09/13/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5974
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12917

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	79 U		200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U		6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U		10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	66.0 J	J	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U		4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U		5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	93600	L	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	8.1 J	J	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U		50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U		25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	UL	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	3.5 J	KB	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	42700		5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	7.0 J	J	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U		1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	5.0 J	J	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	3160 J	J	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U		10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U		10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	3660 J	KB	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U		50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U		20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	79 U		200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U		6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U		10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	70.6 J	J	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U		4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U		5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	93000	L	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	10		10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U		50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U		25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	UL	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U		5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	43500		5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	8.0 J	J	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U		1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	6.8 J	J	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	3190 J	J	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U		10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U		10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	3590 J	KB	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U		50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U		20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.7
3

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	79 U	200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U	6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U	10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	148 J J	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	58900 L	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	9.4 J J	10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U	25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U UL	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 J KB	5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	51900	5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	8.6 J J	15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U	1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	5.7 J J	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	3800 J J	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U	10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U	10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	12400 K	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U	50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.0 U	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	437		200	79	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.3 U		6.0	3.3	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Arsenic	3.7 U		10	3.7	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Barium	137 J	J	200	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U		4.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U		5.0	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Calcium	40800	L	1000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Chromium	23.8		10	0.92	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Cobalt	3.1 J	J	50	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 U		25	1.2	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Iron	623	L	300	15	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 U		5.0	2.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Magnesium	31000		5000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Manganese	15.1		15	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.11 U		1.0	0.11	ug/l	1	09/05/07	09/05/07	RS	SW846 7470A [1]	SW846 7470A [3]
Nickel	14.5 J	J	40	1.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Potassium	3420 J	J	10000	100	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Selenium	4.0 U		10	4.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Silver	0.77 U		10	0.77	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Sodium	11400	K	10000	500	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Thallium	6.5 U	UL	10	6.5	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U		50	1.1	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.4 J	J	20	5.0	ug/l	1	09/14/07	09/17/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5953
(2) Instrument QC Batch: MA5981
(3) Prep QC Batch: MP12873
(4) Prep QC Batch: MP12936

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Richard McCracken, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F52170

DATE: November 6, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. Aqueous samples were analyzed for chlorinated herbicides using USEPA SW846 Method 3510C/8151A. A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard M. Cracken

Richard McCracken, Chemist

11/6/07

Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F52170

I-Holding Times

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, chlorinated herbicides compounds are shipped @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/29/07, extracted on 9/1/07, and analyzed on 9/10/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration data was provided for MCPP or MCPA. During discussions with the laboratory, they indicated that they perform a one-point calibration each day that analysis for MCPP or MCPA is conducted. A five-point initial calibration was not performed, therefore all data for these two compounds has been qualified "J/UJ".

- During the initial calibration performed on 9/9/07 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

III-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A one-point daily calibration was provided for MCPP and MCPA, indicating that the lab is able to detect and quantitate both compounds. %D data was not supplied since a five-point initial calibration was not performed. All MCPP and MCPA data has already been qualified (see initial calibration), no additional qualification is required.

- During continuing calibration performed on 9/10/07 @0136 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During continuing calibration performed on 9/10/07 @0750 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During continuing calibration performed on 9/10/07 @1424 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed prior to this continuing calibration.

IV-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/10/07	OP7992-MB	All target compounds <½MRL	NA	NA	None
9/10/07	RB083007	All target compounds <½MRL	NA	NA	None

V-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Control Limit: 2,4-DCAA (34-179%)

- All samples met recovery criteria.

VI-Laboratory Control Samples

Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-8 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP7992-BS was used as the LCS during the 9/10/07 run. 2,4,5-T (115%) and dicamba (115%) had high recoveries, but neither compound was detected in any samples so no qualifiers were applied. All other herbicides were within criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-8 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- MS/MSD analysis was performed on 48MW3. 2,4,5-TP (Silvex) (121%, 118%) had high recoveries in the MS and MSD, and 2,4,5-T (111%) had a high recovery in the MS - neither compound was detected in any samples so no qualifiers were applied. Dinoseb had a high RPD, but the recoveries in the MS & MSD met criteria - no action is taken on RPD data alone. All other herbicides met recovery and RPD criteria.

VIII-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 & TMMW01, and 48MW3 & TMMW3. All herbicides detected above the MDL met RPD criteria. No data qualifiers were applied.

IX-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL is qualified as estimated, "J." All criteria were met. No qualifiers were applied.

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: OP7992-BS, 2,4,5-TP (Silvex)

Conc. µg/L = (A * DF * Vt) / (CF * Vo)

where: A = Area response of the sample
CF = Calibration Factor from initial calibration (area/(ug/L))
Vt = volume of final extract (mL)
DF = dilution factor
Vo = volume of the sample extracted (mL)

Conc. µg/L = (3796785 * 1 * 10 mL) / (83090 * 1000 mL)
= 0.46 ng/mL = 0.46 µg/L

Reported Conc. = 0.46 µg/L
%D = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37477.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND	50		ug/l	UJ
94-74-6	MCPA	ND	50		ug/l	UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	71%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37478.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	65%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37479.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	55%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37480.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l	UJ	
94-74-6	MCPA	ND	50		ug/l	UJ	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	40%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37481.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	60%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG37482.D

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

3.6

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37482.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	57%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37483.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND	50		ug/l	UJ
94-74-6	MCPA	ND	50		ug/l	UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	61%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70447 14:42 01-Nov-2007

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG37484.D	1	09/10/07	ATX	09/01/07	T:OP7992	T:GGG1164
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	57%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F52170

DATE: November 7, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. The samples were analyzed for explosives, nitroglycerin, and PETN using USEPA SW-846 3535A/8330A. A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	**Field Sample ID**	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

11/7/07
Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F52170

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, explosive compounds are shipped @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/29/07, extracted on 9/4/07, analyzed for PETN and nitroglycerine on 9/7/07, and analyzed for all other explosives on 9/6/07 & 9/13/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/6/07	OP22176-MB	All target explosives <½MRL	NA	NA	None
9/7/07	OP22176-MB	PETN & NG <½MRL	NA	NA	None
9/13/07	OP22176-MB	PETN & NG <½MRL	NA	NA	None
9/11/07	RB083007	All target explosives <½MRL	NA	NA	None
9/07/07	RB083007	PETN & NG <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient (r^2) must be ≥0.990 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration performed on 8/21/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- During the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration verification performed on 8/21/07 @1716 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed after this initial calibration verification.

- During the explosives continuing calibration verification performed on 9/6/07 @0242 on instrument G1315B, tetryl (24.5%) had a high %D from signal #1. All other target compounds met %D criteria. The method blank and LCS are the only analyses associated with this continuing calibration. No data qualifiers were applied.

- During the explosives continuing calibration verification performed on 9/6/07 @0824 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the explosives continuing calibration verification performed on 9/6/07 @1407 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed prior to this continuing calibration.

- During the PETN and nitroglycerin initial calibration verification performed on 3/15/07 @1235 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed in conjunction with this initial calibration verification.

- During the PETN and nitroglycerin continuing calibration performed on 9/7/07 @1242 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 59MW01, 48MW1, TMMW01, 48MW2, 48MW3, and TMMW3 were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 9/7/07 @1417 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 59MW01, 48MW1, TMMW01, 48MW2, 48MW3, and TMMW3 were analyzed prior to this continuing calibration, and sample 48MW4 was analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 9/7/07 @1600 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 48MW4 was analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 9/13/07 @1031 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 49MW01 was analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 9/13/07 @1148 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 49MW01 was analyzed prior to this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria: 3,4-dinitrotoluene (70-136%)

- All criteria were met for explosives, PETN, and nitroglycerin. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-12 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22176-BS was used as the LCS for PETN, nitroglycerin, and explosives analysis. HMX (128%) had a high recovery, but no HMX was detected in any samples so no qualifiers were applied. All other compounds met recovery criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-12 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 48MW3 was used as the MS/MSD for the explosive analysis. 2,4-Dinitrotoluene (118%) had a high recovery in the MS, and tetryl (131%, 129%) had high recoveries in the MS and MSD. Neither compound was detected in any samples so no data qualification was required. PETN had a high RPD, but the MS and MSD recoveries met criteria, no action is taken on RPD alone. All other compounds met criteria. All samples were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 & TMMW01, and 48MW3 & TMMW3. All explosives detected above the MDL met RPD criteria. No data qualifiers were applied.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all detected explosives, PETN, and nitroglycerin.

Sample: OP22176-BS, HMX

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured
Vt = Volume of total extract (mL)
DF = Dilution factor
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL)

Conc. µg/L = (1607036 * 10 * 1) / (3262 * 1000) = 4.9 µg/L

Reported Value = 4.9 µg/L
% Difference = 0.0%
Values were within 10% difference

Sample: OP22176-BS, nitroglycerin

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
DF = Dilution factor
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL).

Conc. µg/L = (3361818 * 10 * 1) / (1228 * 1000) = 27.4 µg/L

Reported Value = 27.4 µg/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	59MW01		
Lab Sample ID:	F52170-1	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022776.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022827.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.051	ug/l	
121-82-4	RDX	ND	0.20	0.060	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.071	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.097	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.065	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.073	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.078	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.10	ug/l	
479-45-8	Tetryl	ND	0.20	0.068	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.065	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.050	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.50	ug/l	
78-11-5	PETN	ND [a]	2.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	115%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW1		
Lab Sample ID:	F52170-2	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022777.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022828.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	950 ml	10.0 ml
Run #2	950 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.21	0.054	ug/l	
121-82-4	RDX	ND	0.21	0.063	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.21	0.059	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.21	0.075	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.21	0.10	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.21	0.068	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.21	0.059	ug/l	
98-95-3	Nitrobenzene	ND	0.21	0.077	ug/l	
88-72-2	o-Nitrotoluene	ND	0.21	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.21	0.082	ug/l	
99-99-0	p-Nitrotoluene	ND	0.21	0.11	ug/l	
479-45-8	Tetryl	ND	0.21	0.072	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.21	0.068	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.21	0.053	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.1	0.53	ug/l	
78-11-5	PETN	ND [a]	2.1	0.53	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%	136%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01		
Lab Sample ID:	F52170-3	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022778.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022829.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	1010 ml	10.0 ml
Run #2	1010 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.050	ug/l	
121-82-4	RDX	ND	0.20	0.059	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.055	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.070	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.096	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.064	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.055	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.072	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.11	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.077	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.10	ug/l	
479-45-8	Tetryl	ND	0.20	0.067	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.064	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.050	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.50	ug/l	
78-11-5	PETN	ND [a]	2.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	102%	118%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW2		
Lab Sample ID:	F52170-4	Date Sampled:	08/29/07
Matrix:	AQ - Ground Water	Date Received:	08/30/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022779.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022830.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	960 ml	10.0 ml
Run #2	960 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.21	0.053	ug/l	
121-82-4	RDX	ND	0.21	0.063	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.21	0.058	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.21	0.074	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.21	0.10	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.21	0.068	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.21	0.058	ug/l	
98-95-3	Nitrobenzene	ND	0.21	0.076	ug/l	
88-72-2	o-Nitrotoluene	ND	0.21	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.21	0.081	ug/l	
99-99-0	p-Nitrotoluene	ND	0.21	0.11	ug/l	
479-45-8	Tetryl	ND	0.21	0.071	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.21	0.068	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.21	0.052	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.1	0.52	ug/l	
78-11-5	PETN	ND [a]	2.1	0.52	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	94%	83%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW3		
Lab Sample ID:	F52170-5	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022780.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022833.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.051	ug/l	
121-82-4	RDX	ND	0.20	0.060	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.071	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.097	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.065	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.073	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.078	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.10	ug/l	
479-45-8	Tetryl	ND	0.20	0.068	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.065	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.050	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.50	ug/l	
78-11-5	PETN	ND [a]	2.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%	104%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW3		
Lab Sample ID:	F52170-6	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022783.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022834.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	1040 ml	10.0 ml
Run #2	1040 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.19	0.049	ug/l	
121-82-4	RDX	ND	0.19	0.058	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.19	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.19	0.068	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.19	0.093	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.19	0.062	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.19	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.19	0.070	ug/l	
88-72-2	o-Nitrotoluene	ND	0.19	0.11	ug/l	
99-08-1	m-Nitrotoluene	ND	0.19	0.075	ug/l	
99-99-0	p-Nitrotoluene	ND	0.19	0.097	ug/l	
479-45-8	Tetryl	ND	0.19	0.065	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.19	0.062	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.19	0.048	ug/l	
55-63-0	Nitroglycerine	ND [a]	1.9	0.48	ug/l	
78-11-5	PETN	ND [a]	1.9	0.48	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	104%	93%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	48MW4		
Lab Sample ID:	F52170-7	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022784.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022837.D	1	09/07/07	MRE	09/04/07	OP22176	GPP795

	Initial Volume	Final Volume
Run #1	1030 ml	10.0 ml
Run #2	1030 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.19	0.050	ug/l	
121-82-4	RDX	ND	0.19	0.058	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.19	0.054	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.19	0.069	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.19	0.094	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.19	0.063	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.19	0.054	ug/l	
98-95-3	Nitrobenzene	ND	0.19	0.071	ug/l	
88-72-2	o-Nitrotoluene	ND	0.19	0.11	ug/l	
99-08-1	m-Nitrotoluene	ND	0.19	0.076	ug/l	
99-99-0	p-Nitrotoluene	ND	0.19	0.098	ug/l	
479-45-8	Tetryl	ND	0.19	0.066	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.19	0.063	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.19	0.049	ug/l	
55-63-0	Nitroglycerine	ND [a]	1.9	0.49	ug/l	
78-11-5	PETN	ND [a]	1.9	0.49	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	98%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01		
Lab Sample ID:	F52170-8	**Date Sampled:**	08/29/07
Matrix:	AQ - Ground Water	**Date Received:**	08/30/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	PP022785.D	1	09/06/07	MRE	09/04/07	OP22176	GPP792
Run #2	PP022922.D	1	09/13/07	NAF	09/04/07	OP22176	GPP799

	Initial Volume	Final Volume
Run #1	900 ml	10.0 ml
Run #2	900 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.22	0.057	ug/l	
121-82-4	RDX	ND	0.22	0.067	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.22	0.062	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.22	0.079	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.22	0.11	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.22	0.072	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.22	0.062	ug/l	
98-95-3	Nitrobenzene	ND	0.22	0.081	ug/l	
88-72-2	o-Nitrotoluene	ND	0.22	0.13	ug/l	
99-08-1	m-Nitrotoluene	ND	0.22	0.087	ug/l	
99-99-0	p-Nitrotoluene	ND	0.22	0.11	ug/l	
479-45-8	Tetryl	ND	0.22	0.076	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.22	0.072	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.22	0.056	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.2	0.56	ug/l	
78-11-5	PETN	ND [a]	2.2	0.56	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	99%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. Project G383-600
(Accutest SDG F52170)

DATE: November 7, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 29, 2007. The samples were analyzed for Dioxin and Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of eight aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59MW01	F52170-1	48MW3	F52170-5
48MW1	F52170-2	TMMW3	F52170-6
TMMW01	F52170-3	48MW4	F52170-7
48MW2	F52170-4	49MW1	F52170-8

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

11/7/07
Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-600
(Accutest SDG F52170)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For aqueous samples, dioxin and furans are shipped @4°C ± 2°C, with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/29/07 were sent in 20 coolers, and were received by the laboratory on 8/30/07 at temperatures ranging from 0.8°C to 3.6°C, with 9 of the 20 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. Accutest shipped the dioxin aliquot to SGS Paradigm Analytical Laboratories on 8/30/07, they were received by DataChem on 8/31/07 at 2.6°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/29/07, extracted on 9/10/07, and analyzed on 9/12/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. ng/L	Action Level ng/L	B qualified samples
9/8/07	LMB14461	All congeners <EDL	NA	NA	None
9/9/07	RB083007	All congeners <EDL	NA	NA	None

J = Estimated value <MRL and >EDL.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

- The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
- The signal to noise ratio ≥10% for all target ions;
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During initial calibration performed on 07/10/07 using instrument HRMS1, all compounds met criteria. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

- The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
- The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During the continuing calibration performed on 9/12/07 @0856 on instrument HRMS1, all criteria were met. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the continuing calibration performed on 9/12/07 @2012 on instrument HRMS1, the following labeled standards had RFs >30%: 13C-1,2,3,7,8-PeCDD (31.1%), 13C-1,2,3,7,8-PeCDF; 13C-2,3,4,7,8-PeCDF. All PeCDDs and PeCDFs have been qualified "J/UJ". The other labeled and unlabeled standards met criteria. All samples were analyzed before this continuing calibration.

- During the continuing calibration performed on 9/13/07 @0753 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples were analyzed in conjunction with this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within ±35% when spiked at the method quantitation limit and within ±30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within ±20% when spiked above 20 times the method quantitation limit.

- Sample OPR14461 was used as LCS and LCSD during the 9/12/07 analytical run. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD ≤20%.

- MS/MSD analysis was performed on 48MW3. All analytes met recovery & RPD criteria.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data set included 59MW01 (F52170-1) & TMMW01 (F52170-3), and 48MW3 (F52170-5) & TMMW3 (F52170-6). All compounds detected in 59MW01 & TMMW01 had RPDs > 50%, but the detections were below the lower method calibration limit where analytical precision is not expected. No data qualifiers were applied. No target analytes were detected in 48MW3 or TMMW3.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". For where presence of quantitation interference (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- The 1,2,3,7,8-PeCDD, OCDD, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, and 1,2,3,4,6,7,8-HpCDF results in 59MW01 (F52170-1) have been qualified "J" as estimated since the amounts detected were less than the Lower Method Calibration Limit. The ion abundance ratio for 2,3,4,6,7,8-HxCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The OCDD result in 48MW1 (F52170-2) has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for OCDD did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- All target analytes were detected in TMMW01 (F52170-3) at concentrations less than the Lower Method Calibration Limit, and have been qualified "J" as estimated. The ion abundance ratio for OCDD did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The OCDD result in 48MW2 (F52170-4) has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

- The OCDD result in 48MW4 (F52170-7) has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

- The 1,2,3,4,6,7,8-HpCDD, 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in 49MW01 (F52170-8) have been qualified "J" as estimated since the amount of each compound detected was less than the Lower Method Calibration Limit. The ion abundance ratio for OCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

Sample: 49MW01 (F52170-8), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
V = volume in mL of the aqueous sample; and
Avg. RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/L)} = \frac{(A(x)) * Q(is) * 1000}{A(is) * V * \text{Avg. RRF}} = \frac{(3450000) * 4.0 * 1000}{(31600000) * 1000 * 1.1174} = 0.391 \text{ ng/L}$$

Reported Value = 0.391 ng/L
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Method 8290
F52170-1
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.00314						
1,2,3,7,8-PeCDD	0.00302			34:10	1.38		A	J
1,2,3,4,7,8-HxCDD	ND	0.00560						
1,2,3,6,7,8-HxCDD	ND	0.00560						
1,2,3,7,8,9-HxCDD	ND	0.00560						
1,2,3,4,6,7,8-HpCDD	ND	0.00560						
OCDD	0.00703			44:34	1.02		A	J
2,3,7,8-TCDF	ND	0.00248						
1,2,3,7,8-PeCDF	0.00370			33:22	1.37		A	J
2,3,4,7,8-PeCDF	0.00298			33:58	1.68		A	
1,2,3,4,7,8-HxCDF	0.00307			36:03	1.24		A	
1,2,3,6,7,8-HxCDF	0.00271			36:10	1.31		A	
2,3,4,6,7,8-HxCDF	EMPC	0.00560	0.00190	36:39	0.82	*	A	
1,2,3,7,8,9-HxCDF	0.00253			37:25	1.40		A	
1,2,3,4,6,7,8-HpCDF	0.00309			38:57	1.15		A	
1,2,3,4,7,8,9-HpCDF	ND	0.00560						
OCDF	ND	0.0112						
Total TCDDs	ND	0.00314						
Total PeCDDs	0.00302							
Total HxCDDs	ND	0.00560						
Total HpCDDs	ND	0.00560						
Total TCDFs	ND	0.00248						
Total PeCDFs	0.00667							
Total HxCDFs	0.0102							
Total HpCDFs	0.00309							
WHO-2005 TEQ (ND=0)	0.00489		0.00508					
WHO-2005 TEQ (ND=½)	0.00776		0.00767					

Client Information			**Sample Information**		
Project Name:	F52170		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F52170-1		Weight / Volume:	893 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14461	
Project ID:	G383-600		Instrument:	HRMS1	
Sample ID:	G383-600-1C		Filename:	a12sep07a-5	
Collection Date/Time:	08/24/07	6:50	Retchk:	a12sep07a-1	
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1	
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15	
Analysis Date/Time:	09/12/07	12:09	Initial Cal:	m8290cc-091207a	

Method 8290
F52170-2
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.00409						
1,2,3,7,8-PeCDD	ND	0.00514						UJ
1,2,3,4,7,8-HxCDD	ND	0.00514						
1,2,3,6,7,8-HxCDD	ND	0.00514						
1,2,3,7,8,9-HxCDD	ND	0.00514						
1,2,3,4,6,7,8-HpCDD	ND	0.00519						
OCDD	EMPC	0.0103	0.00652	44:34	1.03	*	A	J
2,3,7,8-TCDF	ND	0.00271						
1,2,3,7,8-PeCDF	ND	0.00514						UJ
2,3,4,7,8-PeCDF	ND	0.00514						UJ
1,2,3,4,7,8-HxCDF	ND	0.00514						
1,2,3,6,7,8-HxCDF	ND	0.00514						
2,3,4,6,7,8-HxCDF	ND	0.00514						
1,2,3,7,8,9-HxCDF	ND	0.00514						
1,2,3,4,6,7,8-HpCDF	ND	0.00514						
1,2,3,4,7,8,9-HpCDF	ND	0.00514						
OCDF	ND	0.0103						
Total TCDDs	ND	0.00409						
Total PeCDDs	ND	0.00514						
Total HxCDDs	ND	0.00514						
Total HpCDDs	ND	0.00519						
Total TCDFs	ND	0.00271						
Total PeCDFs	ND	0.00514						
Total HxCDFs	ND	0.00514						
Total HpCDFs	ND	0.00514						
WHO-2005 TEQ (ND=0)	ND		0.00000196					
WHO-2005 TEQ (ND=½)	0.00748		0.00748					

Client Information			**Sample Information**	
Project Name:	F52170		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52170-2		Weight / Volume:	973 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14461
Project ID:	G383-600		Instrument:	HRMS1
Sample ID:	G383-600-2C		Filename:	a12sep07a-6
Collection Date/Time:	08/24/07	8:20	Retchk:	a12sep07a-1
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15
Analysis Date/Time:	09/12/07	12:57	Initial Cal:	m8290cc-091207a

Method 8290
F52170-3
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	0.00595			31:18	0.71		A
1,2,3,7,8-PeCDD	0.0169			34:10	1.60		A
1,2,3,4,7,8-HxCDD	0.0137			36:46	1.37		A
1,2,3,6,7,8-HxCDD	0.0125			36:51	1.35		A
1,2,3,7,8,9-HxCDD	0.0130			37:06	1.30		A
1,2,3,4,6,7,8-HpCDD	0.0120			40:13	1.16		A
OCDD	0.0189			44:34	0.95		A
2,3,7,8-TCDF	EMPC	0.00243	0.00355	30:39	0.91	*	A
1,2,3,7,8-PeCDF	0.0178			33:22	1.61		A
2,3,4,7,8-PeCDF	0.0135			33:58	1.48		A
1,2,3,4,7,8-HxCDF	0.0144			36:03	1.35		A
1,2,3,6,7,8-HxCDF	0.0141			36:10	1.27		A
2,3,4,6,7,8-HxCDF	0.0110			36:39	1.26		A
1,2,3,7,8,9-HxCDF	0.0137			37:25	1.38		A
1,2,3,4,6,7,8-HpCDF	0.0113			38:57	1.07		A
1,2,3,4,7,8,9-HpCDF	0.0104			40:52	1.03		A
OCDF	0.0178			44:51	0.95		A
Total TCDDs	0.00595						
Total PeCDDs	0.0169						
Total HxCDDs	0.0392						
Total HpCDDs	0.0120						
Total TCDFs	ND	0.00243	0.00355				
Total PeCDFs	0.0313						
Total HxCDFs	0.0532						
Total HpCDFs	0.0217						
WHO-2005 TEQ (ND=0)	0.0370		0.0374				
WHO-2005 TEQ (ND=½)	0.0371		0.0374				

DATA VAL QUALIFIER

Client Information			**Sample Information**		
Project Name:	F52170		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F52170-3		Weight / Volume:	952 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14461	
Project ID:	G383-600		Instrument:	HRMS1	
Sample ID:	G383-600-3C		Filename:	a12sep07a-7	
Collection Date/Time:	08/24/07	6:50	Retchk:	a12sep07a-1	
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1	
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15	
Analysis Date/Time:	09/12/07	13:46	Initial Cal:	m8290cc-091207a	

Method 8290
F52170-4
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.00310					
1,2,3,7,8-PeCDD	ND	0.00524					UJ
1,2,3,4,7,8-HxCDD	ND	0.00524					
1,2,3,6,7,8-HxCDD	ND	0.00524					
1,2,3,7,8,9-HxCDD	ND	0.00524					
1,2,3,4,6,7,8-HpCDD	ND	0.00524					
OCDD	0.0480			44:34	0.90	A	J
2,3,7,8-TCDF	ND	0.00262					
1,2,3,7,8-PeCDF	ND	0.00524					UJ
2,3,4,7,8-PeCDF	ND	0.00524					UJ
1,2,3,4,7,8-HxCDF	ND	0.00524					
1,2,3,6,7,8-HxCDF	ND	0.00524					
2,3,4,6,7,8-HxCDF	ND	0.00524					
1,2,3,7,8,9-HxCDF	ND	0.00524					
1,2,3,4,6,7,8-HpCDF	ND	0.00524					
1,2,3,4,7,8,9-HpCDF	ND	0.00524					
OCDF	ND	0.0105					
Total TCDDs	ND	0.00310					
Total PeCDDs	ND	0.00524					
Total HxCDDs	ND	0.00524					
Total HpCDDs	ND	0.00524					
Total TCDFs	ND	0.00262					
Total PeCDFs	ND	0.00524					
Total HxCDFs	ND	0.00524					
Total HpCDFs	ND	0.00524					
WHO-2005 TEQ (ND=0)	0.0000144		0.0000144				
WHO-2005 TEQ (ND=½)	0.00709		0.00709				

Client Information			**Sample Information**	
Project Name:	F52170		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52170-4		Weight / Volume:	955 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14461
Project ID:	G383-600		Instrument:	HRMS1
Sample ID:	G383-600-4C		Filename:	a12sep07a-8
Collection Date/Time:	08/24/07	8:40	Retchk:	a12sep07a-1
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15
Analysis Date/Time:	09/12/07	14:34	Initial Cal:	m8290cc-091207a

Method 8290
F52170-5
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.00305					
1,2,3,7,8-PeCDD	ND	0.00483					UJ
1,2,3,4,7,8-HxCDD	ND	0.00483					
1,2,3,6,7,8-HxCDD	ND	0.00483					
1,2,3,7,8,9-HxCDD	ND	0.00483					
1,2,3,4,6,7,8-HpCDD	ND	0.00483					
OCDD	ND	0.00965					
2,3,7,8-TCDF	ND	0.00233					
1,2,3,7,8-PeCDF	ND	0.00483					UJ
2,3,4,7,8-PeCDF	ND	0.00483					UJ
1,2,3,4,7,8-HxCDF	ND	0.00483					
1,2,3,6,7,8-HxCDF	ND	0.00483					
2,3,4,6,7,8-HxCDF	ND	0.00483					
1,2,3,7,8,9-HxCDF	ND	0.00483					
1,2,3,4,6,7,8-HpCDF	ND	0.00483					
1,2,3,4,7,8,9-HpCDF	ND	0.00483					
OCDF	ND	0.00965					
Total TCDDs	ND	0.00305					
Total PeCDDs	ND	0.00483					
Total HxCDDs	ND	0.00483					
Total HpCDDs	ND	0.00483					
Total TCDFs	ND	0.00233					
Total PeCDFs	ND	0.00483					
Total HxCDFs	ND	0.00483					
Total HpCDFs	ND	0.00483					
WHO-2005 TEQ (ND=0)	ND		ND				
WHO-2005 TEQ (ND=½)	0.00661		0.00661				

Client Information			**Sample Information**	
Project Name:	F52170		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52170-5		Weight / Volume:	1036 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14461
Project ID:	G383-600		Instrument:	HRMS1
Sample ID:	G383-600-5C		Filename:	a12sep07a-9
Collection Date/Time:	08/24/07	10:30	Retchk:	a12sep07a-1
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15
Analysis Date/Time:	09/12/07	15:22	Initial Cal:	m8290cc-091207a

Method 8290
F52170-6
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.00280					
1,2,3,7,8-PeCDD	ND	0.00509					UJ
1,2,3,4,7,8-HxCDD	ND	0.00509					
1,2,3,6,7,8-HxCDD	ND	0.00509					
1,2,3,7,8,9-HxCDD	ND	0.00509					
1,2,3,4,6,7,8-HpCDD	ND	0.00509					
OCDD	ND	0.0102					
2,3,7,8-TCDF	ND	0.00222					
1,2,3,7,8-PeCDF	ND	0.00509					UJ
2,3,4,7,8-PeCDF	ND	0.00509					UJ
1,2,3,4,7,8-HxCDF	ND	0.00509					
1,2,3,6,7,8-HxCDF	ND	0.00509					
2,3,4,6,7,8-HxCDF	ND	0.00509					
1,2,3,7,8,9-HxCDF	ND	0.00509					
1,2,3,4,6,7,8-HpCDF	ND	0.00509					
1,2,3,4,7,8,9-HpCDF	ND	0.00509					
OCDF	ND	0.0102					
Total TCDDs	ND	0.00280					
Total PeCDDs	ND	0.00509					
Total HxCDDs	ND	0.00509					
Total HpCDDs	ND	0.00509					
Total TCDFs	ND	0.00222					
Total PeCDFs	ND	0.00509					
Total HxCDFs	ND	0.00509					
Total HpCDFs	0.00264						
WHO-2005 TEQ (ND=0)	ND		ND				
WHO-2005 TEQ (ND=½)	0.00675		0.00675				

Client Information			**Sample Information**	
Project Name:	F52170		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52170-6		Weight / Volume:	983 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14461
Project ID:	G383-600		Instrument:	HRMS1
Sample ID:	G383-600-8C		Filename:	a12sep07a-12
Collection Date/Time:	08/24/07	10:30	Retchk:	a12sep07a-1
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15
Analysis Date/Time:	09/12/07	17:47	Initial Cal:	m8290cc-091207a

Method 8290
F52170-7
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier	
2,3,7,8-TCDD	ND	0.00272					
1,2,3,7,8-PeCDD	ND	0.00482					UJ
1,2,3,4,7,8-HxCDD	ND	0.00482					
1,2,3,6,7,8-HxCDD	ND	0.00482					
1,2,3,7,8,9-HxCDD	ND	0.00482					
1,2,3,4,6,7,8-HpCDD	ND	0.00482					
OCDD	0.00743			44:34	0.95	A	J
2,3,7,8-TCDF	ND	0.00237					
1,2,3,7,8-PeCDF	ND	0.00482					UJ
2,3,4,7,8-PeCDF	ND	0.00482					UJ
1,2,3,4,7,8-HxCDF	ND	0.00482					
1,2,3,6,7,8-HxCDF	ND	0.00482					
2,3,4,6,7,8-HxCDF	ND	0.00482					
1,2,3,7,8,9-HxCDF	ND	0.00482					
1,2,3,4,6,7,8-HpCDF	ND	0.00482					
1,2,3,4,7,8,9-HpCDF	ND	0.00482					
OCDF	ND	0.00964					
Total TCDDs	ND	0.00272					
Total PeCDDs	ND	0.00482					
Total HxCDDs	ND	0.00482					
Total HpCDDs	ND	0.00482					
Total TCDFs	ND	0.00237					
Total PeCDFs	ND	0.00482					
Total HxCDFs	ND	0.00482					
Total HpCDFs	ND	0.00482					
WHO-2005 TEQ (ND=0)	0.00000223		0.00000223				
WHO-2005 TEQ (ND=½)	0.00645		0.00645				

Client Information			**Sample Information**	
Project Name:	F52170		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52170-7		Weight / Volume:	1037 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14461
Project ID:	G383-600		Instrument:	HRMS1
Sample ID:	G383-600-9C		Filename:	a12sep07a-13
Collection Date/Time:	08/24/07	14:10	Retchk:	a12sep07a-1
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15
Analysis Date/Time:	09/12/07	18:36	Initial Cal:	m8290cc-091207a

Method 8290
F52170-8
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio		Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.00471						
1,2,3,7,8-PeCDD	ND	0.00500						UJ
1,2,3,4,7,8-HxCDD	ND	0.00570						
1,2,3,6,7,8-HxCDD	ND	0.00543						
1,2,3,7,8,9-HxCDD	ND	0.00571						
1,2,3,4,6,7,8-HpCDD	0.0110			40:18	1.06		A	J
OCDD	0.391			44:40	0.89			
2,3,7,8-TCDF	0.00380			30:43	0.72		A	J
1,2,3,7,8-PeCDF	ND	0.00500						UJ
2,3,4,7,8-PeCDF	ND	0.00500						UJ
1,2,3,4,7,8-HxCDF	ND	0.00551						
1,2,3,6,7,8-HxCDF	ND	0.00523						
2,3,4,6,7,8-HxCDF	ND	0.00556						
1,2,3,7,8,9-HxCDF	ND	0.00653						
1,2,3,4,6,7,8-HpCDF	0.00594			39:04	1.00		A	J
1,2,3,4,7,8,9-HpCDF	ND	0.00583						
OCDF	EMPC	0.0105	0.0109	44:58	0.72	*	A	J
Total TCDDs	ND	0.00471						
Total PeCDDs	ND	0.00500						
Total HxCDDs	ND	0.00571						
Total HpCDDs	0.0200							
Total TCDFs	0.00380							
Total PeCDFs	ND	0.00500						
Total HxCDFs	ND	0.00653						
Total HpCDFs	0.00594							
WHO-2005 TEQ (ND=0)	0.000667		0.000670					
WHO-2005 TEQ (ND=½)	0.00836		0.00836					

Client Information			**Sample Information**	
Project Name:	F52170		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F52170-8		Weight / Volume:	1000 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14461
Project ID:	G383-600		Instrument:	HRMS1
Sample ID:	G383-600-10C		Filename:	a12sep07a-14
Collection Date/Time:	08/24/07	14:00	Retchk:	a12sep07a-1
Receipt Date/Time:	08/31/07	10:25	Begin ConCal:	a12sep07a-1
Extraction Date:	09/10/07		End ConCal:	a12sep07a-15
Analysis Date/Time:	09/12/07	19:24	Initial Cal:	m8290cc-091207a

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F51711

DATE: December 3, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B for aqueous samples and 5035A/8260B for soil samples. A total of one aqueous and four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW01A	F51711-1	49MW01C	F51711-4
TMMW01AD	F51711-2	TB080907S	F51711-5
49MW01B	F51711-3		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/3/07
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F51711

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples cooled @ 4°C±2°C; pH<2 HCl, the maximum holding time is 14 days (7 days if no HCl added) from sample collection to analysis. For soil samples cooled @ 4°C±2°C; the maximum holding time is 14 days from sample collection to analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. No qualifiers were applied.

- Holding Time Review: All samples were collected for VOCs on 08/9/07 and analyzed on 8/20/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For compounds with low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the 8/14/07 initial calibration performed on instrument MSVOA1 (GCMSG), target compounds chloromethane (17.24%), chloroethane (24.43%), acetone (18.57%), and methylene chloride (61.53%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD (except chloromethane) were quantified using linear regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. Chloromethane (reported on Form I as methyl chloride) was not detected in any samples so no data qualification was required. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for exceeding %Ds, and all non-detects are qualified as estimated "UJ" for grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration verification performed on 8/14/07 @1246 on instrument MSVOA1 (GCMSG), chloromethane (24.8%) had a %D outside criteria. No chloromethane (reported on Form I as methyl chloride) was detected in any samples so no data qualification was required. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification.

- During the continuing calibration performed on 8/20/07 @1331 on instrument MSVOA1 (GCMSG), acetone (62.7%), carbon disulfide (21.9%), 4-methyl-2-pentanone (24.0%), and 2-hexanone (28.4%) had %D/%drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). None of these volatiles were detected in any of the associated samples, the acetone results have been qualified "UJ", no other data qualification was required. All samples were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
8/20/07	VG1734-MB	All target <½MRL	NA	NA	None
8/2/07	072507R	All target <½MRL	NA	NA	None
8/20/07	TB080907S	All target <½MRL	NA	NA	None

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample
Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. The DoD solid matrix LCS recovery limits are specified in Table D-5 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample VG1734-BS was used as the solid LCS for the VOC analysis on 8/20/07. All target compound recoveries were within criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD solid matrix recovery limits follow the LCS criteria and are specified in Table D-5 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51674-5 was used for the MS/MSD analysis on 8/20/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Criteria:
Dibromofluoromethane (80-121%) (DoD QSM = none)
1,2-Dichloroethane-d4 (77-123%) (DoD QSM = none)
Toluene-d8 (71-130%) (DoD QSM = 85-115%)
4-Bromofluorobenzene (59-148%) (DoD QSM = 85-120%)

- The MS and MSD had high toluene-d8 and 4-bromofluorobenzene recoveries, but the sample is not a RFAPP site sample. All other samples met criteria. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- Samples 49MW01B and 49MW01C had low area counts for tert butyl alcohol-d10, but no target compounds were quantitated from this internal standard so no data qualification was required. All other internal standards met criteria. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. All compounds detected above the RL met RPD criteria. No data qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 49MW01C (F51711-4), 1,1-dichloroethylene

Conc. (µg/kg) = (Ax * Is * DF)/(Ais * RRF * Ws * Ps)

where:	Conc	=	sample concentration in µg/kg
	Ax	=	area of characteristic ion for compound being measured
	Is	=	amount of internal standard added (ng)
	DF	=	dilution factor
	Ais	=	Area of characteristic ion for the internal standard
	RRF	=	average relative response factor
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (33188 * 250 * 1) / (695375 * 0.604 * 5.66 * 0.751) = 4.6 µg/kg

Reported Conc. = 4.6 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045700.D	1	08/20/07	SH	n/a	n/a	VG1734
Run #2							

	Initial Weight
Run #1	5.18 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	58	29	ug/kg	UJ
71-43-2	Benzene	ND	5.8	1.2	ug/kg	
75-27-4	Bromodichloromethane	ND	5.8	1.2	ug/kg	
75-25-2	Bromoform	ND	5.8	1.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.8	1.2	ug/kg	
75-00-3	Chloroethane	ND	5.8	3.0	ug/kg	
67-66-3	Chloroform	ND	5.8	1.2	ug/kg	
75-15-0	Carbon disulfide	ND	5.8	1.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.8	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.8	1.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.8	1.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.8	1.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.8	1.5	ug/kg	
124-48-1	Dibromochloromethane	ND	5.8	1.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.8	1.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.8	1.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.8	1.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.8	1.2	ug/kg	
100-41-4	Ethylbenzene	ND	5.8	1.2	ug/kg	
591-78-6	2-Hexanone	ND	29	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg	
74-83-9	Methyl bromide	ND	5.8	2.1	ug/kg	
74-87-3	Methyl chloride	ND	5.8	2.3	ug/kg	
75-09-2	Methylene chloride	ND	12	5.8	ug/kg	
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg	
100-42-5	Styrene	ND	5.8	1.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.8	1.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.8	1.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.8	1.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.8	1.2	ug/kg	
108-88-3	Toluene	ND	5.8	1.2	ug/kg	
79-01-6	Trichloroethylene	ND	5.8	1.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.8	1.6	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.8	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-121%
2037-26-5	Toluene-D8	95%		71-130%
460-00-4	4-Bromofluorobenzene	100%		59-148%
17060-07-0	1,2-Dichloroethane-D4	101%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045701.D	1	08/20/07	SH	n/a	n/a	VG1734
Run #2							

	Initial Weight
Run #1	5.34 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	56	28	ug/kg	UJ
71-43-2	Benzene	ND	5.6	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.6	1.1	ug/kg	
75-25-2	Bromoform	ND	5.6	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.6	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.6	2.9	ug/kg	
67-66-3	Chloroform	ND	5.6	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.6	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.6	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.6	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.6	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.6	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.6	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.6	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.6	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.6	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.6	1.1	ug/kg	
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.6	2.0	ug/kg	
74-87-3	Methyl chloride	ND	5.6	2.2	ug/kg	
75-09-2	Methylene chloride	6.3	11	5.6	ug/kg	J J
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.6	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.6	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.6	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.6	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.6	1.1	ug/kg	
108-88-3	Toluene	ND	5.6	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.6	1.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.6	1.6	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.6	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		80-121%
2037-26-5	Toluene-D8	92%		71-130%
460-00-4	4-Bromofluorobenzene	103%		59-148%
17060-07-0	1,2-Dichloroethane-D4	105%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045702.D	1	08/20/07	SH	n/a	n/a	VG1734
Run #2							

	Initial Weight
Run #1	4.73 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	62	31	ug/kg	UJ
71-43-2	Benzene	ND	6.2	1.2	ug/kg	
75-27-4	Bromodichloromethane	ND	6.2	1.2	ug/kg	
75-25-2	Bromoform	ND	6.2	1.2	ug/kg	
108-90-7	Chlorobenzene	ND	6.2	1.2	ug/kg	
75-00-3	Chloroethane	ND	6.2	3.2	ug/kg	
67-66-3	Chloroform	ND	6.2	1.2	ug/kg	
75-15-0	Carbon disulfide	ND	6.2	1.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.2	1.6	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.2	1.4	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.2	1.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.2	1.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.2	1.6	ug/kg	
124-48-1	Dibromochloromethane	ND	6.2	1.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.2	1.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.2	1.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.2	1.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.2	1.2	ug/kg	
100-41-4	Ethylbenzene	ND	6.2	1.2	ug/kg	
591-78-6	2-Hexanone	ND	31	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	31	12	ug/kg	
74-83-9	Methyl bromide	ND	6.2	2.2	ug/kg	
74-87-3	Methyl chloride	ND	6.2	2.5	ug/kg	
75-09-2	Methylene chloride	ND	12	6.2	ug/kg	
78-93-3	Methyl ethyl ketone	ND	31	12	ug/kg	
100-42-5	Styrene	ND	6.2	1.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.2	1.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.2	1.6	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.2	1.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.2	1.2	ug/kg	
108-88-3	Toluene	ND	6.2	1.2	ug/kg	
79-01-6	Trichloroethylene	ND	6.2	1.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.2	1.7	ug/kg	
	m,p-Xylene	ND	12	1.4	ug/kg	
95-47-6	o-Xylene	ND	6.2	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	94%		71-130%
460-00-4	4-Bromofluorobenzene	103%		59-148%
17060-07-0	1,2-Dichloroethane-D4	98%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045703.D	1	08/20/07	SH	n/a	n/a	VG1734
Run #2							

	Initial Weight
Run #1	5.66 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	ND	59	29	ug/kg		UJ
71-43-2	Benzene	ND	5.9	1.2	ug/kg		
75-27-4	Bromodichloromethane	ND	5.9	1.2	ug/kg		
75-25-2	Bromoform	ND	5.9	1.2	ug/kg		
108-90-7	Chlorobenzene	ND	5.9	1.2	ug/kg		
75-00-3	Chloroethane	ND	5.9	3.1	ug/kg		
67-66-3	Chloroform	ND	5.9	1.2	ug/kg		
75-15-0	Carbon disulfide	ND	5.9	1.2	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.9	1.5	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.9	1.3	ug/kg		
75-35-4	1,1-Dichloroethylene	4.6	5.9	1.2	ug/kg	J	J
107-06-2	1,2-Dichloroethane	ND	5.9	1.2	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.9	1.5	ug/kg		
124-48-1	Dibromochloromethane	ND	5.9	1.2	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
100-41-4	Ethylbenzene	ND	5.9	1.2	ug/kg		
591-78-6	2-Hexanone	ND	29	12	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg		
74-83-9	Methyl bromide	ND	5.9	2.1	ug/kg		
74-87-3	Methyl chloride	ND	5.9	2.4	ug/kg		
75-09-2	Methylene chloride	11.2	12	5.9	ug/kg	J	J
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg		
100-42-5	Styrene	ND	5.9	1.2	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.9	1.2	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.9	1.5	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.9	1.2	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.9	1.2	ug/kg		
108-88-3	Toluene	ND	5.9	1.2	ug/kg		
79-01-6	Trichloroethylene	ND	5.9	1.2	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.9	1.6	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.9	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-121%
2037-26-5	Toluene-D8	94%		71-130%
460-00-4	4-Bromofluorobenzene	98%		59-148%
17060-07-0	1,2-Dichloroethane-D4	95%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB080907S		
Lab Sample ID:	F51711-5	**Date Sampled:**	08/09/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045704.D	1	08/20/07	SH	n/a	n/a	VG1734
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	25	ug/kg	
71-43-2	Benzene	ND	5.0	1.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	1.0	ug/kg	
75-25-2	Bromoform	ND	5.0	1.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	1.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	2.6	ug/kg	
67-66-3	Chloroform	ND	5.0	1.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	1.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	1.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	1.3	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	1.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	1.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	1.0	ug/kg	
591-78-6	2-Hexanone	ND	25	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	10	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.8	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
75-09-2	Methylene chloride	ND	10	5.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	10	ug/kg	
100-42-5	Styrene	ND	5.0	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	1.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	1.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	1.0	ug/kg	
108-88-3	Toluene	ND	5.0	1.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	1.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB080907S		
Lab Sample ID:	F51711-5	**Date Sampled:**	08/09/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	08/10/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.0	1.4	ug/kg	
	m,p-Xylene	ND	10	1.1	ug/kg	
95-47-6	o-Xylene	ND	5.0	1.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-121%
2037-26-5	Toluene-D8	92%		71-130%
460-00-4	4-Bromofluorobenzene	103%		59-148%
17060-07-0	1,2-Dichloroethane-D4	97%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F51711

DATE: December 3, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3550B/8270C. The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW01A	F51711-1	49MW01B	F51711-3
TMMW01AD	F51711-2	49MW01C	F51711-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Surrogate Spikes
	X	Internal Standards
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

12/3/07
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F51711

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For semivolatile (SVOC) and polynuclear aromatic hydrocarbons (PAH) compounds, the samples are cooled @4°C ± 2°C for solid samples with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/9/07, extracted for SVOCs on 8/23/07, extracted for PAHs by SIM on 8/23/07, analyzed for SVOCs on 8/28/07, and analyzed for PAHs by SIM on 8/29/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 8/24/07 using instrument GCMSU. Target compounds 2,4-dinitrophenol (26.13%) and 4,6-dinitro-2-methylphenol (18.15%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients >0.995; therefore no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- Initial calibration for the PAHs-SIM was performed on 8/21/07 using instrument GCMSW. All target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05); no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the SVOC initial calibration verification performed on 8/24/07 @1614 using instrument GCMSU, 4-chloroaniline (25.1%) and 3-nitroaniline (29.3%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC initial calibration verification performed on 8/24/07 @1644 using instrument GCMSU, all target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/28/07 @1000 using instrument GCMSU, 2,4-dinitrophenol (20.7%) had a %D outside criteria. No 2,4-dinitrophenol was detected in any samples so no data qualification was required. All other target compounds met criteria. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the PAH-SIM initial calibration verification performed on 8/21/07 @1750 using instrument GCMSW, all criteria were met for all target compounds. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PAH-SIM continuing calibration performed on 8/28/07 @1905 using instrument GCMSW, all criteria were met for all target compounds. No qualifiers were applied. All samples were analyzed following this continuing calibration.

V-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
8/28/07	OP22012-MB	All SVOC target <½MRL	NA	NA	None
8/29/07	OP22013-MB	All PAH SIM target <½MRL	NA	NA	None
8/2/07	072507R	All SVOC target <½MRL	NA	NA	None
8/2/07	072507R	All PAH SIM target <½MRL	NA	NA	None

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria:
2-Fluorophenol (40-102%) – (DoD QSM = 35-105%)
Phenol-d5 (41-100%) – (DoD QSM = 40-100%)
2,4,6-Tribromophenol (42-108%) – (DoD QSM = 35-125%)
Nitrobenzene-d5 (40-105%) – (DoD QSM = 35-100%)
2-Fluorobiphenyl (43-107%) – (DoD QSM = 45-105%)
p-Terphenyl-d14 (45-119%) – (DoD QSM = 30-125%)

- All samples met surrogate recovery criteria. No qualifiers were applied.

VII-Internal Standards

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD solid matrix LCS recovery limits are specified in Table D-7 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22012-BS was used as the LCS for the SVOC analysis on 8/28/07. All compounds met recovery criteria. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

- Sample OP22013-BS was used as the LCS for the PAH-SIM analysis on 8/29/07. All compounds met recovery criteria. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid matrix MS/MSD recovery limits follow the LCS criteria and are specified in Table D-7 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 49MW01A was used for the MS/MSD during SVOC analysis on 8/28/07. 1,2-Dichlorobenzene, 1,3-chlorobenzene, and hexachloroethane had low recoveries in the MS or MSD, but acceptable recoveries in the associated LCS. The results for these three compounds have been qualified "J/UJ". All samples were analyzed in conjunction with this MS/MSD.

- Sample TMMW01AD was used for the MS/MSD for the solid PAH SIM analysis on 8/29/07. All compounds met recovery criteria. No qualifiers were applied. All samples were analyzed in conjunction with this MS/MSD.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. All compounds detected above the RL met RPD criteria. No data qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: OP22012-BS, 1,2-dichlorobenzene

Conc. (µg/kg) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_i)*(Ws)*(Ps)}

where:	Conc	=	Sample concentration in µg/kg
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	DF	=	Dilution Factor
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_i	=	Volume of extract injected (µL).
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (151494 * 40 * 1000 * 1) / (151463 * 1.446 * 1 * 30.0 * 1) = 922 ug/kg

Reported Value = 922 µg/kg
% Difference = 0.0%, values were within 10% difference.

Sample: OP22013-BS, bezno(a)pyrene

Conc. (µg/kg) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_i)*(Ws)*(Ps)}

where:	Conc	=	Sample concentration in µg/kg
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	DF	=	Dilution Factor
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_i	=	Volume of extract injected (µL).
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (139028 * 4 * 1000 * 1) / (179351 * 1.511 * 1 * 30.0 * 1) = 68.4 ug/kg

Reported Value = 68.4 µg/kg
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004258.D	1	08/28/07	NJ	08/23/07	OP22012	SU205
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1000	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	80	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	400	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	100	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	200	80	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	40	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	40	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	40	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	80	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	100	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	100	ug/kg	
84-66-2	Diethyl phthalate	ND	400	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	100	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	40	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	40	ug/kg	
67-72-1	Hexachloroethane	ND	200	40	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	80	ug/kg	
99-09-2	3-Nitroaniline	ND	400	80	ug/kg	
100-01-6	4-Nitroaniline	ND	400	80	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	40	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	70%		40-102%
4165-62-2	Phenol-d5	82%		41-100%
118-79-6	2,4,6-Tribromophenol	79%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	65%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W036491.D	4	08/29/07	RB	08/23/07	OP22013	SW1884
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	80	ug/kg	
208-96-8	Acenaphthylene	ND	320	80	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	64	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	64	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	64	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	64	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	64	16	ug/kg	
218-01-9	Chrysene	ND	64	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	64	16	ug/kg	
206-44-0	Fluoranthene	ND	320	56	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	64	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	56	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	69% [a]		40-105%
321-60-8	2-Fluorobiphenyl	71% [a]		43-107%
1718-51-0	Terphenyl-d14	86% [a]		45-119%

(a) Surrogate recoveries corrected for actual spike amount.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004261.D	1	08/28/07	NJ	08/23/07	OP22012	SU205
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	990	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	990	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	79	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	990	400	ug/kg	
87-86-5	Pentachlorophenol	ND	990	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	99	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	200	79	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	40	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	40	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	40	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	79	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	99	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	99	ug/kg	
84-66-2	Diethyl phthalate	ND	400	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	99	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	40	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	40	ug/kg	
67-72-1	Hexachloroethane	ND	200	40	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	79	ug/kg	
99-09-2	3-Nitroaniline	ND	400	79	ug/kg	
100-01-6	4-Nitroaniline	ND	400	79	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	40	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	72%		40-102%
4165-62-2	Phenol-d5	85%		41-100%
118-79-6	2,4,6-Tribromophenol	77%		42-108%
4165-60-0	Nitrobenzene-d5	67%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W036492.D	4	08/29/07	RB	08/23/07	OP22013	SW1884
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	79	ug/kg	
208-96-8	Acenaphthylene	ND	320	79	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	320	55	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	55	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67% [a]		40-105%
321-60-8	2-Fluorobiphenyl	67% [a]		43-107%
1718-51-0	Terphenyl-d14	80% [a]		45-119%

(a) Surrogate recoveries corrected for actual spike amount.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004262.D	1	08/28/07	NJ	08/23/07	OP22012	SU205
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	970	390	ug/kg	
95-57-8	2-Chlorophenol	ND	190	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	970	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	77	ug/kg	
95-48-7	2-Methylphenol	ND	190	39	ug/kg	
	3&4-Methylphenol	ND	190	39	ug/kg	
88-75-5	2-Nitrophenol	ND	190	39	ug/kg	
100-02-7	4-Nitrophenol	ND	970	390	ug/kg	
87-86-5	Pentachlorophenol	ND	970	390	ug/kg	
108-95-2	Phenol	ND	190	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	97	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	39	ug/kg	
106-47-8	4-Chloroaniline	ND	190	77	ug/kg	
86-74-8	Carbazole	ND	190	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	77	ug/kg	
132-64-9	Dibenzofuran	ND	190	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	97	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	97	ug/kg	
84-66-2	Diethyl phthalate	ND	390	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	97	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	39	ug/kg	
67-72-1	Hexachloroethane	ND	190	39	ug/kg	
78-59-1	Isophorone	ND	190	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	77	ug/kg	
99-09-2	3-Nitroaniline	ND	390	77	ug/kg	
100-01-6	4-Nitroaniline	ND	390	77	ug/kg	
98-95-3	Nitrobenzene	ND	190	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	68%		40-102%
4165-62-2	Phenol-d5	79%		41-100%
118-79-6	2,4,6-Tribromophenol	77%		42-108%
4165-60-0	Nitrobenzene-d5	63%		40-105%
321-60-8	2-Fluorobiphenyl	64%		43-107%
1718-51-0	Terphenyl-d14	77%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W036495.D	4	08/29/07	RB	08/23/07	OP22013	SW1884
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	62	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	62	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	62	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	62	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	62	15	ug/kg	
218-01-9	Chrysene	ND	62	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	62	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	62	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64% [a]		40-105%
321-60-8	2-Fluorobiphenyl	66% [a]		43-107%
1718-51-0	Terphenyl-d14	81% [a]		45-119%

(a) Surrogate recoveries corrected for actual spike amount.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U004263.D	1	08/28/07	NJ	08/23/07	OP22012	SU205
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1100	440	ug/kg	
95-57-8	2-Chlorophenol	ND	220	44	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	220	44	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	220	44	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	220	44	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1100	440	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	440	89	ug/kg	
95-48-7	2-Methylphenol	ND	220	44	ug/kg	
	3&4-Methylphenol	ND	220	44	ug/kg	
88-75-5	2-Nitrophenol	ND	220	44	ug/kg	
100-02-7	4-Nitrophenol	ND	1100	440	ug/kg	
87-86-5	Pentachlorophenol	ND	1100	440	ug/kg	
108-95-2	Phenol	ND	220	44	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	220	44	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	220	44	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	220	44	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	440	110	ug/kg	
100-51-6	Benzyl Alcohol	ND	220	44	ug/kg	
91-58-7	2-Chloronaphthalene	ND	220	44	ug/kg	
106-47-8	4-Chloroaniline	ND	220	89	ug/kg	
86-74-8	Carbazole	ND	220	44	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	220	44	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	220	44	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	220	44	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	220	44	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	220	44	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	220	44	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	220	44	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	220	44	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	44	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	440	89	ug/kg	
132-64-9	Dibenzofuran	ND	220	44	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	440	110	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	440	110	ug/kg	
84-66-2	Diethyl phthalate	ND	440	220	ug/kg	
131-11-3	Dimethyl phthalate	ND	440	110	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	440	220	ug/kg	
118-74-1	Hexachlorobenzene	ND	220	44	ug/kg	
87-68-3	Hexachlorobutadiene	ND	220	44	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	220	44	ug/kg	
67-72-1	Hexachloroethane	ND	220	44	ug/kg	
78-59-1	Isophorone	ND	220	44	ug/kg	
88-74-4	2-Nitroaniline	ND	440	89	ug/kg	
99-09-2	3-Nitroaniline	ND	440	89	ug/kg	
100-01-6	4-Nitroaniline	ND	440	89	ug/kg	
98-95-3	Nitrobenzene	ND	220	44	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	220	44	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	220	44	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	220	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		40-102%
4165-62-2	Phenol-d5	84%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	68%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	80%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W036496.D	4	08/29/07	RB	08/23/07	OP22013	SW1884
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	360	89	ug/kg	
208-96-8	Acenaphthylene	ND	360	89	ug/kg	
120-12-7	Anthracene	ND	360	53	ug/kg	
56-55-3	Benzo(a)anthracene	ND	71	18	ug/kg	
50-32-8	Benzo(a)pyrene	ND	71	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	71	18	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	71	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	71	18	ug/kg	
218-01-9	Chrysene	ND	71	18	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	71	18	ug/kg	
206-44-0	Fluoranthene	ND	360	62	ug/kg	
86-73-7	Fluorene	ND	360	53	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	71	18	ug/kg	
90-12-0	1-Methylnaphthalene	ND	360	53	ug/kg	
91-57-6	2-Methylnaphthalene	ND	360	53	ug/kg	
91-20-3	Naphthalene	ND	360	53	ug/kg	
85-01-8	Phenanthrene	ND	360	53	ug/kg	
129-00-0	Pyrene	ND	360	62	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64% [a]		40-105%
321-60-8	2-Fluorobiphenyl	64% [a]		43-107%
1718-51-0	Terphenyl-d14	77% [a]		45-119%

(a) Surrogate recoveries corrected for actual spike amount.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F51711

DATE: December 4, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. Samples were analyzed for pesticides and PCBs using USEPA Methods 3550B/8081A and 3550B/8082, respectively. A total of four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW01A	F51711-1	49MW01B	F51711-3
TMMW01AD	F51711-2	49MW01C	F51711-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/4/07
Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F51711

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For soil samples, pesticide and PCB compounds are shipped @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/9/07, extracted for pesticides and PCBs on 8/23/07, analyzed for pesticides on 8/28/07, and analyzed for PCBs on 8/29/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- During the analysis beginning 8/27/07 @1647, endrin and 4,4'-DDT percent breakdowns were 9.5% and 5.0% on signal #1, and 9.2% and 4.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- During the pesticide initial calibration performed on 8/27/07 on instrument ECD6, all criteria were met. No qualifiers were applied. All samples were analyzed following this initial calibration.

- During the PCB initial calibration performed on 8/24/07 on instrument ECD7, all criteria were met. No qualifiers were applied. All samples were analyzed following this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the calibration should be no greater than ±20%.

- During the pesticide initial calibration verification performed on 8/27/07 @1920 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples were analyzed in conjunction with this ICV.

- During the pesticide continuing calibration performed on 8/27/07 @2348 on instrument ECD6, endrin ketone (24.3%) had a high %D on signal #1, while endrin (25.2%) and endrin ketone (20.8%) had a high %D on signal #2. All endrin and endrin ketone results in associated samples have been qualified "J/UJ". All other compounds met criteria. All samples were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/28/07 @0209 on instrument ECD6, endrin (22.4%) had a high %D on signal #2. All endrin results in associated samples have been qualified "J/UJ". All other compounds met criteria. All samples were analyzed prior to this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 8/24/07 @1431 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/28/07 @2134 on instrument ECD7, all criteria were met. No qualifiers were applied. Samples 49MW01A and TMMW01AD were analyzed following this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/29/07 @0040 on instrument ECD7, all criteria were met. No qualifiers were applied. Samples 49MW01A and TMMW01AD were analyzed before this continuing calibration, while 49MW01B and 49MW01C were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/29/07 @0403 on instrument ECD7, all criteria were met. No qualifiers were applied. Samples 49MW01B and 49MW01C were analyzed before this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	8/28/07	OP22020-MB	All target <½MRL	NA	NA	None
Pesticides	8/10/07	072507R	All target <½MRL	NA	NA	None
PCBs	8/28/07	OP22019-MB	All target <½MRL	NA	NA	None
PCBs	8/1/07	072507R	All target <½MRL	NA	NA	None

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
NA = Not Applicable MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria:	Tetrachloro-m-xylene:	Pesticides: 46-122% (DoD QSM 70-125%)
	Decachlorobiphenyl:	Pesticides: 50-133% (DoD QSM 55-130%)
	Tetrachloro-m-xylene:	PCBs: 44-126% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 39-157% (DoD QSM 60-125%)

- Sample TMMW01AD had low tetrachloro-m-xylene recoveries (68.2%, 68.6%) from both signals during pesticide analysis. The pesticide results from TMMW01AD have been qualified "J/UJ" as estimated.

- Sample 49MW01B had a low tetrachloro-m-xylene recovery (68.4%) from signal #1 during pesticide analysis. No data qualification is required unless two surrogates are outside criteria.

- All other samples met surrogate recovery criteria during pesticide analysis.

- The MS and MSD had high recoveries for decachlorobiphenyl during PCB analysis, but the unspiked sample is not an RFAAP sample so no data qualification was required.

- All samples met surrogate recovery criteria during PCB analysis.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM solid matrix LCS recovery limits are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22020-BS was used as the LCS during 8/28/07 pesticide analysis. Endrin aldehyde (26%) had a low recovery, and was not detected in any field samples – the results have been qualified "UL" as estimated. All other pesticides met recovery criteria.

- Sample OP22019-BS was used as the LCS during the 8/29/07 PCB analysis. All criteria were met. No qualifiers were applied.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid matrix MS/MSD recovery limits follow the LCS criteria and are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample TMMW01AD was used for the pesticide MS/MSD analysis. Endrin aldehyde (21%, 21%) had a low recovery in the MS and MSD, as well as having a low recovery in the associated LCS. All sample results have already been qualified "UL", no further qualification is required. All other pesticides met criteria. All samples were analyzed in conjunction with this MS/MSD.

- Sample F51780-21 was used for the PCB MS/MSD analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. All compounds detected above the RL met RPD criteria. No data qualifiers were applied.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

Sample: OP22020-BS, dieldrin

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (2244357 * 10000 * 1) / (46250 * 1 * 30 * 1 * 1000)
= 16.2 ug/kg

Reported Conc. = 16.2 µg/kg
%D = 0.0%
Values were within 10% difference

Sample: OP22019-BS, Aroclor 1260

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Signal #1
Conc1 µg/L = (1473480 * 10000* 1) / (3596 * 1 * 30 * 1000) = 136.6 µg/kg
Conc2 µg/L = (1821630 * 10000* 1) / (4245 * 1 * 30 * 1000) = 143.0µg/kg
Conc3 µg/L = (1653942 * 10000* 1) / (3885 * 1 * 30 * 1000) = 141.9 µg/kg
Conc4 µg/L = (1312278 * 10000* 1) / (3218 * 1 * 30 * 1000) = 135.9 µg/kg
Conc5 µg/L = (2830954 * 10000* 1) / (6866 * 1 * 30 * 1000) = 137.4 µg/kg
Conc6 µg/L = (1094015 * 10000* 1) / (2682 * 1 * 30 * 1000) = 136.0 µg/kg
Average concentration = 138 µg/kg

Reported Value = 138 µg/kg (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08689.D	1	08/28/07	FS	08/23/07	OP22020	GTT291
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
50-29-3	4,4'-DDT	ND	4.0	0.92	ug/kg	
72-20-8	Endrin	ND	4.0	0.80	ug/kg	UJ
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	4.0	1.2	ug/kg	UL
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	UJ
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.56	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND	4.0	0.80	ug/kg	
8001-35-2	Toxaphene	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	77%		46-122%
2051-24-3	Decachlorobiphenyl	81%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX023840.D	1	08/29/07	AC	08/23/07	OP22019	GXX207
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254	ND	20	10	ug/kg	
11096-82-5	Aroclor 1260	ND	20	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		44-126%
2051-24-3	Decachlorobiphenyl	83%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08690.D	1	08/28/07	FS	08/23/07	OP22020	GTT291
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.47	ug/kg	UJ
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.87	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.67	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	3.9	0.79	ug/kg	
72-55-9	4,4'-DDE	ND	3.9	0.79	ug/kg	
50-29-3	4,4'-DDT	ND	3.9	0.91	ug/kg	
72-20-8	Endrin	ND	3.9	0.79	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.9	0.79	ug/kg	UJ
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg	
33213-65-9	Endosulfan-II	ND	3.9	0.59	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.39	ug/kg	
72-43-5	Methoxychlor	ND	3.9	0.79	ug/kg	
8001-35-2	Toxaphene	ND	98	49	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		46-122%
2051-24-3	Decachlorobiphenyl	83%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX023841.D	1	08/29/07	AC	08/23/07	OP22019	GXX207
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.8	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.8	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.8	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.8	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	84%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08693.D	1	08/28/07	FS	08/23/07	OP22020	GTT291
Run #2							

	Initial Weight	Final Volume
Run #1	21.8 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.7	0.64	ug/kg	
319-84-6	alpha-BHC	ND	2.7	0.75	ug/kg	
319-85-7	beta-BHC	ND	2.7	0.70	ug/kg	
319-86-8	delta-BHC	ND	2.7	1.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.7	0.91	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.7	0.54	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.7	0.59	ug/kg	
60-57-1	Dieldrin	ND	2.7	0.59	ug/kg	
72-54-8	4,4'-DDD	ND	5.4	1.1	ug/kg	
72-55-9	4,4'-DDE	ND	5.4	1.1	ug/kg	
50-29-3	4,4'-DDT	ND	5.4	1.2	ug/kg	
72-20-8	Endrin	ND	5.4	1.1	ug/kg	UJ
1031-07-8	Endosulfan sulfate	ND	5.4	1.8	ug/kg	
7421-93-4	Endrin aldehyde	ND	5.4	1.6	ug/kg	UL
53494-70-5	Endrin ketone	ND	5.4	1.1	ug/kg	UJ
959-98-8	Endosulfan-I	ND	2.7	0.59	ug/kg	
33213-65-9	Endosulfan II	ND	5.4	0.80	ug/kg	
76-44-8	Heptachlor	ND	2.7	0.75	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.7	0.54	ug/kg	
72-43-5	Methoxychlor	ND	5.4	1.1	ug/kg	
8001-35-2	Toxaphene	ND	130	67	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		46-122%
2051-24-3	Decachlorobiphenyl	81%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX023844.D	1	08/29/07	AC	08/23/07	OP22019	GXX207
Run #2							

	Initial Weight	Final Volume
Run #1	21.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	27	13	ug/kg	
11104-28-2	Aroclor 1221	ND	27	21	ug/kg	
11141-16-5	Aroclor 1232	ND	27	21	ug/kg	
53469-21-9	Aroclor 1242	ND	27	13	ug/kg	
12672-29-6	Aroclor 1248	ND	27	13	ug/kg	
11097-69-1	Aroclor 1254	ND	27	13	ug/kg	
11096-82-5	Aroclor 1260	ND	27	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		44-126%
2051-24-3	Decachlorobiphenyl	90%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08694.D	1	08/28/07	FS	08/23/07	OP22020	GTT291
Run #2							

	Initial Weight	Final Volume
Run #1	25.1 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.7	0.64	ug/kg	
319-84-6	alpha-BHC	ND	2.7	0.74	ug/kg	
319-85-7	beta-BHC	ND	2.7	0.69	ug/kg	
319-86-8	delta-BHC	ND	2.7	1.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.7	0.90	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.7	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.7	0.58	ug/kg	
60-57-1	Dieldrin	ND	2.7	0.58	ug/kg	
72-54-8	4,4'-DDD	ND	5.3	1.1	ug/kg	
72-55-9	4,4'-DDE	ND	5.3	1.1	ug/kg	
50-29-3	4,4'-DDT	ND	5.3	1.2	ug/kg	
72-20-8	Endrin	ND	5.3	1.1	ug/kg	UJ
1031-07-8	Endosulfan sulfate	ND	5.3	1.8	ug/kg	
7421-93-4	Endrin aldehyde	ND	5.3	1.6	ug/kg	UL
53494-70-5	Endrin ketone	ND	5.3	1.1	ug/kg	UJ
959-98-8	Endosulfan-I	ND	2.7	0.58	ug/kg	
33213-65-9	Endosulfan-II	ND	5.3	0.80	ug/kg	
76-44-8	Heptachlor	ND	2.7	0.74	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.7	0.53	ug/kg	
72-43-5	Methoxychlor	ND	5.3	1.1	ug/kg	
8001-35-2	Toxaphene	ND	130	66	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		46-122%
2051-24-3	Decachlorobiphenyl	86%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	Date Sampled:	08/09/07
Matrix:	SO - Soil	Date Received:	08/10/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX023845.D	1	08/29/07	AC	08/23/07	OP22019	GXX207
Run #2							

	Initial Weight	Final Volume
Run #1	25.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	27	13	ug/kg	
11104-28-2	Aroclor 1221	ND	27	21	ug/kg	
11141-16-5	Aroclor 1232	ND	27	21	ug/kg	
53469-21-9	Aroclor 1242	ND	27	13	ug/kg	
12672-29-6	Aroclor 1248	ND	27	13	ug/kg	
11097-69-1	Aroclor 1254	ND	27	13	ug/kg	
11096-82-5	Aroclor 1260	ND	27	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		44-126%
2051-24-3	Decachlorobiphenyl	95%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F51711

DATE: December 5, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. The samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3050B/6010B for ICP metals and SW-846 7471A for mercury. A total of four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	**Field Sample ID**	Lab Sample ID
49MW01A	F51711-1	49MW01B	F51711-3
TMMW01AD	F51711-2	49MW01C	F51711-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
	X	Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Sample Duplicate
X		Matrix Spike and Spike Duplicate
X		ICP Serial Dilution
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/5/07
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F51711

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: For solid matrices, the samples are shipped cool @4°C±2°C with a maximum holding time is 180 days for ICP metals and 28 days for mercury.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. No qualifiers were applied.

- Holding Time Review: The samples were collected 8/9/07 for metals analysis, digested for mercury on 8/16/07, analyzed for mercury on 8/16/07, digested for ICP metals on 8/22/07, and analyzed for ICP metals on 8/22/07 & 8/23/07. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (DoD QSM <½ MRL)	Hg:	1 – blank (DoD QSM <½ MRL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (DoD QSM 90-110%)		ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%)
	MRL (70-130%) (DoD QSM 80-120%)		MRL (80-120%) (DoD QSM 80-120%)
	High Std. (95-105%)		High Std. (95-105%)

- Mercury analysis was performed on 8/16/07, with a correlation coefficient of 0.999.

- The four samples in this data package were analyzed between CCV2 and CCV3 during the 8/22/07 run. All metals met recovery criteria in these 2 CCVs.

- Samples 49MW01B and 49MW01C were reanalyzed for manganese on 8/23/07. The analyses occurred between CCV5 and CCV6, with manganese meeting the recovery criteria in both CCVs.

- All metals met recovery criteria during the High Standard analysis.

- All other ICVs and CCVs met recovery criteria.

- **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL (mg/kg)	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
8/16/07	Hg	0.02	Met criteria	None	None
8/22/07	ICP-Ag	0.5	153.0	None	None
8/22/07	ICP-Tl	0.5	56.0	None	None
8/22/07	ICP-Zn	1.0	123.0	None	None

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
8/22/07	Antimony	ICB/CCBs	1.11	5.55	None
8/22/07	Silver	ICB/CCBs	3.01	15.05	None
8/16/07	Mercury	ICB/CCBs	<2*MDL	NA	None
8/16/07	Mercury	MP12744-MB	<½MRL	NA	None
8/22/07	ICP Metals	MP12789-MB	<½MRL	NA	None
7/27/07	Potassium	072507R	88.5 J	442.5	None
7/27/07	Sodium	072507R	106.5 J	532.5	49MW01A, TMMW01AD, 49MW01B, 49MW01C
7/28/07	Mercury	072507R	<½MRL	NA	None

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
J = Estimated value <MRL and >MDL.

IV-ICP Interference Check Sample (ICS)

The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. The DoD QSM solid matrix LCS recovery limits are specified in Table D-19 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12789-BS was used as the LCS during ICP metals analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

- Sample MP12744-BS was used as the LCS during mercury analysis. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

VI-Laboratory Duplicate Sample Analysis

Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample 49MW01A was analyzed in duplicate during ICP metals analysis. Selenium (24.3%) and thallium (20.7%) had RPDs above criteria; the high RPDs were due to low sample concentrations (<RL) Therefore, no qualifiers were applied. All other metals met RPD criteria. All samples were analyzed in conjunction with this laboratory duplicate.

- Sample F51761-8 was analyzed in duplicate during mercury analysis. The sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this laboratory duplicate.

VII-Matrix Spike/Spike Duplicate

MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD QSM solid matrix MS/MSD recovery limits follow the LCS criteria and are specified in Table D-19 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample 48MW3 was used as the MS/MSD during ICP metals analysis. Antimony (21.8%, 30.0%), arsenic (69.5%, 71.8%), cadmium (79.7%, 76.6%), and selenium (61.8%, 62.8%) had low recoveries in the MS & MSD, while aluminum (43.2%) had a low recovery in the MSD. The results for these metals have been qualified "L/UL". Antimony (35.3%) also had a high RPD, but no additional qualification was required. The other metals met recovery and RPD criteria. All samples were analyzed in conjunction with this MS/MSD.

- Sample F51761-8 was used as the MS/MSD during mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this MS/MSD.

VIII-ICP Serial Dilution

An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- Sample 49MW01A was used as the serial dilution during ICP metals analysis. Aluminum (22.5%), barium (17.7%), chromium (16.2%), cobalt (18.3%), copper (13.2%), iron (20.9%), lead (25.1%), magnesium (30.3%), manganese (18.9%), nickel (21.9%), potassium (14.6%), vanadium (17.1%), and zinc (18.1%) had %D > 10%. All detections for these metals have been qualified "J/UJ". The other metals met criteria. All samples were analyzed in conjunction with this serial dilution.

- Sample F51761-8 was used as the serial dilution during mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. All samples were analyzed in conjunction with this serial dilution.

IX-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. All compounds detected above the RL met RPD criteria. No data qualifiers were applied.

X-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 49MW01A, Chromium

Conc. (mg/kg) = (conc. µg/L) *(Final Volume L) * (DF) / (Sample weight g) * (Percent solids/100)

Conc. (mg/kg) = (306.5 µg/L)*(0.05 L)*(1) / (1.02)*(0.833) = 18.0 mg/kg

Reported concentration = 18.0 mg/kg
%D = 0.0%
Values were within 10% difference.

CVAA Sample: 49MW01A, Mercury

Conc. (mg/kg) = (conc. µg/L) *(Final Volume L) * (DF) / (Sample weight g) * (Percent solids/100)

Conc. (mg/kg) = (0.473 µg/L)*(0.05 L)*(1) / (0.62)*(0.833) = 0.046 mg/kg

Reported concentration = 0.046 mg/kg
%D = 0.0%.
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
		Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	23000	J	12	2.8	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.22 U	UL	3.5	0.22	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	0.99	L	0.47	0.23	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	39.8	J	12	0.29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.61		0.29	0.059	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	1.2 U	UL	2.4	1.2	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Calcium	222 J	J	290	5.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	18.0	J	0.59	0.082	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.4	J	2.9	0.065	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.3	J	1.5	0.11	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	29300	J	5.9	0.82	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	7.9	J	5.9	0.14	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	1090	J	290	5.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	102	J	0.88	0.059	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.046 J	J	0.097	0.012	mg/kg	1	08/16/07	08/16/07	RS	SW846 7471A [1]	SW846 7471A [3]
Nickel	9.6	J	2.4	0.15	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Potassium	1260	J	590	5.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.94 J	L	5.9	0.26	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.082 U		0.59	0.082	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Sodium	460 J	B	590	29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	1.6 J	J	2.4	1.3	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	64.7	J	2.9	0.059	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Zinc	29.6	J	1.2	0.29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5914
(2) Instrument QC Batch: MA5929
(3) Prep QC Batch: MP12744
(4) Prep QC Batch: MP12789

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
		Percent Solids:	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	23300	J	12	2.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.23 U	UL	3.6	0.23	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.3	L	0.48	0.23	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	41.4	J	12	0.30	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.60		0.30	0.059	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	1.2 U	UL	2.4	1.2	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Calcium	235 J	J	300	5.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	18.6	J	0.59	0.083	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.6	J	3.0	0.065	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.6	J	1.5	0.11	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	28900	J	5.9	0.83	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	8.2	J	5.9	0.14	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	1130	J	300	5.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	104	J	0.89	0.059	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.034 J	J	0.085	0.010	mg/kg	1	08/16/07	08/16/07	RS	SW846 7471A [1]	SW846 7471A [3]
Nickel	10.3	J	2.4	0.15	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Potassium	1330	J	590	5.9	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.87 J	L	5.9	0.27	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.083 U		0.59	0.083	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Sodium	494 J	B	590	30	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	1.3 U		2.4	1.3	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	65.1	J	3.0	0.059	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]
Zinc	31.1	J	1.2	0.30	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5914
(2) Instrument QC Batch: MA5929
(3) Prep QC Batch: MP12744
(4) Prep QC Batch: MP12789

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
		Percent Solids:	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	17400	J	12	2.8	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.22 U	UL	3.5	0.22	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.3	L	0.46	0.23	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	51.3	J	12	0.29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.65		0.29	0.058	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.58 U	UL	1.2	0.58	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	158 J	J	290	5.8	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	22.4	J	0.58	0.081	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	6.6	J	2.9	0.064	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	9.4	J	1.4	0.11	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	17800	J	5.8	0.81	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	4.9 J	J	5.8	0.14	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	797	J	290	5.8	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	322	J	4.3	0.29	mg/kg	5	08/22/07	08/23/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.034 J	J	0.081	0.010	mg/kg	1	08/16/07	08/16/07	RS	SW846 7471A [1]	SW846 7471A [4]
Nickel	8.8	J	2.3	0.14	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	882	J	580	5.8	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.72 J	L	5.8	0.26	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.081 U		0.58	0.081	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	288 J	B	580	29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	1.3 U		2.3	1.3	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	30.1	J	2.9	0.058	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	24.6	J	1.2	0.29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5914
(2) Instrument QC Batch: MA5929
(3) Instrument QC Batch: MA5931
(4) Prep QC Batch: MP12744
(5) Prep QC Batch: MP12789

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
		Percent Solids:	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8650 J	13	3.1	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.25 U UL	3.9	0.25	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.7 L	0.52	0.25	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	26.5 J	13	0.32	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.4	0.32	0.065	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.3 U UL	2.6	1.3	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	178 J J	320	6.5	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	8.7 J	0.65	0.090	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	14.2 J	3.2	0.071	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	4.8 J	1.6	0.12	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	26900 J	6.5	0.90	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	0.16 U UJ	6.5	0.16	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	451 J	320	6.5	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	803 J	4.8	0.32	mg/kg	5	08/22/07	08/23/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.012 U	0.099	0.012	mg/kg	1	08/16/07	08/16/07	RS	SW846 7471A [1]	SW846 7471A [4]
Nickel	11.2 J	2.6	0.16	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	745 J	650	6.5	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	1.2 J L	6.5	0.29	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.090 U	0.65	0.090	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	238 J B	650	32	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	1.6 J J	2.6	1.4	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	18.5 J	3.2	0.065	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	10.7 J	1.3	0.32	mg/kg	1	08/22/07	08/22/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5914
(2) Instrument QC Batch: MA5929
(3) Instrument QC Batch: MA5931
(4) Prep QC Batch: MP12744
(5) Prep QC Batch: MP12789

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Richard McCracken, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F51711

DATE: December 5, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. The samples were analyzed for chlorinated herbicides using USEPA SW846 Method 8151A. A total of four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW01A	F51711-1	49MW01B	F51711-3
TMMW01AD	F51711-2	49MW01C	F51711-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

12/5/07
Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F51711

I-Holding Times
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For solid samples, chlorinated herbicides compounds are shipped @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/9/07, extracted on 8/15/07, and analyzed on 8/24/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration data was provided for MCPP or MCPA. During discussions with the laboratory, they indicated that they perform a one-point calibration each day that analysis for MCPP or MCPA is conducted. A five-point initial calibration was not performed, therefore all data for these two compounds has been qualified "J/UJ".

- During the initial calibration performed on 8/24/07 on instrument GC-DD, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed following this initial calibration.

III-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A one-point daily calibration from 8/24/07 was provided for MCPP and MCPA, indicating that the lab is able to detect and quantitate both compounds. %D data was not supplied since a five-point initial calibration was not performed. All MCPP and MCPA data has already been qualified (see initial calibration), no additional qualification is required.

- During continuing calibration performed on 8/24/07 @1733 on instrument GC-DD, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. All samples were analyzed before this continuing calibration.

IV-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
8/24/07	OP7863-MB	All target compounds <½MRL	NA	NA	None
8/3/07	072507R	All target compounds <½MRL	NA	NA	None

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
NA = Not applicable.
MRL = Method reporting limit.

V-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Matrix Control Limit: 2,4-DCAA (34-179%)

- All samples met recovery criteria.

VI-Laboratory Control Samples
Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD QSM solid matrix LCS recovery limits are specified in Table D-9 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP7863-BS was used as the LCS during the 8/24/07 run. All herbicides were within criteria, no data qualifiers were applied. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM solid matrix MS/MSD recovery limits follow the LCS criteria and are specified in Table D-9 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- MS/MSD analysis was performed on 49MW01A. All herbicides met recovery and RPD criteria, no data qualifiers were applied. All samples were analyzed in conjunction with this LCS.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. All compounds detected above the RL met RPD criteria. No data qualifiers were applied.

IX-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL is qualified as estimated, "J." All criteria were met. No qualifiers were applied.

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: OP7863-BS, 2,4,5-TP (Silvex)

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (2521753 * 10000 * 1) / (76350 * 1 * 30.25 * 1 * 1000)
= 10.9 ug/kg

Reported Conc. = 10.9 µg/kg
%D = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	DD66780.D	1	08/24/07	ATX	08/15/07	T:OP7863	T:GDD1302
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	8.0	4.0	ug/kg	
1918-00-9	Dicamba	ND	8.0	6.0	ug/kg	
88-85-7	Dinoseb	ND	8.0	5.2	ug/kg	
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	
94-82-6	2,4-DB	ND	80	65	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	133%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	DD66781.D	1	08/24/07	ATX	08/15/07	T:OP7863	T:GDD1302
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.9	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.9	5.9	ug/kg	
88-85-7	Dinoseb	ND	7.9	5.1	ug/kg	
75-99-0	Dalapon	ND	39	28	ug/kg	
120-36-5	Dichloroprop	ND	39	11	ug/kg	
94-82-6	2,4-DB	ND	79	64	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	122%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	DD66782.D	1	08/24/07	ATX	08/15/07	T:OP7863	T:GDD1302
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.8	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.8	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.8	5.1	ug/kg	
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	11	ug/kg	
94-82-6	2,4-DB	ND	78	64	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	119%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	DD66783.D	1	08/24/07	ATX	08/15/07	T:OP7863	T:GDD1302
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	44	18	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	18	15	ug/kg	
93-76-5	2,4,5-T	ND	8.8	4.4	ug/kg	
1918-00-9	Dicamba	ND	8.8	6.6	ug/kg	
88-85-7	Dinoseb	ND	8.8	5.7	ug/kg	
75-99-0	Dalapon	ND	44	31	ug/kg	
120-36-5	Dichloroprop	ND	44	12	ug/kg	
94-82-6	2,4-DB	ND	88	72	ug/kg	
93-65-2	MCPP	ND	220		ug/kg	UJ
94-74-6	MCPA	ND	220		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	126%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. Project G383-592
(Accutest SDG F51711)

DATE: December 6, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. The samples were analyzed for Dioxin and Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	**Field Sample ID**	Lab Sample ID
49MW01A	F51711-1	49MW01B	F51711-3
TMMW01AD	F51711-2	49MW01C	F51711-4

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
X		Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken

Richard McCracken, Chemist

12/6/07

Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-592
(Accutest SDG F51711)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For solid samples, dioxin and furans are shipped @4°C ± 2°C, with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. Accutest shipped the dioxin aliquots to SGS Paradigm Analytical Laboratories on 8/13/07, and they were received by SGS Paradigm on 8/14/07 at 3.2°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/9/07, extracted on 8/15/07, and analyzed on 8/26/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. pg/g	Action Level pg/g	B qualified samples
8/26/07	LMB14415	1,2,3,7,8-PeCDF	0.258	1.29	None
8/26/07	LMB14415	2,3,4,7,8-PeCDF	0.252	1.26	None
8/26/07	LMB14415	1,2,3,4,6,7,8-HpCDF	0.774	3.87	All
8/26/07	LMB14415	OCDF	1.67	8.35	All
8/8/07	072507R	1,2,3,4,6,7,8-HpCDF	0.283	1.42	All
8/8/07	072507R	OCDF	0.473	2.36	49MW01A, 49MW01C

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
J = Estimated value <MRL and >EDL.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

  - The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
  - The signal to noise ratio ≥10% for all target ions;
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During initial calibration performed on 07/10/07 using instrument HRMS1, all compounds met criteria. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

  - The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
  - The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During the continuing calibration performed on 8/25/07 @2143 on instrument HRMS1, all criteria were met. No qualifiers were applied. All samples were analyzed following this continuing calibration.

- During the continuing calibration performed on 8/26/07 @0905 on instrument HRMS1, all criteria were met. No qualifiers were applied. All samples were analyzed before this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- Method blank LMB14415 had 8 of 9 internal standards with low recoveries. While this may bias the method blank results, there is no way to determine what effect if any it would have on the qualification of field sample analytical data. No data qualification was required.

- All field samples met criteria. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- Method blank LMB14415 had 4 of 5 cleanup standards with low recoveries. While this may bias the method blank results, there is no way to determine what effect if any it would have on the qualification of field sample analytical data. No data qualification was required.

- All field samples met criteria. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within $\pm$35% when spiked at the method quantitation limit and within $\pm$30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within $\pm$20% when spiked above 20 times the method quantitation limit.

- Sample OPR14415 was used as LCS and LCSD during the 8/25/07 analytical run. All criteria were met. No qualifiers were applied. All samples were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD $\leq$20%.

- MS/MSD analysis was not performed on an RFAAP sample. No data qualification was required.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. OCDF had a 51% RPD, and the OCDF results have been qualified "J". All other compounds detected above the RL met RPD criteria.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". For where presence of quantitation interference (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- The 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in 49MW01A (F51711-1) have been qualified "J" as estimated since the amounts detected were less than the Lower Method Calibration Limit.

- The 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in TMMW01AD (F51711-2) have been qualified "J" as estimated since the amounts detected were less than the Lower Method Calibration Limit. The ion abundance ratio for 2,3,7,8-TCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in 49MW01B (F51711-3) have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

- The 1,2,3,4,6,7,8-HpCDD, 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in 49MW01C (F51711-4) at concentrations less than the Lower Method Calibration Limit, and have been qualified "J" as estimated.

Sample: 49MW01 (F51711-1), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
Avg. RRF = calculated mean relative response factor for the unlabeled analyte.
Ws = weight of sample (g)
Ps = percent solids/100

$$\text{Conc. (ng/L)} = \frac{(A(x))\ *Q(is)*1000}{A(is)\ *\ \text{Avg. RRF}\ *Ws\ *Ps} = \frac{(249000000)*4.0*1000}{(53200000)\ *\ 1.0783\ *11.24\ *\ 0.768} = 2010\text{pg/g}$$

Reported Value = 2010 pg/g
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Method 8290 **F51711-1** Accutest

DATA VAL QUALIFIER

Analytical Data Summary Sheet

Analyte	Amount pg/g	EDL pg/g	EMPC pg/g	RT (min.)	Ratio	Qualifier	
2,3,7,8-TCDD	ND	0.392					
1,2,3,7,8-PeCDD	ND	0.579					
1,2,3,4,7,8-HxCDD	ND	0.579					
1,2,3,6,7,8-HxCDD	ND	0.579					
1,2,3,7,8,9-HxCDD	ND	0.579					
1,2,3,4,6,7,8-HpCDD	13.3			40:31	1.03		
OCDD	2010			45:00	0.90		
2,3,7,8-TCDF	0.317			30:58	0.81	A	J
1,2,3,7,8-PeCDF	ND	0.579					
2,3,4,7,8-PeCDF	ND	0.579					
1,2,3,4,7,8-HxCDF	ND	0.579					
1,2,3,6,7,8-HxCDF	ND	0.579					
2,3,4,6,7,8-HxCDF	ND	0.579					
1,2,3,7,8,9-HxCDF	ND	0.579					
1,2,3,4,6,7,8-HpCDF	1.00			39:13	1.01	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.579					
OCDF	1.90			45:16	0.91	A	BJ
Total TCDDs	ND	0.392					
Total PeCDDs	ND	0.579					
Total HxCDDs	1.06						
Total HpCDDs	28.1						
Total TCDFs	0.584						
Total PeCDFs	ND	0.579					
Total HxCDFs	0.229						
Total HpCDFs	1.57						
WHO-2005 TEQ (ND=0)	0.778		0.778				
WHO-2005 TEQ (ND=½)	1.56		1.56				

Client Information			**Sample Information**	
Project Name:	F51711		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51711-1		Weight / Volume:	11.24 g
			Solids / Lipids:	76.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14415
Project ID:	G383-592		Instrument:	HRMS1
Sample ID:	G383-592-1B		Filename:	a25aug07a_2-4
Collection Date/Time:	08/09/07		Retchk:	a25aug07a-15
Receipt Date/Time:	08/14/07	10:00	Begin ConCal:	a25aug07a-15
Extraction Date:	08/15/07		End ConCal:	a25aug07a_2-14
Analysis Date/Time:	08/26/07	1:01	Initial Cal:	m8290-071007a

DATA VAL QUALIFIER

Method 8290
F51711-2
Accutest

Analytical Data Summary Sheet

Analyte	Amount pg/g	EDL pg/g	EMPC pg/g	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.526						
1,2,3,7,8-PeCDD	ND	0.601						
1,2,3,4,7,8-HxCDD	ND	0.717						
1,2,3,6,7,8-HxCDD	ND	0.730						
1,2,3,7,8,9-HxCDD	ND	0.741						
1,2,3,4,6,7,8-HpCDD	18.0			40:31	1.05			
OCDD	1930			45:00	0.89			
2,3,7,8-TCDF	EMPC	0.380	0.300	30:58	0.61	*	A	J
1,2,3,7,8-PeCDF	ND	0.601						
2,3,4,7,8-PeCDF	ND	0.601						
1,2,3,4,7,8-HxCDF	ND	0.601						
1,2,3,6,7,8-HxCDF	ND	0.601						
2,3,4,6,7,8-HxCDF	ND	0.601						
1,2,3,7,8,9-HxCDF	ND	0.601						
1,2,3,4,6,7,8-HpCDF	1.25			39:13	0.95		A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.636						
OCDF	3.21			45:16	0.88		A	BJ
Total TCDDs	ND	0.526						
Total PeCDDs	ND	0.601						
Total HxCDDs	1.23							
Total HpCDDs	34.6							
Total TCDFs	0.300							
Total PeCDFs	ND	0.601						
Total HxCDFs	0.440		0.829					
Total HpCDFs	3.28							
WHO-2005 TEQ (ND=0)	0.772		0.802					
WHO-2005 TEQ (ND=½)	1.69		1.70					

Client Information			**Sample Information**	
Project Name:	F51711		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51711-2		Weight / Volume:	10.30 g
			Solids / Lipids:	80.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14415
Project ID:	G383-592		Instrument:	HRMS1
Sample ID:	G383-592-2B		Filename:	a25aug07a_2-5
Collection Date/Time:	08/09/07		Retchk:	a25aug07a-15
Receipt Date/Time:	08/14/07	10:00	Begin ConCal:	a25aug07a-15
Extraction Date:	08/15/07		End ConCal:	a25aug07a_2-14
Analysis Date/Time:	08/26/07	1:49	Initial Cal:	m8290-071007a

Method 8290
F51711-3
Accutest

Analytical Data Summary Sheet

Analyte	Amount pg/g	EDL pg/g	EMPC pg/g	RT (min.)	Ratio	Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.317					
1,2,3,7,8-PeCDD	ND	0.571					
1,2,3,4,7,8-HxCDD	ND	0.571					
1,2,3,6,7,8-HxCDD	0.286			37:04	1.28	A	J
1,2,3,7,8,9-HxCDD	0.272			37:19	1.24	A	J
1,2,3,4,6,7,8-HpCDD	11.8			40:31	1.03		
OCDD	773			45:00	0.89		
2,3,7,8-TCDF	0.279			30:58	0.86	A	J
1,2,3,7,8-PeCDF	ND	0.571					
2,3,4,7,8-PeCDF	ND	0.571					
1,2,3,4,7,8-HxCDF	ND	0.571					
1,2,3,6,7,8-HxCDF	ND	0.571					
2,3,4,6,7,8-HxCDF	ND	0.571					
1,2,3,7,8,9-HxCDF	ND	0.571					
1,2,3,4,6,7,8-HpCDF	1.40			39:13	0.99	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.571					
OCDF	3.60			45:16	0.90	A	BJ
Total TCDDs	ND	0.317					
Total PeCDDs	ND	0.571					
Total HxCDDs	1.56						
Total HpCDDs	20.8						
Total TCDFs	0.391						
Total PeCDFs	ND	0.571					
Total HxCDFs	0.702		1.05				
Total HpCDFs	3.28						
WHO-2005 TEQ (ND=0)	0.449		0.449				
WHO-2005 TEQ (ND=½)	1.13		1.13				

Client Information			**Sample Information**	
Project Name:	F51711		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51711-3		Weight / Volume:	10.41 g
			Solids / Lipids:	84.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14415
Project ID:	G383-592		Instrument:	HRMS1
Sample ID:	G383-592-3B		Filename:	a25aug07a_2-6
Collection Date/Time:	08/09/07		Retchk:	a25aug07a-15
Receipt Date/Time:	08/14/07	10:00	Begin ConCal:	a25aug07a-15
Extraction Date:	08/15/07		End ConCal:	a25aug07a_2-14
Analysis Date/Time:	08/26/07	2:38	Initial Cal:	m8290-071007a

Method 8290
F51711-4
Accutest

Analytical Data Summary Sheet

Analyte	Amount pg/g	EDL pg/g	EMPC pg/g	RT (min.)	Ratio	Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.260					
1,2,3,7,8-PeCDD	ND	0.553					
1,2,3,4,7,8-HxCDD	ND	0.553					
1,2,3,6,7,8-HxCDD	ND	0.553					
1,2,3,7,8,9-HxCDD	ND	0.553					
1,2,3,4,6,7,8-HpCDD	3.37			40:31	1.00	A	J
OCDD	295			45:00	0.89		
2,3,7,8-TCDF	0.334			30:58	0.82	A	J
1,2,3,7,8-PeCDF	ND	0.553					
2,3,4,7,8-PeCDF	ND	0.553					
1,2,3,4,7,8-HxCDF	ND	0.553					
1,2,3,6,7,8-HxCDF	ND	0.553					
2,3,4,6,7,8-HxCDF	ND	0.553					
1,2,3,7,8,9-HxCDF	ND	0.553					
1,2,3,4,6,7,8-HpCDF	0.883			39:13	1.07	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.553					
OCDF	2.00			45:16	0.82	A	BJ
Total TCDDs	ND	0.260					
Total PeCDDs	ND	0.553					
Total HxCDDs	ND	0.553					
Total HpCDDs	5.79						
Total TCDFs	0.710						
Total PeCDFs	ND	0.553					
Total HxCDFs	0.228						
Total HpCDFs	1.58						
WHO-2005 TEQ (ND=0)	0.165		0.165				
WHO-2005 TEQ (ND=½)	0.859		0.859				

Client Information			**Sample Information**	
Project Name:	F51711		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51711-4		Weight / Volume:	12.16 g
			Solids / Lipids:	74.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14415
Project ID:	G383-592		Instrument:	HRMS1
Sample ID:	G383-592-4B		Filename:	a25aug07a_2-7
Collection Date/Time:	08/09/07		Retchk:	a25aug07a-15
Receipt Date/Time:	08/14/07	10:00	Begin ConCal:	a25aug07a-15
Extraction Date:	08/15/07		End ConCal:	a25aug07a_2-14
Analysis Date/Time:	08/26/07	3:26	Initial Cal:	m8290-071007a

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F51711

DATE: December 4, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 9, 2007. The samples were analyzed for explosives using USEPA SW846 Method 8330A, and nitroglycerin & PETN using USEPA SW-846 Method 8332A. A total of four soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW01A	F51711-1	49MW01B	F51711-3
TMMW01AD	F51711-2	49MW01C	F51711-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

12/4/07
Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F51711

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. For solid samples, explosive compounds are shipped @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/9/07 were sent in one cooler, and were received by the laboratory on 8/10/07 at 2.2°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 8/9/07, extracted on 8/23/07, analyzed for PETN and nitroglycerine on 8/27/07, and analyzed for all other explosives on 8/28/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
8/27/07	OP22031-MB	All target explosives <½MRL	NA	NA	None
8/27/07	OP22031-MB	PETN & NG <½MRL	NA	NA	None
8/1/07	072507R	All target explosives <½MRL	NA	NA	None
8/1/07	072507R	PETN & NG <½MRL	NA	NA	None

072507R is a rinsate blank, collected on 7/25/07, analyzed in F51300 (sample 31).
MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient (r^2) must be ≥0.990 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration performed on 8/21/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- During the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration verification performed on 8/21/07 @2017 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed after this initial calibration verification.

- During the explosives continuing calibration verification performed on 8/27/07 @2042 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 49MW01A, TMMW01AD, and 49MW01C were analyzed following this continuing calibration.

- During the explosives continuing calibration verification performed on 8/28/07 @0145 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 49MW01A, TMMW01AD, and 49MW01C were analyzed before this continuing calibration, while sample 49MW01B was analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/28/07 @0403 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 49MW01B was analyzed before this continuing calibration.

- During the PETN and nitroglycerin initial calibration verification performed on 3/15/07 @1235 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed in conjunction with this initial calibration verification.

- During the PETN and nitroglycerin continuing calibration performed on 8/27/07 @1050 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/27/07 @1207 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed prior to this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria: 3,4-dinitrotoluene (72-145%)

- All criteria were met for explosives, PETN, and nitroglycerin. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM solid matrix LCS recovery limits are specified in Table D-13 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP22031-BS was used as the LCS for explosives analysis. All compounds met recovery criteria. All samples were analyzed in conjunction with this LCS.

- Sample OP22031-BS2 was used as the LCS for PETN and nitroglycerin analysis. All compounds met recovery criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD QSM solid matrix MS/MSD recovery limits follow the LCS criteria and are specified in Table D-13 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 49MW01B was used as the MS/MSD for the explosive analysis. All compounds met criteria. All samples were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicates in this data package included 49MW01A and TMMW01AD. All compounds detected above the RL met RPD criteria. No data qualifiers were applied.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all detected compounds.

Sample: OP22176-BS, HMX

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (1532544 * 20000 * 1) / (2998 * 1 * 2 * 1 * 1000)
= 5110 ug/kg

Reported Value = 5110 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: OP22031-BS2, nitroglycerin

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where:
- Ax = Area response for the compound being measured
- Vt = Total volume of extract, taking into account dilutions (uL)
- DF = Dilution factor
- CF = Calibration Factor from initial calibration (area/pg)
- Vi = Volume of extract injected (uL)
- Ws = weight of sample (g)
- Ps = percent solids/100

Conc. µg/kg = (3557279 * 20000 * 1) / (1228 * 1 * 2.0 * 1 * 1000)
= 29000 ug/kg

Reported Value = 29000 µg/kg
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01A		
Lab Sample ID:	F51711-1	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023813.D	1	08/28/07	NAF	08/23/07	OP22031	GGG1011
Run #2	PP022571.D	1	08/27/07	NAF	08/23/07	OP22031	GPP783

	Initial Weight	Final Volume
Run #1	2.35 g	20.0 ml
Run #2	2.35 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	85	ug/kg	
121-82-4	RDX	ND	210	43	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	43	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	76	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	43	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	43	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	46	ug/kg	
98-95-3	Nitrobenzene	ND	210	60	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	66	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	88	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	59	ug/kg	
479-45-8	Tetryl	ND	430	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	50	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	43	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	640	ug/kg	
78-11-5	PETN	ND [a]	1700	640	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	115%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMMW01AD		
Lab Sample ID:	F51711-2	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	84.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023814.D	1	08/28/07	NAF	08/23/07	OP22031	GGG1011
Run #2	PP022572.D	1	08/27/07	NAF	08/23/07	OP22031	GPP783

	Initial Weight	Final Volume
Run #1	2.45 g	20.0 ml
Run #2	2.45 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	200	82	ug/kg	
121-82-4	RDX	ND	200	41	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	200	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	73	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	41	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	200	41	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	200	44	ug/kg	
98-95-3	Nitrobenzene	ND	200	58	ug/kg	
88-72-2	o-Nitrotoluene	ND	200	63	ug/kg	
99-08-1	m-Nitrotoluene	ND	200	84	ug/kg	
99-99-0	p-Nitrotoluene	ND	200	56	ug/kg	
479-45-8	Tetryl	ND	410	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	200	48	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	200	41	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1600	610	ug/kg	
78-11-5	PETN	ND [a]	1600	610	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	112%	105%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01B		
Lab Sample ID:	F51711-3	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	85.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023818.D	1	08/28/07	NAF	08/23/07	OP22031	GGG1011
Run #2	PP022573.D	1	08/27/07	NAF	08/23/07	OP22031	GPP783

	Initial Weight	Final Volume
Run #1	2.89 g	20.0 ml
Run #2	2.89 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	170	69	ug/kg	
121-82-4	RDX	ND	170	35	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	170	35	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	170	62	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	170	35	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	170	35	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	170	37	ug/kg	
98-95-3	Nitrobenzene	ND	170	49	ug/kg	
88-72-2	o-Nitrotoluene	ND	170	53	ug/kg	
99-08-1	m-Nitrotoluene	ND	170	71	ug/kg	
99-99-0	p-Nitrotoluene	ND	170	48	ug/kg	
479-45-8	Tetryl	ND	350	98	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	170	41	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	170	35	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1400	520	ug/kg	
78-11-5	PETN	ND [a]	1400	520	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49MW01C		
Lab Sample ID:	F51711-4	**Date Sampled:**	08/09/07
Matrix:	SO - Soil	**Date Received:**	08/10/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	75.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023815.D	1	08/28/07	NAF	08/23/07	OP22031	GGG1011
Run #2	PP022576.D	1	08/27/07	NAF	08/23/07	OP22031	GPP783

	Initial Weight	Final Volume
Run #1	2.60 g	20.0 ml
Run #2	2.60 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	190	77	ug/kg	
121-82-4	RDX	ND	190	38	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	68	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	190	38	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	190	42	ug/kg	
98-95-3	Nitrobenzene	ND	190	55	ug/kg	
88-72-2	o-Nitrotoluene	ND	190	59	ug/kg	
99-08-1	m-Nitrotoluene	ND	190	79	ug/kg	
99-99-0	p-Nitrotoluene	ND	190	53	ug/kg	
479-45-8	Tetryl	ND	380	110	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	190	45	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	190	38	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1500	580	ug/kg	
78-11-5	PETN	ND [a]	1500	580	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	98%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F51300

DATE: December 19, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B for aqueous samples and 5035A/8260B for soil samples. A total of 3 aqueous and 30 soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59SB06A	F51300-1	43SB07A	F51300-18
59SB06B	F51300-2	43SB07B	F51300-19
59SB06C	F51300-3	43SB07C	F51300-20
59SB05A	F51300-4	43SB08A	F51300-21
59SB05B	F51300-5	43SB08B	F51300-22
59SB05C	F51300-6	43SB08C	F51300-23
59SB04A	F51300-7	43SB09A	F51300-24
59SB04B	F51300-8	43SB09B	F51300-25
59SB04C	F51300-9	43SB09C	F51300-26
TMSB04C	F51300-10	43SB10A	F51300-27
59SB02A	F51300-11	43SB10B	F51300-28
59SB02B	F51300-12	43SB10C	F51300-29
TMSB02B	F51300-13	TMSB10B	F51300-30
59SB02C	F51300-14	072507R	F51300-31
43SB06A	F51300-15	TB072507S	F51300-32
43SB06B	F51300-16	TB072507W	F51300-33
43SB06C	F51300-17		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
X		Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
X		Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
X		Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

12/19/07

Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F51300

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: Aqueous samples must be cooled @ 4°C±2°C and acidified to pH<2 with HCl, with a maximum holding time of 14 days (7 days if no HCl added) from sample collection to analysis. Soil samples must be cooled @ 4°C±2°C, with a maximum holding time of 14 days from sample collection to analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied.

- Holding Time Review: All samples were collected for VOCs on 7/25/07, and were analyzed on 7/31/07, 8/1/07, and 8/2/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For compounds with low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration performed on 07/25/07 on instrument MSVOA9 (GCMSF), target compounds methylene chloride (49.21%) and acetone (21.26%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. Samples F51300-1 and F51300-2 were analyzed in conjunction with this initial calibration.

- During the initial calibration performed on 07/31/07 on instrument MSVOA1 (GCMSG), target compounds chloromethane (19.70%), vinyl chloride (16.26%), bromomethane (33.30%), chloroethane (18.67%), acetone (17.23%), and methylene chloride (41.28%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD (except chloromethane) were quantified using linear or second order regression, and had correlation coefficients >0.995 (except bromomethane which had a correlation coefficient of 0.994). No chloromethane (listed on Form I as methyl chloride) was detected in the associated samples so qualifiers were applied to the chloromethane data. Bromomethane (listed on Form I as methyl bromide) results in associated samples have been qualified "J/UJ". Samples F51300-15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -30, and -32 were analyzed in conjunction with this initial calibration.

- During the initial calibration performed on 07/16/07 on instrument MSVOA3 (GCMSH), target compounds acetone (18.53%), methylene chloride (32.02%), trichloroethene (24.48%), ethylbenzene (15.12%), m,p-xylene (16.56%), and o-xylene (15.44%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. Samples F51300-3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, and -29 were analyzed in conjunction with this initial calibration.

- During the initial calibration performed on 07/31/07 on instrument MSVOA6 (GCMSJ), target compounds bromomethane (22.0%), chloroethane (21.95%), methylene chloride (123.02%), and trans-1,3-dichloropropene (21.19%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. Samples F51300-31 & -33 were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for exceeding %Ds, and all non-detects are qualified as estimated "UJ" for grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration verification performed on 7/25/07 @1534 on instrument MSVOA9 (GCMSF), bromomethane (28.8%) had a %D outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification.

- During the continuing calibration performed on 7/31/07 @1226 on instrument MSVOA9 (GCMSF), all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Samples F51300-1 and F51300-2 were analyzed following this continuing calibration.

- During the initial calibration verification performed on 7/31/07 @1408 on instrument MSVOA1 (GCMSG), vinyl chloride (23.5%), bromomethane (29.6%), chloroethane (24.1%), acetone (25.2%) had %D outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification.

- During the continuing calibration performed on 7/31/07 @1532 on instrument MSVOA1 (GCMSG), all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. Samples F51300-15, -16, -17, -18, -19, -21, -22, -24, -25, -26, -27, -28, -30, and -32 were analyzed following this initial calibration.

- During the continuing calibration performed on 8/1/07 @0917 on instrument MSVOA1 (GCMSG), acetone (23.8%) and carbon tetrachloride (32.1%) had %D/%drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Detections of these volatiles in the associated samples have been qualified "J", non-detects were not qualified. Samples F51300-20 and -23 were analyzed following this continuing calibration.

- During the initial calibration verification performed on 7/16/07 @1820 on instrument MSVOA3 (GCMSH), bromomethane (36.1%) had a %D outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification.

- During the continuing calibration performed on 7/31/07 @1112 on instrument MSVOA3 (GCMSH), bromomethane (27.9%), chloroethane (25.4%), acetone (75.0%), 2-butanone (22.9%), and trichloroethene (20.7%) had %D/%drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Detections of these volatiles in the associated samples have been qualified "J", acetone non-detects have been qualified "UJ", all other non-detects were not qualified. Samples F51300-3, -4, -5, -6, -8, -9, -10, -14, and -29 were analyzed following this continuing calibration.

- During the continuing calibration performed on 8/1/07 @1018 on instrument MSVOA3 (GCMSH), acetone (81.3%), 2-butanone (27.8%), and carbon tetrachloride (21.5%) had %D/%drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Detections of these volatiles in the associated samples have been qualified "J", acetone non-detects have been qualified "UJ", all other non-detects were not qualified. Samples F51300-7, -11, -12, and -13 were analyzed following this continuing calibration.

- During the initial calibration verification performed on 7/31/07 @1339 on instrument MSVOA6 (GCMSJ), bromomethane (21.8%), acetone (22.5%), trans-1,3-dichloropropene (20.5%), had a %D outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification.

- During the continuing calibration performed on 8/2/07 @0947 on instrument MSVOA6 (GCMSJ), all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Samples F51300-31 & -33 were analyzed following this initial calibration verification.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
7/31/07	VH1665-MB	All target <½MRL	NA	NA	None
7/31/07	VF416-MB	All target <½MRL	NA	NA	None
7/31/07	VG1720-MB	All target <½MRL	NA	NA	None
8/1/07	VG1721-MB	All target <½MRL	NA	NA	None
8/1/07	VH1666-MB	All target <½MRL	NA	NA	None
8/2/07	VJ2193-MB	All target <½MRL	NA	NA	None
8/2/07	072507R	All target <½MRL	NA	NA	None
8/6/07	072607R	All target <½MRL	NA	NA	None
7/31/07	TB072507S	All target <½MRL	NA	NA	None
8/2/07	TB072507W	All target <½MRL	NA	NA	None

072507R and 072607R are rinsate blanks.
NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample

Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. The aqueous LCS recovery limits are specified in Table D-4 of the DoD QSM (DoD, 2006), while the solid matrix LCS recovery limits are specified in Table D-5 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample VH1665-BS was the solid LCS for the VOC analysis using instrument H on 7/31/07. All target compound recoveries were within criteria, no data qualification was required. Samples F51300-3, -4, -5, -6, -8, -9, -10, -14, and -29 were analyzed in conjunction with this LCS.

- Sample VF416-BS was the solid LCS for the VOC analysis using instrument F on 7/31/07. All target compound recoveries were within criteria, no data qualification was required. Samples F51300-1 and -2 were analyzed in conjunction with this LCS.

- Sample VG1720-BS was the solid LCS for the VOC analysis using instrument G on 7/31/07. All target compound recoveries were within criteria, no data qualification was required. Samples F51300-15, -16, -17, -18, -19, -21, -22, -24, -25, -26, -27, -28, -30, and -32 were analyzed in conjunction with this LCS.

- Sample VG1721-BS was the solid LCS for the VOC analysis using instrument G on 8/1/07. Vinyl chloride (126%) had a high recovery, but no vinyl chloride was detected in the associated samples so no data qualification was required. All other target compound recoveries were within criteria. Samples F51300-20 and -23 were analyzed in conjunction with this LCS.

- Sample VH1666-BS was the solid LCS for the VOC analysis using instrument H on 8/1/07. All target compound recoveries were within criteria, no data qualification was required. Samples F51300-7, -11, -12, and -13 were analyzed in conjunction with this LCS.

- Sample VJ2193-BS was the aqueous LCS for the VOC analysis using instrument J on 8/2/07. All target compound recoveries were within criteria, no data qualification was required. Samples F51300-31 and -33 were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The MS/MSD aqueous recovery limits follow the LCS criteria specified in Table D-4 of the DoD QSM (DoD, 2006), while the solid matrix recovery limits follow the LCS criteria specified in Table D-5 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51300-29 was used for solid matrix MS/MSD analysis on 7/31/07. Carbon tetrachloride (139%, 141%), toluene (133%), and trichloroethene (130%) were outside DoD QSM recovery criteria. Detections of these compounds have been qualified "J" in the associated samples; non-detects were not qualified. All other target compounds met recovery criteria. All samples were analyzed in conjunction with this MS/MSD.

- Sample F51300-25 was used for the solid MS/MSD analysis on 07/31/07. Ethylbenzene (0%) 1,1,2,2-tetrachloroethane (187%), 1,1,2-trichloroethane (162%), and vinyl chloride (129%), were outside DoD QSM recovery criteria. All ethylbenzene results (detections and non-detects) have been qualified "J/UJ" in the associated samples. Detections of the other compounds with high recoveries have been qualified "J" in the associated samples. The other target compounds met recovery criteria. All samples were analyzed in conjunction with this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous criteria:	Dibromofluoromethane (87-116%) (DoD QSM = 85-115%) 1,2-Dichloroethane-d4 (76-127%) (DoD QSM = 70-120%) Toluene-d8 (86-112%) (DoD QSM = 85-120%) 4-Bromofluorobenzene (84-120%) (DoD QSM = 75-120%)
Solid matrix criteria:	Dibromofluoromethane (80-121%) (DoD QSM = none) 1,2-Dichloroethane-d4 (77-123%) (DoD QSM = none) Toluene-d8 (71-130%) (DoD QSM = 85-115%) 4-Bromofluorobenzene (59-148%) (DoD QSM = 85-120%)

- All solid matrix samples and all aqueous samples met surrogate recovery criteria. No qualifiers were applied.

IX-Internal Standards (IS)

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- Sample F51300-25 had a low 1,4-dichlorobenzene-d4 area count. All volatiles quantitated from this internal standard have been qualified "J/UJ".

- All other solid matrix samples and all aqueous samples met criteria. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included 59SB04C (F51300-9) & TMSB04C (F51300-10), 59SB02B (F51300-12) & TMSB02B (F51300-13), and 43SB10B (F51300-28) & TMSB10B (F51300-30). All compounds detected above the reporting limit (RL) met RPD criteria.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 43SB09B (F51300-25), ethylbenzene

Conc. (µg/kg) = (Ax * Is * DF)/(Ais * RRF * Ws * Ps)

where:	Conc	=	sample concentration in µg/kg
	Ax	=	area of characteristic ion for compound being measured
	Is	=	amount of internal standard added (ng)
	DF	=	dilution factor
	Ais	=	Area of characteristic ion for the internal standard
	RRF	=	average relative response factor
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (1215748 * 250 ng * 1) / (551729 * 1.977 * 5.19 * 0.869) = 61.8 µg/kg

Reported Conc. = 61.8 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022553.D	1	07/31/07	WJ	n/a	n/a	VF416
Run #2							

	Initial Weight
Run #1	4.61 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	46.3	59	30	ug/kg	J	J
71-43-2	Benzene	ND	5.9	1.2	ug/kg		
75-27-4	Bromodichloromethane	ND	5.9	1.2	ug/kg		
75-25-2	Bromoform	ND	5.9	1.2	ug/kg		
108-90-7	Chlorobenzene	ND	5.9	1.2	ug/kg		
75-00-3	Chloroethane	ND	5.9	3.1	ug/kg		
67-66-3	Chloroform	ND	5.9	1.2	ug/kg		
75-15-0	Carbon disulfide	ND	5.9	1.2	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.9	1.5	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.9	1.3	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.9	1.2	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.9	1.2	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.9	1.5	ug/kg		
124-48-1	Dibromochloromethane	ND	5.9	1.2	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
100-41-4	Ethylbenzene	ND	5.9	1.2	ug/kg		WJ
591-78-6	2-Hexanone	ND	30	12	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	30	12	ug/kg		
74-83-9	Methyl bromide	ND	5.9	2.1	ug/kg		
74-87-3	Methyl chloride	ND	5.9	2.4	ug/kg		
75-09-2	Methylene chloride	ND	12	5.9	ug/kg		
78-93-3	Methyl ethyl ketone	ND	30	12	ug/kg		
100-42-5	Styrene	ND	5.9	1.2	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.9	1.2	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.9	1.5	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.9	1.2	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.9	1.2	ug/kg		
108-88-3	Toluene	ND	5.9	1.2	ug/kg		
79-01-6	Trichloroethylene	ND	5.9	1.2	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.9	1.7	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.9	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	112%		59-148%
17060-07-0	1,2-Dichloroethane-D4	112%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022554.D	1	07/31/07	WJ	n/a	n/a	VF416
Run #2							

	Initial Weight
Run #1	6.00 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	47	24	ug/kg	
71-43-2	Benzene	ND	4.7	0.94	ug/kg	
75-27-4	Bromodichloromethane	ND	4.7	0.94	ug/kg	
75-25-2	Bromoform	ND	4.7	0.94	ug/kg	
108-90-7	Chlorobenzene	ND	4.7	0.94	ug/kg	
75-00-3	Chloroethane	ND	4.7	2.4	ug/kg	
67-66-3	Chloroform	ND	4.7	0.94	ug/kg	
75-15-0	Carbon disulfide	ND	4.7	0.94	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.7	1.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.7	1.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.7	0.94	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.7	0.94	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.7	1.2	ug/kg	
124-48-1	Dibromochloromethane	ND	4.7	0.94	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.7	0.94	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.7	0.94	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.7	0.94	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.7	0.94	ug/kg	
100-41-4	Ethylbenzene	ND	4.7	0.94	ug/kg	WJ
591-78-6	2-Hexanone	ND	24	9.4	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	24	9.4	ug/kg	
74-83-9	Methyl bromide	ND	4.7	1.7	ug/kg	
74-87-3	Methyl chloride	ND	4.7	1.9	ug/kg	
75-09-2	Methylene chloride	ND	9.4	4.7	ug/kg	
78-93-3	Methyl ethyl ketone	ND	24	9.4	ug/kg	
100-42-5	Styrene	ND	4.7	0.94	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.7	0.94	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.7	1.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.7	0.94	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.7	0.94	ug/kg	
108-88-3	Toluene	ND	4.7	0.94	ug/kg	
79-01-6	Trichloroethylene	ND	4.7	0.94	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.7	1.3	ug/kg	
	m,p-Xylene	ND	9.4	1.0	ug/kg	
95-47-6	o-Xylene	ND	4.7	0.94	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		80-121%
2037-26-5	Toluene-D8	93%		71-130%
460-00-4	4-Bromofluorobenzene	100%		59-148%
17060-07-0	1,2-Dichloroethane-D4	114%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044767.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	6.23 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	47	23	ug/kg	UJ
71-43-2	Benzene	ND	4.7	0.93	ug/kg	
75-27-4	Bromodichloromethane	ND	4.7	0.93	ug/kg	
75-25-2	Bromoform	ND	4.7	0.93	ug/kg	
108-90-7	Chlorobenzene	ND	4.7	0.93	ug/kg	
75-00-3	Chloroethane	ND	4.7	2.4	ug/kg	
67-66-3	Chloroform	ND	4.7	0.93	ug/kg	
75-15-0	Carbon disulfide	ND	4.7	0.93	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.7	1.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.7	1.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.7	0.93	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.7	0.93	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.7	1.2	ug/kg	
124-48-1	Dibromochloromethane	ND	4.7	0.93	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.7	0.93	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.7	0.93	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.7	0.93	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.7	0.93	ug/kg	
100-41-4	Ethylbenzene	ND	4.7	0.93	ug/kg	UJ
591-78-6	2-Hexanone	ND	23	9.3	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	23	9.3	ug/kg	
74-83-9	Methyl bromide	ND	4.7	1.7	ug/kg	
74-87-3	Methyl chloride	ND	4.7	1.9	ug/kg	
75-09-2	Methylene chloride	ND	9.3	4.7	ug/kg	
78-93-3	Methyl ethyl ketone	ND	23	9.3	ug/kg	
100-42-5	Styrene	ND	4.7	0.93	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.7	0.93	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.7	1.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.7	0.93	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.7	0.93	ug/kg	
108-88-3	Toluene	ND	4.7	0.93	ug/kg	
79-01-6	Trichloroethylene	ND	4.7	0.93	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.7	1.3	ug/kg	
	m,p-Xylene	ND	9.3	1.0	ug/kg	
95-47-6	o-Xylene	ND	4.7	0.93	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	95%		71-130%
460-00-4	4-Bromofluorobenzene	116%		59-148%
17060-07-0	1,2-Dichloroethane-D4	119%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044768.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	4.98 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	56	28	ug/kg	UJ
71-43-2	Benzene	ND	5.6	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.6	1.1	ug/kg	
75-25-2	Bromoform	ND	5.6	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.6	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.6	2.9	ug/kg	
67-66-3	Chloroform	ND	5.6	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.6	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.6	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.6	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.6	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.6	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.6	1.5	ug/kg	
124-48-1	Dibromochloromethane	ND	5.6	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.6	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.6	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.6	1.1	ug/kg	UJ
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.6	2.0	ug/kg	
74-87-3	Methyl chloride	ND	5.6	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.6	ug/kg	
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.6	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.6	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.6	1.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.6	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.6	1.1	ug/kg	
108-88-3	Toluene	ND	5.6	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.6	1.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.6	1.6	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.6	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	112%		59-148%
17060-07-0	1,2-Dichloroethane-D4	119%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044769.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	5.04 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	59	29	ug/kg	UJ
71-43-2	Benzene	ND	5.9	1.2	ug/kg	
75-27-4	Bromodichloromethane	ND	5.9	1.2	ug/kg	
75-25-2	Bromoform	ND	5.9	1.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.9	1.2	ug/kg	
75-00-3	Chloroethane	ND	5.9	3.1	ug/kg	
67-66-3	Chloroform	ND	5.9	1.2	ug/kg	
75-15-0	Carbon disulfide	ND	5.9	1.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.9	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.9	1.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.9	1.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.9	1.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.9	1.5	ug/kg	
124-48-1	Dibromochloromethane	ND	5.9	1.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.9	1.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.9	1.2	ug/kg	
100-41-4	Ethylbenzene	ND	5.9	1.2	ug/kg	UJ
591-78-6	2-Hexanone	ND	29	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg	
74-83-9	Methyl bromide	ND	5.9	2.1	ug/kg	
74-87-3	Methyl chloride	ND	5.9	2.4	ug/kg	
75-09-2	Methylene chloride	ND	12	5.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg	
100-42-5	Styrene	ND	5.9	1.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.9	1.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.9	1.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.9	1.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.9	1.2	ug/kg	
108-88-3	Toluene	ND	5.9	1.2	ug/kg	
79-01-6	Trichloroethylene	ND	5.9	1.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.9	1.6	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.9	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	111%		59-148%
17060-07-0	1,2-Dichloroethane-D4	116%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044770.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	5.48 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone [a]	51.3	53	26	ug/kg	J	J
71-43-2	Benzene	ND	5.3	1.1	ug/kg		
75-27-4	Bromodichloromethane	ND	5.3	1.1	ug/kg		
75-25-2	Bromoform	ND	5.3	1.1	ug/kg		
108-90-7	Chlorobenzene	ND	5.3	1.1	ug/kg		
75-00-3	Chloroethane	ND	5.3	2.7	ug/kg		
67-66-3	Chloroform	ND	5.3	1.1	ug/kg		
75-15-0	Carbon disulfide	ND	5.3	1.1	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.3	1.4	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.3	1.2	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.3	1.1	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.3	1.1	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.3	1.4	ug/kg		
124-48-1	Dibromochloromethane	ND	5.3	1.1	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.3	1.1	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.3	1.1	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.3	1.1	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.3	1.1	ug/kg		
100-41-4	Ethylbenzene	ND	5.3	1.1	ug/kg		UJ
591-78-6	2-Hexanone	ND	26	11	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	26	11	ug/kg		
74-83-9	Methyl bromide	ND	5.3	1.9	ug/kg		
74-87-3	Methyl chloride	ND	5.3	2.1	ug/kg		
75-09-2	Methylene chloride	ND	11	5.3	ug/kg		
78-93-3	Methyl ethyl ketone	ND	26	11	ug/kg		
100-42-5	Styrene	ND	5.3	1.1	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.3	1.1	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.3	1.4	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.3	1.1	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.3	1.1	ug/kg		
108-88-3	Toluene	ND	5.3	1.1	ug/kg		
79-01-6	Trichloroethylene	ND	5.3	1.1	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.3	1.5	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.3	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	115%		59-148%
17060-07-0	1,2-Dichloroethane-D4	120%		77-123%

(a) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044788.D	1	08/01/07	SH	n/a	n/a	VH1666
Run #2							

	Initial Weight
Run #1	5.05 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	57	29	ug/kg	UJ
71-43-2	Benzene	ND	5.7	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.7	1.1	ug/kg	
75-25-2	Bromoform	ND	5.7	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.7	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.7	3.0	ug/kg	
67-66-3	Chloroform	ND	5.7	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.7	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.7	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.7	1.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.7	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.7	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.7	1.5	ug/kg	
124-48-1	Dibromochloromethane	ND	5.7	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.7	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.7	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.7	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.7	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.7	1.1	ug/kg	UJ
591-78-6	2-Hexanone	ND	29	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	29	11	ug/kg	
74-83-9	Methyl bromide	ND	5.7	2.1	ug/kg	
74-87-3	Methyl chloride	ND	5.7	2.3	ug/kg	
75-09-2	Methylene chloride	ND	11	5.7	ug/kg	
78-93-3	Methyl ethyl ketone	ND	29	11	ug/kg	
100-42-5	Styrene	ND	5.7	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.7	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.7	1.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.7	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.7	1.1	ug/kg	
108-88-3	Toluene	ND	5.7	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.7	1.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.7	1.6	ug/kg	
	m,p-Xylene	ND	11	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.7	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		80-121%
2037-26-5	Toluene-D8	100%		71-130%
460-00-4	4-Bromofluorobenzene	114%		59-148%
17060-07-0	1,2-Dichloroethane-D4	99%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044772.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044772.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	5.75 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	52	26	ug/kg	UJ
71-43-2	Benzene	ND	5.2	1.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.2	1.0	ug/kg	
75-25-2	Bromoform	ND	5.2	1.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.2	1.0	ug/kg	
75-00-3	Chloroethane	ND	5.2	2.7	ug/kg	
67-66-3	Chloroform	ND	5.2	1.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.2	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.2	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.2	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.2	1.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.2	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.2	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.2	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.2	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.2	1.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.2	1.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.2	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.2	1.0	ug/kg	UJ
591-78-6	2-Hexanone	ND	26	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	26	10	ug/kg	
74-83-9	Methyl bromide	ND	5.2	1.9	ug/kg	
74-87-3	Methyl chloride	ND	5.2	2.1	ug/kg	
75-09-2	Methylene chloride	ND	10	5.2	ug/kg	
78-93-3	Methyl ethyl ketone	ND	26	10	ug/kg	
100-42-5	Styrene	ND	5.2	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.2	1.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.2	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.2	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.2	1.0	ug/kg	
108-88-3	Toluene	ND	5.2	1.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.2	1.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.2	1.5	ug/kg	
	m,p-Xylene	ND	10	1.1	ug/kg	
95-47-6	o-Xylene	ND	5.2	1.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	110%		59-148%
17060-07-0	1,2-Dichloroethane-D4	119%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044773.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	6.00 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
67-64-1	Acetone	ND	49	24	ug/kg	UJ
71-43-2	Benzene	ND	4.9	0.97	ug/kg	
75-27-4	Bromodichloromethane	ND	4.9	0.97	ug/kg	
75-25-2	Bromoform	ND	4.9	0.97	ug/kg	
108-90-7	Chlorobenzene	ND	4.9	0.97	ug/kg	
75-00-3	Chloroethane	ND	4.9	2.5	ug/kg	
67-66-3	Chloroform	ND	4.9	0.97	ug/kg	
75-15-0	Carbon disulfide	ND	4.9	0.97	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.9	1.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.9	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.9	0.97	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.9	0.97	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.9	1.3	ug/kg	
124-48-1	Dibromochloromethane	ND	4.9	0.97	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.9	0.97	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.9	0.97	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.9	0.97	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.9	0.97	ug/kg	
100-41-4	Ethylbenzene	ND	4.9	0.97	ug/kg	UJ
591-78-6	2-Hexanone	ND	24	9.7	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	24	9.7	ug/kg	
74-83-9	Methyl bromide	ND	4.9	1.7	ug/kg	
74-87-3	Methyl chloride	ND	4.9	1.9	ug/kg	
75-09-2	Methylene chloride	ND	9.7	4.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	24	9.7	ug/kg	
100-42-5	Styrene	ND	4.9	0.97	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.9	0.97	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.9	1.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.9	0.97	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.9	0.97	ug/kg	
108-88-3	Toluene	ND	4.9	0.97	ug/kg	
79-01-6	Trichloroethylene	ND	4.9	0.97	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.9	1.4	ug/kg	
	m,p-Xylene	ND	9.7	1.1	ug/kg	
95-47-6	o-Xylene	ND	4.9	0.97	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	114%		59-148%
17060-07-0	1,2-Dichloroethane-D4	121%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8260B	**Percent Solids:**	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044774.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	4.96 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone [a]	56.6	60	30	ug/kg	J	J
71-43-2	Benzene	ND	6.0	1.2	ug/kg		
75-27-4	Bromodichloromethane	ND	6.0	1.2	ug/kg		
75-25-2	Bromoform	ND	6.0	1.2	ug/kg		
108-90-7	Chlorobenzene	ND	6.0	1.2	ug/kg		
75-00-3	Chloroethane	ND	6.0	3.1	ug/kg		
67-66-3	Chloroform	ND	6.0	1.2	ug/kg		
75-15-0	Carbon disulfide	ND	6.0	1.2	ug/kg		
56-23-5	Carbon tetrachloride	ND	6.0	1.6	ug/kg		
75-34-3	1,1-Dichloroethane	ND	6.0	1.3	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	6.0	1.2	ug/kg		
107-06-2	1,2-Dichloroethane	ND	6.0	1.2	ug/kg		
78-87-5	1,2-Dichloropropane	ND	6.0	1.6	ug/kg		
124-48-1	Dibromochloromethane	ND	6.0	1.2	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	6.0	1.2	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	6.0	1.2	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	6.0	1.2	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	6.0	1.2	ug/kg		
100-41-4	Ethylbenzene	ND	6.0	1.2	ug/kg		UJ
591-78-6	2-Hexanone	ND	30	12	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	30	12	ug/kg		
74-83-9	Methyl bromide	ND	6.0	2.2	ug/kg		
74-87-3	Methyl chloride	ND	6.0	2.4	ug/kg		
75-09-2	Methylene chloride	ND	12	6.0	ug/kg		
78-93-3	Methyl ethyl ketone	ND	30	12	ug/kg		
100-42-5	Styrene	ND	6.0	1.2	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	6.0	1.2	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.0	1.6	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	6.0	1.2	ug/kg		
127-18-4	Tetrachloroethylene	ND	6.0	1.2	ug/kg		
108-88-3	Toluene	ND	6.0	1.2	ug/kg		
79-01-6	Trichloroethylene	ND	6.0	1.2	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.0	1.7	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	6.0	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	114%		59-148%
17060-07-0	1,2-Dichloroethane-D4	120%		77-123%

(a) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8260B	**Percent Solids:**	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044789.D	1	08/01/07	SH	n/a	n/a	VH1666
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	ND	56	28	ug/kg		UJ
71-43-2	Benzene	ND	5.6	1.1	ug/kg		
75-27-4	Bromodichloromethane	ND	5.6	1.1	ug/kg		
75-25-2	Bromoform	ND	5.6	1.1	ug/kg		
108-90-7	Chlorobenzene	ND	5.6	1.1	ug/kg		
75-00-3	Chloroethane	ND	5.6	2.9	ug/kg		
67-66-3	Chloroform	ND	5.6	1.1	ug/kg		
75-15-0	Carbon disulfide	ND	5.6	1.1	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.6	1.5	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.6	1.2	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.6	1.1	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.6	1.1	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.6	1.5	ug/kg		
124-48-1	Dibromochloromethane	ND	5.6	1.1	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.6	1.1	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.6	1.1	ug/kg		
100-41-4	Ethylbenzene	ND	5.6	1.1	ug/kg		UJ
591-78-6	2-Hexanone	ND	28	11	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg		
74-83-9	Methyl bromide	ND	5.6	2.0	ug/kg		
74-87-3	Methyl chloride	ND	5.6	2.2	ug/kg		
75-09-2	Methylene chloride	ND	11	5.6	ug/kg		
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg		
100-42-5	Styrene	ND	5.6	1.1	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.6	1.1	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.6	1.5	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.6	1.1	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.6	1.1	ug/kg		
108-88-3	Toluene	ND	5.6	1.1	ug/kg		
79-01-6	Trichloroethylene	ND	5.6	1.1	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.6	1.6	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.6	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	125%		59-148%
17060-07-0	1,2-Dichloroethane-D4	107%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044790.D	1	08/01/07	SH	n/a	n/a	VH1666
Run #2							

	Initial Weight
Run #1	5.76 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
67-64-1	Acetone	ND	52	26	ug/kg	UJ
71-43-2	Benzene	ND	5.2	1.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.2	1.0	ug/kg	
75-25-2	Bromoform	ND	5.2	1.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.2	1.0	ug/kg	
75-00-3	Chloroethane	ND	5.2	2.7	ug/kg	
67-66-3	Chloroform	ND	5.2	1.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.2	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.2	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.2	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.2	1.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.2	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.2	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.2	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.2	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.2	1.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.2	1.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.2	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.2	1.0	ug/kg	UJ
591-78-6	2-Hexanone	ND	26	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	26	10	ug/kg	
74-83-9	Methyl bromide	ND	5.2	1.9	ug/kg	
74-87-3	Methyl chloride	ND	5.2	2.1	ug/kg	
75-09-2	Methylene chloride	ND	10	5.2	ug/kg	
78-93-3	Methyl ethyl ketone	ND	26	10	ug/kg	
100-42-5	Styrene	ND	5.2	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.2	1.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.2	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.2	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.2	1.0	ug/kg	
108-88-3	Toluene	ND	5.2	1.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.2	1.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.2	1.5	ug/kg	
	m,p-Xylene	ND	10	1.1	ug/kg	
95-47-6	o-Xylene	ND	5.2	1.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-121%
2037-26-5	Toluene-D8	98%		71-130%
460-00-4	4-Bromofluorobenzene	115%		59-148%
17060-07-0	1,2-Dichloroethane-D4	109%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044791.D	1	08/01/07	SH	n/a	n/a	VH1666
Run #2							

	Initial Weight
Run #1	5.51 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAC QUALIFIER)
67-64-1	Acetone	ND	53	27	ug/kg	UJ
71-43-2	Benzene	ND	5.3	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.3	1.1	ug/kg	
75-25-2	Bromoform	ND	5.3	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.3	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.3	2.8	ug/kg	
67-66-3	Chloroform	ND	5.3	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.3	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.3	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.3	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.3	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.3	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.3	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.3	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.3	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.3	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.3	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.3	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.3	1.1	ug/kg	UJ
591-78-6	2-Hexanone	ND	27	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	27	11	ug/kg	
74-83-9	Methyl bromide	ND	5.3	1.9	ug/kg	
74-87-3	Methyl chloride	ND	5.3	2.1	ug/kg	
75-09-2	Methylene chloride	ND	11	5.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND	27	11	ug/kg	
100-42-5	Styrene	ND	5.3	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.3	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.3	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.3	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.3	1.1	ug/kg	
108-88-3	Toluene	ND	5.3	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.3	1.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.3	1.5	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.3	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-121%
2037-26-5	Toluene-D8	96%		71-130%
460-00-4	4-Bromofluorobenzene	112%		59-148%
17060-07-0	1,2-Dichloroethane-D4	113%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044778.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	4.90 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone	ND	61	31	ug/kg		UJ
71-43-2	Benzene	ND	6.1	1.2	ug/kg		
75-27-4	Bromodichloromethane	ND	6.1	1.2	ug/kg		
75-25-2	Bromoform	ND	6.1	1.2	ug/kg		
108-90-7	Chlorobenzene	ND	6.1	1.2	ug/kg		
75-00-3	Chloroethane	ND	6.1	3.2	ug/kg		
67-66-3	Chloroform	ND	6.1	1.2	ug/kg		
75-15-0	Carbon disulfide	ND	6.1	1.2	ug/kg		
56-23-5	Carbon tetrachloride	ND	6.1	1.6	ug/kg		
75-34-3	1,1-Dichloroethane	ND	6.1	1.3	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	6.1	1.2	ug/kg		
107-06-2	1,2-Dichloroethane	ND	6.1	1.2	ug/kg		
78-87-5	1,2-Dichloropropane	ND	6.1	1.6	ug/kg		
124-48-1	Dibromochloromethane	ND	6.1	1.2	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	6.1	1.2	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	6.1	1.2	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	6.1	1.2	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	6.1	1.2	ug/kg		
100-41-4	Ethylbenzene	ND	6.1	1.2	ug/kg		UJ
591-78-6	2-Hexanone	ND	31	12	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	31	12	ug/kg		
74-83-9	Methyl bromide	ND	6.1	2.2	ug/kg		
74-87-3	Methyl chloride	ND	6.1	2.5	ug/kg		
75-09-2	Methylene chloride	ND	12	6.1	ug/kg		
78-93-3	Methyl ethyl ketone	ND	31	12	ug/kg		
100-42-5	Styrene	ND	6.1	1.2	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	6.1	1.2	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.1	1.6	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	6.1	1.2	ug/kg		
127-18-4	Tetrachloroethylene	ND	6.1	1.2	ug/kg		
108-88-3	Toluene	ND	6.1	1.2	ug/kg		
79-01-6	Trichloroethylene	ND	6.1	1.2	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.1	1.7	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	6.1	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		80-121%
2037-26-5	Toluene-D8	100%		71-130%
460-00-4	4-Bromofluorobenzene	116%		59-148%
17060-07-0	1,2-Dichloroethane-D4	123%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045271.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	6.30 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone	29.1	46	23	ug/kg	J	J
71-43-2	Benzene	ND	4.6	0.93	ug/kg		
75-27-4	Bromodichloromethane	ND	4.6	0.93	ug/kg		
75-25-2	Bromoform	ND	4.6	0.93	ug/kg		
108-90-7	Chlorobenzene	ND	4.6	0.93	ug/kg		
75-00-3	Chloroethane	ND	4.6	2.4	ug/kg		
67-66-3	Chloroform	ND	4.6	0.93	ug/kg		
75-15-0	Carbon disulfide	ND	4.6	0.93	ug/kg		
56-23-5	Carbon tetrachloride	ND	4.6	1.2	ug/kg		
75-34-3	1,1-Dichloroethane	ND	4.6	1.0	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	4.6	0.93	ug/kg		
107-06-2	1,2-Dichloroethane	ND	4.6	0.93	ug/kg		
78-87-5	1,2-Dichloropropane	ND	4.6	1.2	ug/kg		
124-48-1	Dibromochloromethane	ND	4.6	0.93	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	4.6	0.93	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	4.6	0.93	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	4.6	0.93	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	4.6	0.93	ug/kg		
100-41-4	Ethylbenzene	ND	4.6	0.93	ug/kg		UJ
591-78-6	2-Hexanone	ND	23	9.3	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	23	9.3	ug/kg		
74-83-9	Methyl bromide	ND	4.6	1.7	ug/kg		UJ
74-87-3	Methyl chloride	ND	4.6	1.9	ug/kg		
75-09-2	Methylene chloride	ND	9.3	4.6	ug/kg		
78-93-3	Methyl ethyl ketone	ND	23	9.3	ug/kg		
100-42-5	Styrene	ND	4.6	0.93	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	4.6	0.93	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.6	1.2	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	4.6	0.93	ug/kg		
127-18-4	Tetrachloroethylene	ND	4.6	0.93	ug/kg		
108-88-3	Toluene	ND	4.6	0.93	ug/kg		
79-01-6	Trichloroethylene	ND	4.6	0.93	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.6	1.3	ug/kg	
	m,p-Xylene	ND	9.3	1.0	ug/kg	
95-47-6	o-Xylene	ND	4.6	0.93	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-121%
2037-26-5	Toluene-D8	96%		71-130%
460-00-4	4-Bromofluorobenzene	107%		59-148%
17060-07-0	1,2-Dichloroethane-D4	103%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: G0045272.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045272.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	4.30 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	94.0	71	36	ug/kg	
71-43-2	Benzene	ND	7.1	1.4	ug/kg	
75-27-4	Bromodichloromethane	ND	7.1	1.4	ug/kg	
75-25-2	Bromoform	ND	7.1	1.4	ug/kg	
108-90-7	Chlorobenzene	ND	7.1	1.4	ug/kg	
75-00-3	Chloroethane	ND	7.1	3.7	ug/kg	
67-66-3	Chloroform	ND	7.1	1.4	ug/kg	
75-15-0	Carbon disulfide	ND	7.1	1.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.1	1.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.1	1.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.1	1.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.1	1.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.1	1.9	ug/kg	
124-48-1	Dibromochloromethane	ND	7.1	1.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.1	1.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.1	1.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.1	1.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.1	1.4	ug/kg	
100-41-4	Ethylbenzene	ND	7.1	1.4	ug/kg	UJ
591-78-6	2-Hexanone	ND	36	14	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	36	14	ug/kg	
74-83-9	Methyl bromide	ND	7.1	2.6	ug/kg	UJ
74-87-3	Methyl chloride	ND	7.1	2.8	ug/kg	
75-09-2	Methylene chloride	ND	14	7.1	ug/kg	
78-93-3	Methyl ethyl ketone	ND	36	14	ug/kg	
100-42-5	Styrene	ND	7.1	1.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.1	1.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.1	1.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.1	1.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.1	1.4	ug/kg	
108-88-3	Toluene	ND	7.1	1.4	ug/kg	
79-01-6	Trichloroethylene	ND	7.1	1.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.1	2.0	ug/kg	
	m,p-Xylene	ND	14	1.6	ug/kg	
95-47-6	o-Xylene	ND	7.1	1.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	105%		59-148%
17060-07-0	1,2-Dichloroethane-D4	97%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.17 3

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045273.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	5.99 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	43.5	47	23	ug/kg	J	J
71-43-2	Benzene	ND	4.7	0.93	ug/kg		
75-27-4	Bromodichloromethane	ND	4.7	0.93	ug/kg		
75-25-2	Bromoform	ND	4.7	0.93	ug/kg		
108-90-7	Chlorobenzene	ND	4.7	0.93	ug/kg		
75-00-3	Chloroethane	ND	4.7	2.4	ug/kg		
67-66-3	Chloroform	ND	4.7	0.93	ug/kg		
75-15-0	Carbon disulfide	ND	4.7	0.93	ug/kg		
56-23-5	Carbon tetrachloride	ND	4.7	1.2	ug/kg		
75-34-3	1,1-Dichloroethane	ND	4.7	1.0	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	4.7	0.93	ug/kg		
107-06-2	1,2-Dichloroethane	ND	4.7	0.93	ug/kg		
78-87-5	1,2-Dichloropropane	ND	4.7	1.2	ug/kg		
124-48-1	Dibromochloromethane	ND	4.7	0.93	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	4.7	0.93	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	4.7	0.93	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	4.7	0.93	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	4.7	0.93	ug/kg		
100-41-4	Ethylbenzene	ND	4.7	0.93	ug/kg		UJ
591-78-6	2-Hexanone	ND	23	9.3	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	23	9.3	ug/kg		
74-83-9	Methyl bromide	ND	4.7	1.7	ug/kg		UJ
74-87-3	Methyl chloride	ND	4.7	1.9	ug/kg		
75-09-2	Methylene chloride	ND	9.3	4.7	ug/kg		
78-93-3	Methyl ethyl ketone	ND	23	9.3	ug/kg		
100-42-5	Styrene	ND	4.7	0.93	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	4.7	0.93	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.7	1.2	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	4.7	0.93	ug/kg		
127-18-4	Tetrachloroethylene	ND	4.7	0.93	ug/kg		
108-88-3	Toluene	ND	4.7	0.93	ug/kg		
79-01-6	Trichloroethylene	ND	4.7	0.93	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.7	1.3	ug/kg	
	m,p-Xylene	ND	9.3	1.0	ug/kg	
95-47-6	o-Xylene	ND	4.7	0.93	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-121%
2037-26-5	Toluene-D8	92%		71-130%
460-00-4	4-Bromofluorobenzene	104%		59-148%
17060-07-0	1,2-Dichloroethane-D4	100%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045274.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	3.85 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone	ND	72	36	ug/kg		
71-43-2	Benzene	ND	7.2	1.4	ug/kg		
75-27-4	Bromodichloromethane	ND	7.2	1.4	ug/kg		
75-25-2	Bromoform	ND	7.2	1.4	ug/kg		
108-90-7	Chlorobenzene	ND	7.2	1.4	ug/kg		
75-00-3	Chloroethane	ND	7.2	3.7	ug/kg		
67-66-3	Chloroform	ND	7.2	1.4	ug/kg		
75-15-0	Carbon disulfide	ND	7.2	1.4	ug/kg		
56-23-5	Carbon tetrachloride	ND	7.2	1.9	ug/kg		
75-34-3	1,1-Dichloroethane	ND	7.2	1.6	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	7.2	1.4	ug/kg		
107-06-2	1,2-Dichloroethane	ND	7.2	1.4	ug/kg		
78-87-5	1,2-Dichloropropane	ND	7.2	1.9	ug/kg		
124-48-1	Dibromochloromethane	ND	7.2	1.4	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	7.2	1.4	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	7.2	1.4	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	7.2	1.4	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	7.2	1.4	ug/kg		
100-41-4	Ethylbenzene	ND	7.2	1.4	ug/kg		UJ
591-78-6	2-Hexanone	ND	36	14	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	36	14	ug/kg		
74-83-9	Methyl bromide	ND	7.2	2.6	ug/kg		UJ
74-87-3	Methyl chloride	ND	7.2	2.9	ug/kg		
75-09-2	Methylene chloride	ND	14	7.2	ug/kg		
78-93-3	Methyl ethyl ketone	ND	36	14	ug/kg		
100-42-5	Styrene	ND	7.2	1.4	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	7.2	1.4	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.2	1.9	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	7.2	1.4	ug/kg		
127-18-4	Tetrachloroethylene	ND	7.2	1.4	ug/kg		
108-88-3	Toluene	ND	7.2	1.4	ug/kg		
79-01-6	Trichloroethylene	ND	7.2	1.4	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.2	2.0	ug/kg	
	m,p-Xylene	ND	14	1.6	ug/kg	
95-47-6	o-Xylene	ND	7.2	1.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-121%
2037-26-5	Toluene-D8	98%		71-130%
460-00-4	4-Bromofluorobenzene	118%		59-148%
17060-07-0	1,2-Dichloroethane-D4	99%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045275.D	1	08/01/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	5.35 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	44.8	54	27	ug/kg	J	J
71-43-2	Benzene	ND	5.4	1.1	ug/kg		
75-27-4	Bromodichloromethane	ND	5.4	1.1	ug/kg		
75-25-2	Bromoform	ND	5.4	1.1	ug/kg		
108-90-7	Chlorobenzene	ND	5.4	1.1	ug/kg		
75-00-3	Chloroethane	ND	5.4	2.8	ug/kg		
67-66-3	Chloroform	ND	5.4	1.1	ug/kg		
75-15-0	Carbon disulfide	ND	5.4	1.1	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.4	1.4	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.4	1.2	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.4	1.1	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.4	1.1	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.4	1.4	ug/kg		
124-48-1	Dibromochloromethane	ND	5.4	1.1	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.4	1.1	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.4	1.1	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.4	1.1	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.4	1.1	ug/kg		
100-41-4	Ethylbenzene	ND	5.4	1.1	ug/kg		UJ
591-78-6	2-Hexanone	ND	27	11	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	27	11	ug/kg		
74-83-9	Methyl bromide	ND	5.4	2.0	ug/kg		UJ
74-87-3	Methyl chloride	ND	5.4	2.2	ug/kg		
75-09-2	Methylene chloride	ND	11	5.4	ug/kg		
78-93-3	Methyl ethyl ketone	ND	27	11	ug/kg		
100-42-5	Styrene	ND	5.4	1.1	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.4	1.1	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.4	1.4	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.4	1.1	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.4	1.1	ug/kg		
108-88-3	Toluene	ND	5.4	1.1	ug/kg		
79-01-6	Trichloroethylene	ND	5.4	1.1	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.4	1.5	ug/kg	
	m,p-Xylene	9.8	11	1.2	ug/kg	J
95-47-6	o-Xylene	ND	5.4	1.1	ug/kg	

DATA VAL QUALIFIER J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-121%
2037-26-5	Toluene-D8	89%		71-130%
460-00-4	4-Bromofluorobenzene	103%		59-148%
17060-07-0	1,2-Dichloroethane-D4	95%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045297.D	1	08/01/07	SH	n/a	n/a	VG1721
Run #2							

	Initial Weight
Run #1	5.27 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	56	28	ug/kg	
71-43-2	Benzene	ND	5.6	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.6	1.1	ug/kg	
75-25-2	Bromoform	ND	5.6	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.6	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.6	2.9	ug/kg	
67-66-3	Chloroform	ND	5.6	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.6	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.6	1.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.6	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.6	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.6	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.6	1.5	ug/kg	
124-48-1	Dibromochloromethane	ND	5.6	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.6	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.6	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.6	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.6	1.1	ug/kg	UJ
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.6	2.0	ug/kg	UJ
74-87-3	Methyl chloride	ND	5.6	2.3	ug/kg	
75-09-2	Methylene chloride	ND	11	5.6	ug/kg	
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.6	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.6	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.6	1.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.6	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.6	1.1	ug/kg	
108-88-3	Toluene	ND	5.6	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.6	1.1	ug/kg	

DATA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.6	1.6	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.6	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	99%		59-148%
17060-07-0	1,2-Dichloroethane-D4	99%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045262.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	5.45 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	48	24	ug/kg	
71-43-2	Benzene	ND	4.8	0.95	ug/kg	
75-27-4	Bromodichloromethane	ND	4.8	0.95	ug/kg	
75-25-2	Bromoform	ND	4.8	0.95	ug/kg	
108-90-7	Chlorobenzene	ND	4.8	0.95	ug/kg	
75-00-3	Chloroethane	ND	4.8	2.5	ug/kg	
67-66-3	Chloroform	ND	4.8	0.95	ug/kg	
75-15-0	Carbon disulfide	ND	4.8	0.95	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.8	1.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.8	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.8	0.95	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.8	0.95	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.8	1.2	ug/kg	
124-48-1	Dibromochloromethane	ND	4.8	0.95	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.8	0.95	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.8	0.95	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.8	0.95	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.8	0.95	ug/kg	
100-41-4	Ethylbenzene	ND	4.8	0.95	ug/kg	UJ
591-78-6	2-Hexanone	ND	24	9.5	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	24	9.5	ug/kg	
74-83-9	Methyl bromide	ND	4.8	1.7	ug/kg	UJ
74-87-3	Methyl chloride	ND	4.8	1.9	ug/kg	
75-09-2	Methylene chloride	ND	9.5	4.8	ug/kg	
78-93-3	Methyl ethyl ketone	ND	24	9.5	ug/kg	
100-42-5	Styrene	ND	4.8	0.95	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.8	0.95	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.8	1.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.8	0.95	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.8	0.95	ug/kg	
108-88-3	Toluene	ND	4.8	0.95	ug/kg	
79-01-6	Trichloroethylene	ND	4.8	0.95	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.8	1.3	ug/kg	
	m,p-Xylene	ND	9.5	1.1	ug/kg	
95-47-6	o-Xylene	ND	4.8	0.95	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	110%		59-148%
17060-07-0	1,2-Dichloroethane-D4	101%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.22 3

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045263.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	5.80 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	95.2	51	26	ug/kg	
71-43-2	Benzene	ND	5.1	1.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.1	1.0	ug/kg	
75-25-2	Bromoform	ND	5.1	1.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.1	1.0	ug/kg	
75-00-3	Chloroethane	ND	5.1	2.7	ug/kg	
67-66-3	Chloroform	ND	5.1	1.0	ug/kg	
75-15-0	Carbon disulfide	2.1	5.1	1.0	ug/kg	J
56-23-5	Carbon tetrachloride	ND	5.1	1.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.1	1.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.1	1.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.1	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.1	1.3	ug/kg	
124-48-1	Dibromochloromethane	ND	5.1	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.1	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.1	1.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.1	1.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.1	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.1	1.0	ug/kg	UJ
591-78-6	2-Hexanone	ND	26	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	26	10	ug/kg	
74-83-9	Methyl bromide	ND	5.1	1.8	ug/kg	UJ
74-87-3	Methyl chloride	ND	5.1	2.0	ug/kg	
75-09-2	Methylene chloride	ND	10	5.1	ug/kg	
78-93-3	Methyl ethyl ketone	ND	26	10	ug/kg	
100-42-5	Styrene	ND	5.1	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.1	1.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.1	1.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.1	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.1	1.0	ug/kg	
108-88-3	Toluene	ND	5.1	1.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.1	1.0	ug/kg	

DATA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.1	1.4	ug/kg	
	m,p-Xylene	ND	10	1.1	ug/kg	
95-47-6	o-Xylene	ND	5.1	1.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-121%
2037-26-5	Toluene-D8	98%		71-130%
460-00-4	4-Bromofluorobenzene	94%		59-148%
17060-07-0	1,2-Dichloroethane-D4	107%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045298.D	1	08/01/07	SH	n/a	n/a	VG1721
Run #2							

	Initial Weight
Run #1	4.85 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone [a]	33.5	59	29	ug/kg	J	J
71-43-2	Benzene	ND	5.9	1.2	ug/kg		
75-27-4	Bromodichloromethane	ND	5.9	1.2	ug/kg		
75-25-2	Bromoform	ND	5.9	1.2	ug/kg		
108-90-7	Chlorobenzene	ND	5.9	1.2	ug/kg		
75-00-3	Chloroethane	ND	5.9	3.1	ug/kg		
67-66-3	Chloroform	ND	5.9	1.2	ug/kg		
75-15-0	Carbon disulfide	ND	5.9	1.2	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.9	1.5	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.9	1.3	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.9	1.2	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.9	1.2	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.9	1.5	ug/kg		
124-48-1	Dibromochloromethane	ND	5.9	1.2	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
100-41-4	Ethylbenzene	ND	5.9	1.2	ug/kg		UJ
591-78-6	2-Hexanone	ND	29	12	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg		
74-83-9	Methyl bromide	ND	5.9	2.1	ug/kg		UJ
74-87-3	Methyl chloride	ND	5.9	2.4	ug/kg		
75-09-2	Methylene chloride	ND	12	5.9	ug/kg		
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg		
100-42-5	Styrene	ND	5.9	1.2	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.9	1.2	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.9	1.5	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.9	1.2	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.9	1.2	ug/kg		
108-88-3	Toluene	ND	5.9	1.2	ug/kg		
79-01-6	Trichloroethylene	ND	5.9	1.2	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.9	1.6	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.9	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-121%
2037-26-5	Toluene-D8	94%		71-130%
460-00-4	4-Bromofluorobenzene	101%		59-148%
17060-07-0	1,2-Dichloroethane-D4	103%		77-123%

(a) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.24 B

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045265.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	3.88 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	71	36	ug/kg	
71-43-2	Benzene	ND	7.1	1.4	ug/kg	
75-27-4	Bromodichloromethane	ND	7.1	1.4	ug/kg	
75-25-2	Bromoform	ND	7.1	1.4	ug/kg	
108-90-7	Chlorobenzene	ND	7.1	1.4	ug/kg	
75-00-3	Chloroethane	ND	7.1	3.7	ug/kg	
67-66-3	Chloroform	ND	7.1	1.4	ug/kg	
75-15-0	Carbon disulfide	ND	7.1	1.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.1	1.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.1	1.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.1	1.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.1	1.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.1	1.9	ug/kg	
124-48-1	Dibromochloromethane	ND	7.1	1.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.1	1.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.1	1.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.1	1.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.1	1.4	ug/kg	
100-41-4	Ethylbenzene	ND	7.1	1.4	ug/kg	UJ
591-78-6	2-Hexanone	ND	36	14	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	36	14	ug/kg	
74-83-9	Methyl bromide	ND	7.1	2.6	ug/kg	UJ
74-87-3	Methyl chloride	ND	7.1	2.9	ug/kg	
75-09-2	Methylene chloride	ND	14	7.1	ug/kg	
78-93-3	Methyl ethyl ketone	ND	36	14	ug/kg	
100-42-5	Styrene	ND	7.1	1.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.1	1.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.1	1.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.1	1.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.1	1.4	ug/kg	
108-88-3	Toluene	ND	7.1	1.4	ug/kg	
79-01-6	Trichloroethylene	ND	7.1	1.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.1	2.0	ug/kg	
	m,p-Xylene	ND	14	1.6	ug/kg	
95-47-6	o-Xylene	ND	7.1	1.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-121%
2037-26-5	Toluene-D8	98%		71-130%
460-00-4	4-Bromofluorobenzene	105%		59-148%
17060-07-0	1,2-Dichloroethane-D4	100%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.25

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045259.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2 [a]	G0045299.D	1	08/01/07	SH	n/a	n/a	VG1721

	Initial Weight
Run #1	5.19 g
Run #2	5.86 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
67-64-1	Acetone	61.2	55	28	ug/kg	
71-43-2	Benzene	ND	5.5	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.5	1.1	ug/kg	
75-25-2	Bromoform	ND	5.5	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.5	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.5	2.9	ug/kg	
67-66-3	Chloroform	ND	5.5	1.1	ug/kg	
75-15-0	Carbon disulfide	7.3	5.5	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.5	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.5	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.5	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.5	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.5	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.5	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.5	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.5	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.5	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.5	1.1	ug/kg	
100-41-4	Ethylbenzene	61.8	5.5	1.1	ug/kg	J
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.5	2.0	ug/kg	UJ
74-87-3	Methyl chloride	ND	5.5	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.5	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.5	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.5	1.4	ug/kg	UJ
79-00-5	1,1,2-Trichloroethane	ND	5.5	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.5	1.1	ug/kg	
108-88-3	Toluene	2.7	5.5	1.1	ug/kg	J J
79-01-6	Trichloroethylene	ND	5.5	1.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.5	1.6	ug/kg	
	m,p-Xylene	12.4	11	1.2	ug/kg	
95-47-6	o-Xylene	8.9	5.5	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%	103%	80-121%
2037-26-5	Toluene-D8	106%	97%	71-130%
460-00-4	4-Bromofluorobenzene	116%	104%	59-148%
17060-07-0	1,2-Dichloroethane-D4	98%	97%	77-123%

(a) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045266.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	4.34 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone	33.6	66	33	ug/kg	J	J
71-43-2	Benzene	ND	6.6	1.3	ug/kg		
75-27-4	Bromodichloromethane	ND	6.6	1.3	ug/kg		
75-25-2	Bromoform	ND	6.6	1.3	ug/kg		
108-90-7	Chlorobenzene	ND	6.6	1.3	ug/kg		
75-00-3	Chloroethane	ND	6.6	3.4	ug/kg		
67-66-3	Chloroform	ND	6.6	1.3	ug/kg		
75-15-0	Carbon disulfide	ND	6.6	1.3	ug/kg		
56-23-5	Carbon tetrachloride	ND	6.6	1.7	ug/kg		
75-34-3	1,1-Dichloroethane	ND	6.6	1.5	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	6.6	1.3	ug/kg		
107-06-2	1,2-Dichloroethane	ND	6.6	1.3	ug/kg		
78-87-5	1,2-Dichloropropane	ND	6.6	1.7	ug/kg		
124-48-1	Dibromochloromethane	ND	6.6	1.3	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	6.6	1.3	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	6.6	1.3	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	6.6	1.3	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	6.6	1.3	ug/kg		
100-41-4	Ethylbenzene	ND	6.6	1.3	ug/kg		UJ
591-78-6	2-Hexanone	ND	33	13	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	33	13	ug/kg		
74-83-9	Methyl bromide	ND	6.6	2.4	ug/kg		UJ
74-87-3	Methyl chloride	ND	6.6	2.6	ug/kg		
75-09-2	Methylene chloride	ND	13	6.6	ug/kg		
78-93-3	Methyl ethyl ketone	ND	33	13	ug/kg		
100-42-5	Styrene	ND	6.6	1.3	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	6.6	1.3	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.6	1.7	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	6.6	1.3	ug/kg		
127-18-4	Tetrachloroethylene	ND	6.6	1.3	ug/kg		
108-88-3	Toluene	ND	6.6	1.3	ug/kg		
79-01-6	Trichloroethylene	ND	6.6	1.3	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.6	1.9	ug/kg	
	m,p-Xylene	ND	13	1.5	ug/kg	
95-47-6	o-Xylene	ND	6.6	1.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-121%
2037-26-5	Toluene-D8	94%		71-130%
460-00-4	4-Bromofluorobenzene	100%		59-148%
17060-07-0	1,2-Dichloroethane-D4	102%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.27 3

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045267.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	4.09 g
Run #2	

VOA TCL List

DATA VAL QUALIFIED

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	70	35	ug/kg	
71-43-2	Benzene	ND	7.0	1.4	ug/kg	
75-27-4	Bromodichloromethane	ND	7.0	1.4	ug/kg	
75-25-2	Bromoform	ND	7.0	1.4	ug/kg	
108-90-7	Chlorobenzene	ND	7.0	1.4	ug/kg	
75-00-3	Chloroethane	ND	7.0	3.6	ug/kg	
67-66-3	Chloroform	ND	7.0	1.4	ug/kg	
75-15-0	Carbon disulfide	ND	7.0	1.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.0	1.8	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.0	1.5	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.0	1.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.0	1.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.0	1.8	ug/kg	
124-48-1	Dibromochloromethane	ND	7.0	1.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.0	1.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.0	1.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.0	1.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.0	1.4	ug/kg	
100-41-4	Ethylbenzene	ND	7.0	1.4	ug/kg	UJ
591-78-6	2-Hexanone	ND	35	14	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	35	14	ug/kg	
74-83-9	Methyl bromide	ND	7.0	2.5	ug/kg	UJ
74-87-3	Methyl chloride	ND	7.0	2.8	ug/kg	
75-09-2	Methylene chloride	ND	14	7.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	35	14	ug/kg	
100-42-5	Styrene	ND	7.0	1.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.0	1.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.0	1.8	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.0	1.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.0	1.4	ug/kg	
108-88-3	Toluene	ND	7.0	1.4	ug/kg	
79-01-6	Trichloroethylene	ND	7.0	1.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.0	2.0	ug/kg	
	m,p-Xylene	ND	14	1.5	ug/kg	
95-47-6	o-Xylene	ND	7.0	1.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-121%
2037-26-5	Toluene-D8	96%		71-130%
460-00-4	4-Bromofluorobenzene	96%		59-148%
17060-07-0	1,2-Dichloroethane-D4	97%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3-28
3

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045268.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	4.92 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone	ND	59	29	ug/kg		
71-43-2	Benzene	ND	5.9	1.2	ug/kg		
75-27-4	Bromodichloromethane	ND	5.9	1.2	ug/kg		
75-25-2	Bromoform	ND	5.9	1.2	ug/kg		
108-90-7	Chlorobenzene	ND	5.9	1.2	ug/kg		
75-00-3	Chloroethane	ND	5.9	3.1	ug/kg		
67-66-3	Chloroform	ND	5.9	1.2	ug/kg		
75-15-0	Carbon disulfide	ND	5.9	1.2	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.9	1.5	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.9	1.3	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.9	1.2	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.9	1.2	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.9	1.5	ug/kg		
124-48-1	Dibromochloromethane	ND	5.9	1.2	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.9	1.2	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.9	1.2	ug/kg		
100-41-4	Ethylbenzene	ND	5.9	1.2	ug/kg		UJ
591-78-6	2-Hexanone	ND	29	12	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg		
74-83-9	Methyl bromide	ND	5.9	2.1	ug/kg		UJ
74-87-3	Methyl chloride	ND	5.9	2.3	ug/kg		
75-09-2	Methylene chloride	ND	12	5.9	ug/kg		
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg		
100-42-5	Styrene	ND	5.9	1.2	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.9	1.2	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.9	1.5	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.9	1.2	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.9	1.2	ug/kg		
108-88-3	Toluene	ND	5.9	1.2	ug/kg		
79-01-6	Trichloroethylene	ND	5.9	1.2	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.9	1.6	ug/kg	
	m,p-Xylene	ND	12	1.3	ug/kg	
95-47-6	o-Xylene	ND	5.9	1.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-121%
2037-26-5	Toluene-D8	92%		71-130%
460-00-4	4-Bromofluorobenzene	93%		59-148%
17060-07-0	1,2-Dichloroethane-D4	103%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.2.6 C3

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044779.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2							

	Initial Weight
Run #1	6.77 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
67-64-1	Acetone	ND	44	22	ug/kg	UJ
71-43-2	Benzene	ND	4.4	0.88	ug/kg	
75-27-4	Bromodichloromethane	ND	4.4	0.88	ug/kg	
75-25-2	Bromoform	ND	4.4	0.88	ug/kg	
108-90-7	Chlorobenzene	ND	4.4	0.88	ug/kg	
75-00-3	Chloroethane	ND	4.4	2.3	ug/kg	
67-66-3	Chloroform	ND	4.4	0.88	ug/kg	
75-15-0	Carbon disulfide	ND	4.4	0.88	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.4	1.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.4	0.97	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.4	0.88	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.4	0.88	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.4	1.1	ug/kg	
124-48-1	Dibromochloromethane	ND	4.4	0.88	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.4	0.88	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.4	0.88	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.4	0.88	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.4	0.88	ug/kg	
100-41-4	Ethylbenzene	ND	4.4	0.88	ug/kg	UJ
591-78-6	2-Hexanone	ND	22	8.8	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	22	8.8	ug/kg	
74-83-9	Methyl bromide	ND	4.4	1.6	ug/kg	
74-87-3	Methyl chloride	ND	4.4	1.8	ug/kg	
75-09-2	Methylene chloride	ND	8.8	4.4	ug/kg	
78-93-3	Methyl ethyl ketone	ND	22	8.8	ug/kg	
100-42-5	Styrene	ND	4.4	0.88	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.4	0.88	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.4	1.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.4	0.88	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.4	0.88	ug/kg	
108-88-3	Toluene	ND	4.4	0.88	ug/kg	
79-01-6	Trichloroethylene	ND	4.4	0.88	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.4	1.2	ug/kg	
	m,p-Xylene	ND	8.8	0.97	ug/kg	
95-47-6	o-Xylene	ND	4.4	0.88	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		80-121%
2037-26-5	Toluene-D8	101%		71-130%
460-00-4	4-Bromofluorobenzene	119%		59-148%
17060-07-0	1,2-Dichloroethane-D4	122%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045269.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	5.31 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
67-64-1	Acetone	ND	55	27	ug/kg	
71-43-2	Benzene	ND	5.5	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.5	1.1	ug/kg	
75-25-2	Bromoform	ND	5.5	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.5	1.1	ug/kg	
75-00-3	Chloroethane	ND	5.5	2.9	ug/kg	
67-66-3	Chloroform	ND	5.5	1.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.5	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.5	1.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.5	1.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.5	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.5	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.5	1.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.5	1.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.5	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.5	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.5	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.5	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.5	1.1	ug/kg	UJ
591-78-6	2-Hexanone	ND	27	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	27	11	ug/kg	
74-83-9	Methyl bromide	ND	5.5	2.0	ug/kg	UJ
74-87-3	Methyl chloride	ND	5.5	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	27	11	ug/kg	
100-42-5	Styrene	ND	5.5	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.5	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.5	1.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.5	1.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.5	1.1	ug/kg	
108-88-3	Toluene	ND	5.5	1.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.5	1.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.5	1.5	ug/kg	
	m,p-Xylene	ND	11	1.2	ug/kg	
95-47-6	o-Xylene	ND	5.5	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-121%
2037-26-5	Toluene-D8	91%		71-130%
460-00-4	4-Bromofluorobenzene	94%		59-148%
17060-07-0	1,2-Dichloroethane-D4	102%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031592.D	1	08/02/07	LD	n/a	n/a	VJ2193
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		87-116%
17060-07-0	1,2-Dichloroethane-D4	99%		76-127%
2037-26-5	Toluene-D8	96%		86-112%
460-00-4	4-Bromofluorobenzene	102%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB072507S		
Lab Sample ID:	F51300-32	**Date Sampled:**	07/25/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	07/26/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0045270.D	1	07/31/07	SH	n/a	n/a	VG1720
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
67-64-1	Acetone	ND	50	25	ug/kg		
71-43-2	Benzene	ND	5.0	1.0	ug/kg		
75-27-4	Bromodichloromethane	ND	5.0	1.0	ug/kg		
75-25-2	Bromoform	ND	5.0	1.0	ug/kg		
108-90-7	Chlorobenzene	ND	5.0	1.0	ug/kg		
75-00-3	Chloroethane	ND	5.0	2.6	ug/kg		
67-66-3	Chloroform	ND	5.0	1.0	ug/kg		
75-15-0	Carbon disulfide	ND	5.0	1.0	ug/kg		
56-23-5	Carbon tetrachloride	ND	5.0	1.3	ug/kg		
75-34-3	1,1-Dichloroethane	ND	5.0	1.1	ug/kg		
75-35-4	1,1-Dichloroethylene	ND	5.0	1.0	ug/kg		
107-06-2	1,2-Dichloroethane	ND	5.0	1.0	ug/kg		
78-87-5	1,2-Dichloropropane	ND	5.0	1.3	ug/kg		
124-48-1	Dibromochloromethane	ND	5.0	1.0	ug/kg		
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.0	ug/kg		
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	1.0	ug/kg		
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	1.0	ug/kg		
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	1.0	ug/kg		
100-41-4	Ethylbenzene	ND	5.0	1.0	ug/kg		
591-78-6	2-Hexanone	ND	25	10	ug/kg		
108-10-1	4-Methyl-2-pentanone	ND	25	10	ug/kg		
74-83-9	Methyl bromide	ND	5.0	1.8	ug/kg		UJ
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg		
75-09-2	Methylene chloride	ND	10	5.0	ug/kg		
78-93-3	Methyl ethyl ketone	ND	25	10	ug/kg		
100-42-5	Styrene	ND	5.0	1.0	ug/kg		
71-55-6	1,1,1-Trichloroethane	ND	5.0	1.0	ug/kg		
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	1.3	ug/kg		
79-00-5	1,1,2-Trichloroethane	ND	5.0	1.0	ug/kg		
127-18-4	Tetrachloroethylene	ND	5.0	1.0	ug/kg		
108-88-3	Toluene	ND	5.0	1.0	ug/kg		
79-01-6	Trichloroethylene	ND	5.0	1.0	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB072507S		
Lab Sample ID:	F51300-32	Date Sampled:	07/25/07
Matrix:	SO - Trip Blank Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.0	1.4	ug/kg	
	m,p-Xylene	ND	10	1.1	ug/kg	
95-47-6	o-Xylene	ND	5.0	1.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-121%
2037-26-5	Toluene-D8	92%		71-130%
460-00-4	4-Bromofluorobenzene	99%		59-148%
17060-07-0	1,2-Dichloroethane-D4	98%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB072507W		
Lab Sample ID:	F51300-33	Date Sampled:	07/25/07
Matrix:	AQ - Trip Blank Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031593.D	1	08/02/07	LD	n/a	n/a	VJ2193
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB072507W		
Lab Sample ID:	F51300-33	Date Sampled:	07/25/07
Matrix:	AQ - Trip Blank Soil	Date Received:	07/26/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		87-116%
17060-07-0	1,2-Dichloroethane-D4	100%		76-127%
2037-26-5	Toluene-D8	95%		86-112%
460-00-4	4-Bromofluorobenzene	104%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F51300

DATE: December 20, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3550B/8270C (solids) and 3510C/8270C (aqueous). The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of 1 aqueous and 30 soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59SB06A	F51300-1	43SB06C	F51300-17
59SB06B	F51300-2	43SB07A	F51300-18
59SB06C	F51300-3	43SB07B	F51300-19
59SB05A	F51300-4	43SB07C	F51300-20
59SB05B	F51300-5	43SB08A	F51300-21
59SB05C	F51300-6	43SB08B	F51300-22
59SB04A	F51300-7	43SB08C	F51300-23
59SB04B	F51300-8	43SB09A	F51300-24
59SB04C	F51300-9	43SB09B	F51300-25
TMSB04C	F51300-10	43SB09C	F51300-26
59SB02A	F51300-11	43SB10A	F51300-27
59SB02B	F51300-12	43SB10B	F51300-28
TMSB02B	F51300-13	43SB10C	F51300-29
59SB02C	F51300-14	TMSB10B	F51300-30
43SB06A	F51300-15	072507R	F51300-31
43SB06B	F51300-16		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Surrogate Spikes
	X	Internal Standards
	X	Laboratory Control Sample
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. McCracken

Richard McCracken, Chemist

10/20/07

Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F51300

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: Solid samples must be stored @4°C ± 2°C with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/25/07. The aqueous sample was extracted for SVOCs on 7/31/07, extracted for PAHs by SIM on 7/31/07, analyzed for SVOCs on 8/2/07, and analyzed for PAHs by SIM on 8/2/07. The solid matrix samples were extracted for SVOCs on 8/2/07 & 8/3/07; extracted for PAHs by SIM on 8/2/07 & 8/3/07; analyzed for SVOCs on 8/3/07, 8/6/07, & 8/7/07; and analyzed for PAHs by SIM on 8/7/07 & 8/8/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check

GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 7/5/07 using instrument MSBNA02 (GCMSL). Target compounds 2,4-dinitrophenol (19.68%) and 4,6-dinitro-2-methylphenol (25.87%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients ≥0.995; therefore no qualifiers were applied. Sample F51300-31 were analyzed in conjunction with this initial calibration.

- Initial calibration for the PAHs-SIM was performed on 7/18/07 using instrument MSBNA3 (GCMSR). All target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05); no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- Initial calibration for the SVOCs was performed on 7/13/07 using instrument MSBNA04 (GCMSU). Target compounds 2,4-dinitrophenol (42.04%) and 4,6-dinitro-2-methylphenol (24.04%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients ≥0.995; therefore no qualifiers were applied. All solid matrix samples (F51300-1 thru -30) were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the SVOC initial calibration verification performed on 7/5/07 @1527 using instrument MSBNA02 (GCMSL), 3-nitroaniline (26.0%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC initial calibration verification performed on 7/5/07 @1555 using instrument MSBNA02 (GCMSL), all target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/1/07 @1616 using instrument MSBNA02 (GCMSL), 2,4-dinitrophenol (33.0%) and 4,6-dinitro-2-methylphenol (22.1%) had %D outside criteria. All other target compounds met criteria. The MS and MSD were the only samples analyzed following this continuing calibration. Therefore, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/2/07 @1324 using instrument MSBNA02 (GCMSL), all target compounds met criteria. No qualifiers were applied. Sample F51300-31 was analyzed following this continuing calibration.

- During the PAH-SIM initial calibration verification performed on 7/18/07 @0634 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PAH-SIM continuing calibration performed on 8/2/07 @1000 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. Sample F51300-31 was analyzed following this continuing calibration.

- During the PAH-SIM continuing calibration performed on 8/6/07 @2107 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, and -16 were analyzed following this continuing calibration.

- During the PAH-SIM continuing calibration performed on 8/7/07 @1245 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. Sample F51300-17 was analyzed following this continuing calibration.

- During the PAH-SIM continuing calibration performed on 8/8/07 @1443 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. Samples F51300-18, -19, -20, -21, -22 -23, -24, -25, -26, -27, -28, -29 and -30 were analyzed following this continuing calibration.

- During the SVOC initial calibration verification performed on 7/13/07 @1348 using instrument MSBNA04 (GCMSU), 4-chloroaniline (38.2%) and 3-nitroaniline (39.0%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC initial calibration verification performed on 7/13/07 @1419 using instrument MSBNA04 (GCMSU), all target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/3/07 @0952 using instrument MSBNA04 (GCMSU), all target compounds met criteria. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, and -13 were analyzed following this continuing calibration.

- During the SVOC continuing calibration performed on 8/6/07 @1128 using instrument MSBNA04 (GCMSU), all target compounds met criteria. No qualifiers were applied. Samples F51300-14, -15, -16, and -17 were analyzed following this continuing calibration.

- During the SVOC continuing calibration performed on 8/7/07 @0942 using instrument MSBNA04 (GCMSU), all target compounds met criteria. No qualifiers were applied. Samples F51300-18, -19, -20, -21, -22 -23, -24, -25, -26, -27, -28, -29 and -30 were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
8/2/07	OP21675-MB	All SVOC target <½MRL	NA	NA	None
8/3/07	OP21718-MB	All SVOC target <½MRL	NA	NA	None
8/6/07	OP21718-MB	All SVOC target <½MRL	NA	NA	None
8/7/07	OP21737-MB	All SVOC target <½MRL	NA	NA	None
8/2/07	OP21676-MB	All PAH SIM target <½MRL	NA	NA	None
8/6/07	OP21719-MB	All PAH SIM target <½MRL	NA	NA	None
8/7/07	OP21719-MB	All PAH SIM target <½MRL	NA	NA	None
8/8/07	OP21738-MB	All PAH SIM target <½MRL	NA	NA	None
8/2/07	072507R	All SVOC target <½MRL	NA	NA	None
8/2/07	072507R	All PAH SIM target <½MRL	NA	NA	None
8/2/07	072607R	All SVOC target <½MRL	NA	NA	None
8/2/07	072607R	All PAH SIM target <½MRL	NA	NA	None

072507R & 072607R are rinsate blanks.
NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Tables D-2 & D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:
2-Fluorophenol (14-62%) – (DoD QSM = 20-110%)
Phenol-d5 (10-40%) – (DoD QSM = 10-115%)
2,4,6-Tribromophenol (33-118%) – (DoD QSM = 40-125%)
Nitrobenzene-d5 (42-108%) – (DoD QSM = 40-110%)
2-Fluorobiphenyl (40-106%) – (DoD QSM = 50-110%)
p-Terphenyl-d14 (39-121%) – (DoD QSM = 50-135%)

Solid Criteria:
2-Fluorophenol (40-102%) – (DoD QSM = 35-105%)
Phenol-d5 (41-100%) – (DoD QSM = 40-100%)
2,4,6-Tribromophenol (42-108%) – (DoD QSM = 35-125%)
Nitrobenzene-d5 (40-105%) – (DoD QSM = 35-100%)
2-Fluorobiphenyl (43-107%) – (DoD QSM = 45-105%)
p-Terphenyl-d14 (45-119%) – (DoD QSM = 30-125%)

- All samples met surrogate recovery criteria. No qualifiers were applied.

VII-Internal Standards

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All samples met criteria. No qualifiers were applied.

VIII-Laboratory Control Sample

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD solid matrix LCS recovery limits are specified in Table D-7 of the DoD QSM (DoD, 2006), while aqueous recovery limits are specified in Table D-6 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21675-BS was used as the aqueous LCS during SVOC analysis on 8/2/07. All compounds met recovery criteria. No qualifiers were applied. Sample 072507R was analyzed in conjunction with this LCS.

- Sample OP21718-BS was used as the solid LCS during SVOC analysis on 8/3/07. All compounds met recovery criteria. No qualifiers were applied. Samples F51300-1 thru -17 were analyzed in conjunction with this LCS.

- Sample OP21737-BS was used as the solid LCS during SVOC analysis on 8/7/07. All compounds met recovery criteria. No qualifiers were applied. Samples F51300-18 thru -30 were analyzed in conjunction with this LCS.

- Sample OP21676-BS was used as the aqueous LCS for the PAH-SIM analysis on 8/2/07. All compounds met recovery criteria. No qualifiers were applied. Sample F51300-31 was analyzed in conjunction with this LCS.

- Sample OP21719-BS was used as the solid LCS for the PAH-SIM analysis on 8/6/07. All compounds met recovery criteria. No qualifiers were applied. Samples F51300-1 thru -17 were analyzed in conjunction with this LCS.

- Sample OP21738-BS was used as the solid LCS for the PAH-SIM analysis on 8/8/07. All compounds met recovery criteria. No qualifiers were applied. Samples F51300-18 thru -30 were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid matrix MS/MSD recovery limits follow the LCS criteria specified in Table D-7 of the DoD QSM (DoD, 2006), while aqueous recovery limits follow the LCS criteria in Table D-6 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51272-6 was used as the aqueous MS/MSD during SVOC analysis on 8/1/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

- Sample F51300-5 was used as the solid MS/MSD during SVOC analysis on 8/3/07. All target compounds met recovery criteria. No qualifiers were applied. Samples F51300-1 thru -17 were analyzed in conjunction with this MS/MSD.

- Sample F51300-25 was used as the solid MS/MSD during SVOC analysis on 8/7/07. All target compounds met recovery criteria. No qualifiers were applied. Samples F51300-18 thru -30 were analyzed in conjunction with this MS/MSD.

- Sample F53100-31 was used as the aqueous MS/MSD during PAH SIM analysis on 8/2/07. All compounds met recovery criteria. No qualifiers were applied. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

- Sample F53100-7 was used as the solid MS/MSD during PAH SIM analysis on 8/7/07. Chrysene (52%, 53%) and 1-methylnaphthalene (56%, 57%) had low recoveries in the MS & MSD; all chrysene and 1-methylnaphthalene results in associated samples have been qualified "J/UJ". All other target compounds met recovery criteria. Samples F51300-1 thru -17 were analyzed in conjunction with this MS/MSD.

- Sample F53100-25 was used as the solid MS/MSD during PAH SIM analysis on 8/8/07. All target compounds met recovery criteria. Samples F51300-18 thru -30 were analyzed in conjunction with this MS/MSD.

X-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included 59SB04C (F51300-9) & TMSB04C (F51300-10), 59SB02B (F51300-12) & TMSB02B (F51300-13), and 43SB10B (F51300-28) & TMSB10B (F51300-30). All compounds detected above the reporting limit (RL) met RPD criteria.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: F51300-16, di-n-butyl phthalate

Conc. (µg/kg) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_i)*(Ws)*(Ps)}

where:	Conc	=	Sample concentration in µg/kg
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	DF	=	Dilution Factor
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_i	=	Volume of extract injected (µL).
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (735472 * 40 * 1000 * 2) / (691959 *1.457 * 1 * 30.4 * 0.817) = 2350 ug/kg

Reported Value = 2350 µg/kg
% Difference = 0.0%
Values were within 10% difference.

Sample: F51300-11, chrysene

Conc. (µg/kg) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_i)*(Ws)*(Ps)}

where:	Conc	=	Sample concentration in µg/kg
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	DF	=	Dilution Factor
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_i	=	Volume of extract injected (µL).
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (6444 * 4 * 1000 * 4) / (121726 * 1.586 * 1 * 30.8 * 0.895) = 19.4 ug/kg

Reported Value = 19.4 µg/kg
% Difference = 0.1%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003745.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	900	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	900	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	72	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	900	360	ug/kg	
87-86-5	Pentachlorophenol	ND	900	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	90	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	180	72	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	36	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	36	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	36	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	72	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	360	90	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	360	90	ug/kg	
84-66-2	Diethyl phthalate	ND	360	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	90	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	36	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	36	ug/kg	
67-72-1	Hexachloroethane	ND	180	36	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	72	ug/kg	
99-09-2	3-Nitroaniline	ND	360	72	ug/kg	
100-01-6	4-Nitroaniline	ND	360	72	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	36	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	61%		40-102%
4165-62-2	Phenol-d5	67%		41-100%
118-79-6	2,4,6-Tribromophenol	61%		42-108%
4165-60-0	Nitrobenzene-d5	56%		40-105%
321-60-8	2-Fluorobiphenyl	59%		43-107%
1718-51-0	Terphenyl-d14	67%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09626.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09626.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
83-32-9	Acenaphthene	ND	290	72	ug/kg		
208-96-8	Acenaphthylene	ND	290	72	ug/kg		
120-12-7	Anthracene	ND	290	43	ug/kg		
56-55-3	Benzo(a)anthracene	ND	57	14	ug/kg		
50-32-8	Benzo(a)pyrene	ND	57	14	ug/kg		
205-99-2	Benzo(b)fluoranthene	ND	57	14	ug/kg		
191-24-2	Benzo(g,h,i)perylene	ND	57	14	ug/kg		
207-08-9	Benzo(k)fluoranthene	ND	57	14	ug/kg		
218-01-9	Chrysene	ND	57	14	ug/kg		UJ
53-70-3	Dibenzo(a,h)anthracene	ND	57	14	ug/kg		
206-44-0	Fluoranthene	ND	290	50	ug/kg		
86-73-7	Fluorene	ND	290	43	ug/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	57	14	ug/kg		
90-12-0	1-Methylnaphthalene	ND	290	43	ug/kg		UJ
91-57-6	2-Methylnaphthalene	ND	290	43	ug/kg		
91-20-3	Naphthalene	ND	290	43	ug/kg		
85-01-8	Phenanthrene	ND	290	43	ug/kg		
129-00-0	Pyrene	ND	290	50	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003746.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	74	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	74	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	93	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	93	ug/kg	
84-66-2	Diethyl phthalate	ND	370	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg	
67-72-1	Hexachloroethane	ND	190	37	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	74	ug/kg	
99-09-2	3-Nitroaniline	ND	370	74	ug/kg	
100-01-6	4-Nitroaniline	ND	370	74	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	54%		40-102%
4165-62-2	Phenol-d5	58%		41-100%
118-79-6	2,4,6-Tribromophenol	72%		42-108%
4165-60-0	Nitrobenzene-d5	49%		40-105%
321-60-8	2-Fluorobiphenyl	51%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09627.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
83-32-9	Acenaphthene	ND	300	74	ug/kg		
208-96-8	Acenaphthylene	ND	300	74	ug/kg		
120-12-7	Anthracene	ND	300	44	ug/kg		
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg		
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg		
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg		
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg		
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg		
218-01-9	Chrysene	ND	59	15	ug/kg		UJ
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg		
206-44-0	Fluoranthene	ND	300	52	ug/kg		
86-73-7	Fluorene	ND	300	44	ug/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg		
90-12-0	1-Methylnaphthalene	ND	300	44	ug/kg		UJ
91-57-6	2-Methylnaphthalene	ND	300	44	ug/kg		
91-20-3	Naphthalene	ND	300	44	ug/kg		
85-01-8	Phenanthrene	ND	300	44	ug/kg		
129-00-0	Pyrene	ND	300	52	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003747.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	960	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	960	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	77	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	960	380	ug/kg	
87-86-5	Pentachlorophenol	ND	960	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	96	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	77	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	77	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	96	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	96	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	96	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	77	ug/kg	
99-09-2	3-Nitroaniline	ND	380	77	ug/kg	
100-01-6	4-Nitroaniline	ND	380	77	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		40-102%
4165-62-2	Phenol-d5	68%		41-100%
118-79-6	2,4,6-Tribromophenol	77%		42-108%
4165-60-0	Nitrobenzene-d5	56%		40-105%
321-60-8	2-Fluorobiphenyl	58%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09628.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09628.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003748.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	920	370	ug/kg	
95-57-8	2-Chlorophenol	ND	180	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	920	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	73	ug/kg	
95-48-7	2-Methylphenol	ND	180	37	ug/kg	
	3&4-Methylphenol	ND	180	37	ug/kg	
88-75-5	2-Nitrophenol	ND	180	37	ug/kg	
100-02-7	4-Nitrophenol	ND	920	370	ug/kg	
87-86-5	Pentachlorophenol	ND	920	370	ug/kg	
108-95-2	Phenol	ND	180	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	92	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	37	ug/kg	
106-47-8	4-Chloroaniline	ND	180	73	ug/kg	
86-74-8	Carbazole	ND	180	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	73	ug/kg	
132-64-9	Dibenzofuran	ND	180	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	92	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	92	ug/kg	
84-66-2	Diethyl phthalate	ND	370	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	92	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	37	ug/kg	
67-72-1	Hexachloroethane	ND	180	37	ug/kg	
78-59-1	Isophorone	ND	180	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	73	ug/kg	
99-09-2	3-Nitroaniline	ND	370	73	ug/kg	
100-01-6	4-Nitroaniline	ND	370	73	ug/kg	
98-95-3	Nitrobenzene	ND	180	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	73%		40-102%
4165-62-2	Phenol-d5	79%		41-100%
118-79-6	2,4,6-Tribromophenol	80%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	81%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09629.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	290	73	ug/kg	
208-96-8	Acenaphthylene	ND	290	73	ug/kg	
120-12-7	Anthracene	ND	290	44	ug/kg	
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg	
218-01-9	Chrysene	ND	59	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg	
206-44-0	Fluoranthene	ND	290	51	ug/kg	
86-73-7	Fluorene	ND	290	44	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	290	44	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	290	44	ug/kg	
91-20-3	Naphthalene	ND	290	44	ug/kg	
85-01-8	Phenanthrene	ND	290	44	ug/kg	
129-00-0	Pyrene	ND	290	51	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003749.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	960	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	960	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	77	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	960	380	ug/kg	
87-86-5	Pentachlorophenol	ND	960	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	96	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	77	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	77	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	96	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	96	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	96	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	77	ug/kg	
99-09-2	3-Nitroaniline	ND	380	77	ug/kg	
100-01-6	4-Nitroaniline	ND	380	77	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	63%		40-102%
4165-62-2	Phenol-d5	68%		41-100%
118-79-6	2,4,6-Tribromophenol	67%		42-108%
4165-60-0	Nitrobenzene-d5	56%		40-105%
321-60-8	2-Fluorobiphenyl	58%		43-107%
1718-51-0	Terphenyl-d14	70%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09630.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003752.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	76	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	76	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	95	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	76	ug/kg	
99-09-2	3-Nitroaniline	ND	380	76	ug/kg	
100-01-6	4-Nitroaniline	ND	380	76	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	71%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	61%		40-105%
321-60-8	2-Fluorobiphenyl	62%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09631.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q DATA VAL QUALIFIER
83-32-9	Acenaphthene	ND	300	76	ug/kg	
208-96-8	Acenaphthylene	ND	300	76	ug/kg	
120-12-7	Anthracene	ND	300	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	46	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	300	46	ug/kg	
91-20-3	Naphthalene	ND	300	46	ug/kg	
85-01-8	Phenanthrene	ND	300	46	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003753.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	940	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	940	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	75	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	940	380	ug/kg	
87-86-5	Pentachlorophenol	ND	940	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	94	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	75	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	75	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	94	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	94	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	94	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	75	ug/kg	
99-09-2	3-Nitroaniline	ND	380	75	ug/kg	
100-01-6	4-Nitroaniline	ND	380	75	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	57%		40-102%
4165-62-2	Phenol-d5	61%		41-100%
118-79-6	2,4,6-Tribromophenol	72%		42-108%
4165-60-0	Nitrobenzene-d5	51%		40-105%
321-60-8	2-Fluorobiphenyl	55%		43-107%
1718-51-0	Terphenyl-d14	72%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09632.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	300	75	ug/kg	
208-96-8	Acenaphthylene	ND	300	75	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	60	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	60	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	60	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	60	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	60	15	ug/kg	
218-01-9	Chrysene	ND	60	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	60	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	60	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003754.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1000	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	80	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	400	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	100	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	200	80	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	40	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	40	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	40	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	80	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	100	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	100	ug/kg	
84-66-2	Diethyl phthalate	ND	400	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	100	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	40	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	40	ug/kg	
67-72-1	Hexachloroethane	ND	200	40	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	80	ug/kg	
99-09-2	3-Nitroaniline	ND	400	80	ug/kg	
100-01-6	4-Nitroaniline	ND	400	80	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	40	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	74%		40-102%
4165-62-2	Phenol-d5	78%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09635.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	80	ug/kg	
208-96-8	Acenaphthylene	ND	320	80	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	64	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	64	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	64	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	64	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	64	16	ug/kg	
218-01-9	Chrysene	ND	64	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	64	16	ug/kg	
206-44-0	Fluoranthene	ND	320	56	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	64	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	56	ug/kg	

DATA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003755.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	76	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	76	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	95	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	76	ug/kg	
99-09-2	3-Nitroaniline	ND	380	76	ug/kg	
100-01-6	4-Nitroaniline	ND	380	76	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	69%		40-102%
4165-62-2	Phenol-d5	74%		41-100%
118-79-6	2,4,6-Tribromophenol	82%		42-108%
4165-60-0	Nitrobenzene-d5	63%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	89%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09636.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DMA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	300	76	ug/kg	
208-96-8	Acenaphthylene	ND	300	76	ug/kg	
120-12-7	Anthracene	ND	300	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	46	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	300	46	ug/kg	
91-20-3	Naphthalene	ND	300	46	ug/kg	
85-01-8	Phenanthrene	ND	300	46	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003756.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	980	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	980	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	79	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	980	390	ug/kg	
87-86-5	Pentachlorophenol	ND	980	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	98	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	79	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	79	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	98	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	98	ug/kg	
84-66-2	Diethyl phthalate	ND	390	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	98	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg	
67-72-1	Hexachloroethane	ND	200	39	ug/kg	
78-59-1	Isophorone	ND	200	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	79	ug/kg	
99-09-2	3-Nitroaniline	ND	390	79	ug/kg	
100-01-6	4-Nitroaniline	ND	390	79	ug/kg	
98-95-3	Nitrobenzene	ND	200	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	63%		40-102%
4165-62-2	Phenol-d5	68%		41-100%
118-79-6	2,4,6-Tribromophenol	70%		42-108%
4165-60-0	Nitrobenzene-d5	57%		40-105%
321-60-8	2-Fluorobiphenyl	59%		43-107%
1718-51-0	Terphenyl-d14	74%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09637.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	79	ug/kg	
208-96-8	Acenaphthylene	ND	310	79	ug/kg	
120-12-7	Anthracene	ND	310	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	310	55	ug/kg	
86-73-7	Fluorene	ND	310	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg	
91-20-3	Naphthalene	ND	310	47	ug/kg	
85-01-8	Phenanthrene	ND	310	47	ug/kg	
129-00-0	Pyrene	ND	310	55	ug/kg	

DATA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003757.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	910	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	910	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	73	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	910	360	ug/kg	
87-86-5	Pentachlorophenol	ND	910	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	91	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	180	73	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	36	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	36	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	36	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	73	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	360	91	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	360	91	ug/kg	
84-66-2	Diethyl phthalate	ND	360	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	91	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	36	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	36	ug/kg	
67-72-1	Hexachloroethane	ND	180	36	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	73	ug/kg	
99-09-2	3-Nitroaniline	ND	360	73	ug/kg	
100-01-6	4-Nitroaniline	ND	360	73	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	36	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	74%		40-102%
4165-62-2	Phenol-d5	79%		41-100%
118-79-6	2,4,6-Tribromophenol	80%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	80%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09638.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09638.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
83-32-9	Acenaphthene	ND	290	73	ug/kg		
208-96-8	Acenaphthylene	ND	290	73	ug/kg		
120-12-7	Anthracene	ND	290	44	ug/kg		
56-55-3	Benzo(a)anthracene	ND	58	15	ug/kg		
50-32-8	Benzo(a)pyrene	ND	58	15	ug/kg		
205-99-2	Benzo(b)fluoranthene	16.6	58	15	ug/kg	J	J
191-24-2	Benzo(g,h,i)perylene	ND	58	15	ug/kg		
207-08-9	Benzo(k)fluoranthene	ND	58	15	ug/kg		
218-01-9	Chrysene	19.4	58	15	ug/kg	J	J
53-70-3	Dibenzo(a,h)anthracene	ND	58	15	ug/kg		
206-44-0	Fluoranthene	ND	290	51	ug/kg		
86-73-7	Fluorene	ND	290	44	ug/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	58	15	ug/kg		
90-12-0	1-Methylnaphthalene	ND	290	44	ug/kg		UJ
91-57-6	2-Methylnaphthalene	ND	290	44	ug/kg		
91-20-3	Naphthalene	ND	290	44	ug/kg		
85-01-8	Phenanthrene	ND	290	44	ug/kg		
129-00-0	Pyrene	ND	290	51	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003758.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	990	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	990	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	80	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	990	400	ug/kg	
87-86-5	Pentachlorophenol	ND	990	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	99	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	200	80	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	40	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	40	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	40	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	80	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	99	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	99	ug/kg	
84-66-2	Diethyl phthalate	ND	400	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	99	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	40	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	40	ug/kg	
67-72-1	Hexachloroethane	ND	200	40	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	80	ug/kg	
99-09-2	3-Nitroaniline	ND	400	80	ug/kg	
100-01-6	4-Nitroaniline	ND	400	80	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	40	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	62%		40-102%
4165-62-2	Phenol-d5	68%		41-100%
118-79-6	2,4,6-Tribromophenol	70%		42-108%
4165-60-0	Nitrobenzene-d5	51%		40-105%
321-60-8	2-Fluorobiphenyl	52%		43-107%
1718-51-0	Terphenyl-d14	71%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09639.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	320	80	ug/kg	
208-96-8	Acenaphthylene	ND	320	80	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	64	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	64	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	64	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	64	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	64	16	ug/kg	
218-01-9	Chrysene	ND	64	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	64	16	ug/kg	
206-44-0	Fluoranthene	ND	320	56	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	64	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	56	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003759.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	970	390	ug/kg	
95-57-8	2-Chlorophenol	ND	190	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	970	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	78	ug/kg	
95-48-7	2-Methylphenol	ND	190	39	ug/kg	
	3&4-Methylphenol	ND	190	39	ug/kg	
88-75-5	2-Nitrophenol	ND	190	39	ug/kg	
100-02-7	4-Nitrophenol	ND	970	390	ug/kg	
87-86-5	Pentachlorophenol	ND	970	390	ug/kg	
108-95-2	Phenol	ND	190	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	97	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	39	ug/kg	
106-47-8	4-Chloroaniline	ND	190	78	ug/kg	
86-74-8	Carbazole	ND	190	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	78	ug/kg	
132-64-9	Dibenzofuran	ND	190	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	97	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	97	ug/kg	
84-66-2	Diethyl phthalate	ND	390	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	97	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	39	ug/kg	
67-72-1	Hexachloroethane	ND	190	39	ug/kg	
78-59-1	Isophorone	ND	190	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	78	ug/kg	
99-09-2	3-Nitroaniline	ND	390	78	ug/kg	
100-01-6	4-Nitroaniline	ND	390	78	ug/kg	
98-95-3	Nitrobenzene	ND	190	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	61%		40-102%
4165-62-2	Phenol-d5	66%		41-100%
118-79-6	2,4,6-Tribromophenol	69%		42-108%
4165-60-0	Nitrobenzene-d5	53%		40-105%
321-60-8	2-Fluorobiphenyl	56%		43-107%
1718-51-0	Terphenyl-d14	71%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09640.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
83-32-9	Acenaphthene	ND	310	78	ug/kg	
208-96-8	Acenaphthylene	ND	310	78	ug/kg	
120-12-7	Anthracene	ND	310	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	62	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	62	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	62	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	62	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	62	16	ug/kg	
218-01-9	Chrysene	ND	62	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	62	16	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	62	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg	
91-20-3	Naphthalene	ND	310	47	ug/kg	
85-01-8	Phenanthrene	ND	310	47	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003782.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003782.D	1	08/06/07	NJ	08/02/07	OP21718	SU184
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	980	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	980	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	78	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	980	390	ug/kg	
87-86-5	Pentachlorophenol	ND	980	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	98	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	78	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	78	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	98	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	98	ug/kg	
84-66-2	Diethyl phthalate	ND	390	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	98	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg	
67-72-1	Hexachloroethane	ND	200	39	ug/kg	
78-59-1	Isophorone	ND	200	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	78	ug/kg	
99-09-2	3-Nitroaniline	ND	390	78	ug/kg	
100-01-6	4-Nitroaniline	ND	390	78	ug/kg	
98-95-3	Nitrobenzene	ND	200	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		40-102%
4165-62-2	Phenol-d5	66%		41-100%
118-79-6	2,4,6-Tribromophenol	70%		42-108%
4165-60-0	Nitrobenzene-d5	57%		40-105%
321-60-8	2-Fluorobiphenyl	61%		43-107%
1718-51-0	Terphenyl-d14	71%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09641.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09641.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	78	ug/kg	
208-96-8	Acenaphthylene	ND	310	78	ug/kg	
120-12-7	Anthracene	ND	310	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	310	55	ug/kg	
86-73-7	Fluorene	ND	310	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg	
91-20-3	Naphthalene	ND	310	47	ug/kg	
85-01-8	Phenanthrene	ND	310	47	ug/kg	
129-00-0	Pyrene	ND	310	55	ug/kg	

DANA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003783.D	1	08/06/07	NJ	08/02/07	OP21718	SU184
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	970	390	ug/kg	
95-57-8	2-Chlorophenol	ND	190	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	970	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	77	ug/kg	
95-48-7	2-Methylphenol	ND	190	39	ug/kg	
	3&4-Methylphenol	ND	190	39	ug/kg	
88-75-5	2-Nitrophenol	ND	190	39	ug/kg	
100-02-7	4-Nitrophenol	ND	970	390	ug/kg	
87-86-5	Pentachlorophenol	ND	970	390	ug/kg	
108-95-2	Phenol	ND	190	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	97	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	39	ug/kg	
106-47-8	4-Chloroaniline	ND	190	77	ug/kg	
86-74-8	Carbazole	ND	190	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	77	ug/kg	
132-64-9	Dibenzofuran	ND	190	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	97	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	97	ug/kg	
84-66-2	Diethyl phthalate	ND	390	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	97	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	39	ug/kg	
67-72-1	Hexachloroethane	ND	190	39	ug/kg	
78-59-1	Isophorone	ND	190	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	77	ug/kg	
99-09-2	3-Nitroaniline	ND	390	77	ug/kg	
100-01-6	4-Nitroaniline	ND	390	77	ug/kg	
98-95-3	Nitrobenzene	ND	190	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	59%		40-102%
4165-62-2	Phenol-d5	62%		41-100%
118-79-6	2,4,6-Tribromophenol	71%		42-108%
4165-60-0	Nitrobenzene-d5	54%		40-105%
321-60-8	2-Fluorobiphenyl	57%		43-107%
1718-51-0	Terphenyl-d14	72%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09642.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	62	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	62	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	62	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	62	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	62	15	ug/kg	
218-01-9	Chrysene	ND	62	15	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	62	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	62	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

DATA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U003784.D	2	08/06/07	NJ	08/02/07	OP21718	SU184
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	2000	810	ug/kg	
95-57-8	2-Chlorophenol	ND	400	81	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	400	81	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	400	81	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	400	81	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	2000	810	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	810	160	ug/kg	
95-48-7	2-Methylphenol	ND	400	81	ug/kg	
	3&4-Methylphenol	ND	400	81	ug/kg	
88-75-5	2-Nitrophenol	ND	400	81	ug/kg	
100-02-7	4-Nitrophenol	ND	2000	810	ug/kg	
87-86-5	Pentachlorophenol	ND	2000	810	ug/kg	
108-95-2	Phenol	ND	400	81	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	400	81	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	400	81	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	400	81	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	810	200	ug/kg	
100-51-6	Benzyl Alcohol	ND	400	81	ug/kg	
91-58-7	2-Chloronaphthalene	ND	400	81	ug/kg	
106-47-8	4-Chloroaniline	ND	400	160	ug/kg	
86-74-8	Carbazole	ND	400	81	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	400	81	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	400	81	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	400	81	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	400	81	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	400	81	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	400	81	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	400	81	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	400	81	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	400	81	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	810	160	ug/kg	
132-64-9	Dibenzofuran	ND	400	81	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	2350	810	200	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	810	200	ug/kg	
84-66-2	Diethyl phthalate	ND	810	400	ug/kg	
131-11-3	Dimethyl phthalate	ND	810	200	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	810	400	ug/kg	
118-74-1	Hexachlorobenzene	ND	400	81	ug/kg	
87-68-3	Hexachlorobutadiene	ND	400	81	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	400	81	ug/kg	
67-72-1	Hexachloroethane	ND	400	81	ug/kg	
78-59-1	Isophorone	ND	400	81	ug/kg	
88-74-4	2-Nitroaniline	ND	810	160	ug/kg	
99-09-2	3-Nitroaniline	ND	810	160	ug/kg	
100-01-6	4-Nitroaniline	ND	810	160	ug/kg	
98-95-3	Nitrobenzene	ND	400	81	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	400	81	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	400	81	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	400	81	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	70%		41-100%
118-79-6	2,4,6-Tribromophenol	73%		42-108%
4165-60-0	Nitrobenzene-d5	58%		40-105%
321-60-8	2-Fluorobiphenyl	63%		43-107%
1718-51-0	Terphenyl-d14	63%		45-119%

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.15

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09643.D	4	08/07/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	81	ug/kg	
208-96-8	Acenaphthylene	ND	320	81	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	64	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	64	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	64	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	64	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	64	16	ug/kg	
218-01-9	Chrysene	ND	64	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	64	16	ug/kg	
206-44-0	Fluoranthene	ND	320	56	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	64	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	56	ug/kg	

DATA VAL QUALIFIER

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003785.D	1	08/06/07	NJ	08/02/07	OP21718	SU184
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	920	370	ug/kg	
95-57-8	2-Chlorophenol	ND	180	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	920	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	73	ug/kg	
95-48-7	2-Methylphenol	ND	180	37	ug/kg	
	3&4-Methylphenol	ND	180	37	ug/kg	
88-75-5	2-Nitrophenol	ND	180	37	ug/kg	
100-02-7	4-Nitrophenol	ND	920	370	ug/kg	
87-86-5	Pentachlorophenol	ND	920	370	ug/kg	
108-95-2	Phenol	ND	180	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	92	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	37	ug/kg	
106-47-8	4-Chloroaniline	ND	180	73	ug/kg	
86-74-8	Carbazole	ND	180	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	73	ug/kg	
132-64-9	Dibenzofuran	ND	180	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	92	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	92	ug/kg	
84-66-2	Diethyl phthalate	ND	370	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	92	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	37	ug/kg	
67-72-1	Hexachloroethane	ND	180	37	ug/kg	
78-59-1	Isophorone	ND	180	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	73	ug/kg	
99-09-2	3-Nitroaniline	ND	370	73	ug/kg	
100-01-6	4-Nitroaniline	ND	370	73	ug/kg	
98-95-3	Nitrobenzene	ND	180	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	59%		40-102%
4165-62-2	Phenol-d5	64%		41-100%
118-79-6	2,4,6-Tribromophenol	67%		42-108%
4165-60-0	Nitrobenzene-d5	54%		40-105%
321-60-8	2-Fluorobiphenyl	57%		43-107%
1718-51-0	Terphenyl-d14	67%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09667.D	4	08/07/07	NJ	08/02/07	OP21719	SR456
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
83-32-9	Acenaphthene	ND	290	73	ug/kg		
208-96-8	Acenaphthylene	ND	290	73	ug/kg		
120-12-7	Anthracene	ND	290	44	ug/kg		
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg		
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg		
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg		
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg		
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg		
218-01-9	Chrysene	ND	59	15	ug/kg		UJ
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg		
206-44-0	Fluoranthene	ND	290	51	ug/kg		
86-73-7	Fluorene	ND	290	44	ug/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg		
90-12-0	1-Methylnaphthalene	ND	290	44	ug/kg		UJ
91-57-6	2-Methylnaphthalene	ND	290	44	ug/kg		
91-20-3	Naphthalene	ND	290	44	ug/kg		
85-01-8	Phenanthrene	ND	290	44	ug/kg		
129-00-0	Pyrene	ND	290	51	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003799.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	920	370	ug/kg	
95-57-8	2-Chlorophenol	ND	180	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	920	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	180	37	ug/kg	
	3&4-Methylphenol	ND	180	37	ug/kg	
88-75-5	2-Nitrophenol	ND	180	37	ug/kg	
100-02-7	4-Nitrophenol	ND	920	370	ug/kg	
87-86-5	Pentachlorophenol	ND	920	370	ug/kg	
108-95-2	Phenol	ND	180	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	92	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	37	ug/kg	
106-47-8	4-Chloroaniline	ND	180	74	ug/kg	
86-74-8	Carbazole	ND	180	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	74	ug/kg	
132-64-9	Dibenzofuran	ND	180	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	92	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	92	ug/kg	
84-66-2	Diethyl phthalate	ND	370	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	92	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	37	ug/kg	
67-72-1	Hexachloroethane	ND	180	37	ug/kg	
78-59-1	Isophorone	ND	180	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	74	ug/kg	
99-09-2	3-Nitroaniline	ND	370	74	ug/kg	
100-01-6	4-Nitroaniline	ND	370	74	ug/kg	
98-95-3	Nitrobenzene	ND	180	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	60%		40-102%
4165-62-2	Phenol-d5	66%		41-100%
118-79-6	2,4,6-Tribromophenol	66%		42-108%
4165-60-0	Nitrobenzene-d5	54%		40-105%
321-60-8	2-Fluorobiphenyl	61%		43-107%
1718-51-0	Terphenyl-d14	71%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09700.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	74	ug/kg	
208-96-8	Acenaphthylene	ND	300	74	ug/kg	
120-12-7	Anthracene	ND	300	44	ug/kg	
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg	
218-01-9	Chrysene	ND	59	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	44	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	44	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	44	ug/kg	
91-20-3	Naphthalene	ND	300	44	ug/kg	
85-01-8	Phenanthrene	ND	300	44	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003800.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	29.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	980	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	980	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	78	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	980	390	ug/kg	
87-86-5	Pentachlorophenol	ND	980	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	98	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	78	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	78	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.19

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
84-74-2	Di-n-butyl phthalate	ND	390	98	ug/kg		
117-84-0	Di-n-octyl phthalate	ND	390	98	ug/kg		
84-66-2	Diethyl phthalate	ND	390	200	ug/kg		
131-11-3	Dimethyl phthalate	ND	390	98	ug/kg		
117-81-7	bis(2-Ethylhexyl)phthalate	373	390	200	ug/kg	J	J
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg		
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg		
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg		
67-72-1	Hexachloroethane	ND	200	39	ug/kg		
78-59-1	Isophorone	ND	200	39	ug/kg		
88-74-4	2-Nitroaniline	ND	390	78	ug/kg		
99-09-2	3-Nitroaniline	ND	390	78	ug/kg		
100-01-6	4-Nitroaniline	ND	390	78	ug/kg		
98-95-3	Nitrobenzene	ND	200	39	ug/kg		
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg		
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg		
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	60%		40-102%
4165-62-2	Phenol-d5	77%		41-100%
118-79-6	2,4,6-Tribromophenol	84%		42-108%
4165-60-0	Nitrobenzene-d5	57%		40-105%
321-60-8	2-Fluorobiphenyl	72%		43-107%
1718-51-0	Terphenyl-d14	87%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09701.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	29.7 g	1.0 ml
Run #2		

BN PAH List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
83-32-9	Acenaphthene	ND	310	78	ug/kg		
208-96-8	Acenaphthylene	ND	310	78	ug/kg		
120-12-7	Anthracene	ND	310	47	ug/kg		
56-55-3	Benzo(a)anthracene	ND	62	16	ug/kg		
50-32-8	Benzo(a)pyrene	ND	62	16	ug/kg		
205-99-2	Benzo(b)fluoranthene	ND	62	16	ug/kg		
191-24-2	Benzo(g,h,i)perylene	ND	62	16	ug/kg		
207-08-9	Benzo(k)fluoranthene	ND	62	16	ug/kg		
218-01-9	Chrysene	ND	62	16	ug/kg		
53-70-3	Dibenzo(a,h)anthracene	ND	62	16	ug/kg		
206-44-0	Fluoranthene	ND	310	55	ug/kg		
86-73-7	Fluorene	ND	310	47	ug/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	62	16	ug/kg		
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg		
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg		
91-20-3	Naphthalene	65.8	310	47	ug/kg	J	J
85-01-8	Phenanthrene	ND	310	47	ug/kg		
129-00-0	Pyrene	ND	310	55	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003801.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	980	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	980	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	78	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	980	390	ug/kg	
87-86-5	Pentachlorophenol	ND	980	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	98	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	78	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	78	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	98	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	98	ug/kg	
84-66-2	Diethyl phthalate	ND	390	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	98	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg	
67-72-1	Hexachloroethane	ND	200	39	ug/kg	
78-59-1	Isophorone	ND	200	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	78	ug/kg	
99-09-2	3-Nitroaniline	ND	390	78	ug/kg	
100-01-6	4-Nitroaniline	ND	390	78	ug/kg	
98-95-3	Nitrobenzene	ND	200	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	57%		40-102%
4165-62-2	Phenol-d5	60%		41-100%
118-79-6	2,4,6-Tribromophenol	59%		42-108%
4165-60-0	Nitrobenzene-d5	53%		40-105%
321-60-8	2-Fluorobiphenyl	55%		43-107%
1718-51-0	Terphenyl-d14	61%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09702.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	78	ug/kg	
208-96-8	Acenaphthylene	ND	310	78	ug/kg	
120-12-7	Anthracene	ND	310	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	310	55	ug/kg	
86-73-7	Fluorene	ND	310	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg	
91-20-3	Naphthalene	ND	310	47	ug/kg	
85-01-8	Phenanthrene	ND	310	47	ug/kg	
129-00-0	Pyrene	ND	310	55	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003802.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	850	340	ug/kg	
95-57-8	2-Chlorophenol	ND	170	34	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	34	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	34	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	34	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	850	340	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	340	68	ug/kg	
95-48-7	2-Methylphenol	ND	170	34	ug/kg	
	3&4-Methylphenol	ND	170	34	ug/kg	
88-75-5	2-Nitrophenol	ND	170	34	ug/kg	
100-02-7	4-Nitrophenol	ND	850	340	ug/kg	
87-86-5	Pentachlorophenol	ND	850	340	ug/kg	
108-95-2	Phenol	ND	170	34	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	34	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	34	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	170	34	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	340	85	ug/kg	
100-51-6	Benzyl Alcohol	ND	170	34	ug/kg	
91-58-7	2-Chloronaphthalene	ND	170	34	ug/kg	
106-47-8	4-Chloroaniline	ND	170	68	ug/kg	
86-74-8	Carbazole	ND	170	34	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	170	34	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	170	34	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	170	34	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	170	34	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	170	34	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	170	34	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	170	34	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	170	34	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	170	34	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	340	68	ug/kg	
132-64-9	Dibenzofuran	ND	170	34	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	340	85	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	340	85	ug/kg	
84-66-2	Diethyl phthalate	ND	340	170	ug/kg	
131-11-3	Dimethyl phthalate	ND	340	85	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	340	170	ug/kg	
118-74-1	Hexachlorobenzene	ND	170	34	ug/kg	
87-68-3	Hexachlorobutadiene	ND	170	34	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	170	34	ug/kg	
67-72-1	Hexachloroethane	ND	170	34	ug/kg	
78-59-1	Isophorone	ND	170	34	ug/kg	
88-74-4	2-Nitroaniline	ND	340	68	ug/kg	
99-09-2	3-Nitroaniline	ND	340	68	ug/kg	
100-01-6	4-Nitroaniline	ND	340	68	ug/kg	
98-95-3	Nitrobenzene	ND	170	34	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	170	34	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	34	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	170	34	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	70%		40-102%
4165-62-2	Phenol-d5	75%		41-100%
118-79-6	2,4,6-Tribromophenol	77%		42-108%
4165-60-0	Nitrobenzene-d5	65%		40-105%
321-60-8	2-Fluorobiphenyl	70%		43-107%
1718-51-0	Terphenyl-d14	82%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09703.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	270	68	ug/kg	
208-96-8	Acenaphthylene	ND	270	68	ug/kg	
120-12-7	Anthracene	ND	270	41	ug/kg	
56-55-3	Benzo(a)anthracene	ND	55	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND	55	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	55	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	55	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	55	14	ug/kg	
218-01-9	Chrysene	ND	55	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	55	14	ug/kg	
206-44-0	Fluoranthene	ND	270	48	ug/kg	
86-73-7	Fluorene	ND	270	41	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	55	14	ug/kg	
90-12-0	1-Methylnaphthalene	ND	270	41	ug/kg	
91-57-6	2-Methylnaphthalene	ND	270	41	ug/kg	
91-20-3	Naphthalene	ND	270	41	ug/kg	
85-01-8	Phenanthrene	ND	270	41	ug/kg	
129-00-0	Pyrene	ND	270	48	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003803.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	960	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	960	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	77	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	960	380	ug/kg	
87-86-5	Pentachlorophenol	ND	960	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	96	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	77	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	77	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	96	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	96	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	96	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	77	ug/kg	
99-09-2	3-Nitroaniline	ND	380	77	ug/kg	
100-01-6	4-Nitroaniline	ND	380	77	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	70%		40-102%
4165-62-2	Phenol-d5	76%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	65%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	75%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09704.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003804.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	74	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	74	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	93	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	93	ug/kg	
84-66-2	Diethyl phthalate	ND	370	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg	
67-72-1	Hexachloroethane	ND	190	37	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	74	ug/kg	
99-09-2	3-Nitroaniline	ND	370	74	ug/kg	
100-01-6	4-Nitroaniline	ND	370	74	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	55%		40-102%
4165-62-2	Phenol-d5	58%		41-100%
118-79-6	2,4,6-Tribromophenol	59%		42-108%
4165-60-0	Nitrobenzene-d5	50%		40-105%
321-60-8	2-Fluorobiphenyl	53%		43-107%
1718-51-0	Terphenyl-d14	60%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09705.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	74	ug/kg	
208-96-8	Acenaphthylene	ND	300	74	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg	
218-01-9	Chrysene	ND	59	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003805.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	920	370	ug/kg	
95-57-8	2-Chlorophenol	ND	180	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	920	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	180	37	ug/kg	
	3&4-Methylphenol	ND	180	37	ug/kg	
88-75-5	2-Nitrophenol	ND	180	37	ug/kg	
100-02-7	4-Nitrophenol	ND	920	370	ug/kg	
87-86-5	Pentachlorophenol	ND	920	370	ug/kg	
108-95-2	Phenol	ND	180	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	92	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	37	ug/kg	
106-47-8	4-Chloroaniline	ND	180	74	ug/kg	
86-74-8	Carbazole	ND	180	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	74	ug/kg	
132-64-9	Dibenzofuran	ND	180	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	92	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	92	ug/kg	
84-66-2	Diethyl phthalate	ND	370	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	92	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	37	ug/kg	
67-72-1	Hexachloroethane	ND	180	37	ug/kg	
78-59-1	Isophorone	ND	180	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	74	ug/kg	
99-09-2	3-Nitroaniline	ND	370	74	ug/kg	
100-01-6	4-Nitroaniline	ND	370	74	ug/kg	
98-95-3	Nitrobenzene	ND	180	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	81%		40-102%
4165-62-2	Phenol-d5	87%		41-100%
118-79-6	2,4,6-Tribromophenol	83%		42-108%
4165-60-0	Nitrobenzene-d5	77%		40-105%
321-60-8	2-Fluorobiphenyl	81%		43-107%
1718-51-0	Terphenyl-d14	85%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.2.4 B

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09706.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
83-32-9	Acenaphthene	ND	290	74	ug/kg		
208-96-8	Acenaphthylene	ND	290	74	ug/kg		
120-12-7	Anthracene	ND	290	44	ug/kg		
56-55-3	Benzo(a)anthracene	88.8	59	15	ug/kg		
50-32-8	Benzo(a)pyrene	140	59	15	ug/kg		
205-99-2	Benzo(b)fluoranthene	80.1	59	15	ug/kg		
191-24-2	Benzo(g,h,i)perylene	65.5	59	15	ug/kg		
207-08-9	Benzo(k)fluoranthene	93.5	59	15	ug/kg		
218-01-9	Chrysene	81.8	59	15	ug/kg		
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg		
206-44-0	Fluoranthene	69.4	290	52	ug/kg	J	J
86-73-7	Fluorene	ND	290	44	ug/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	72.8	59	15	ug/kg		
90-12-0	1-Methylnaphthalene	ND	290	44	ug/kg		
91-57-6	2-Methylnaphthalene	ND	290	44	ug/kg		
91-20-3	Naphthalene	ND	290	44	ug/kg		
85-01-8	Phenanthrene	ND	290	44	ug/kg		
129-00-0	Pyrene	118	290	52	ug/kg	J	J

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003806.D

Accutest Laboratories

Report of Analysis

3.2.5

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003806.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
65-85-0	Benzoic acid	ND	960	380	ug/kg		
95-57-8	2-Chlorophenol	ND	190	38	ug/kg		
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg		
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg		
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg		
51-28-5	2,4-Dinitrophenol	ND	960	380	ug/kg		
534-52-1	4,6-Dinitro-o-cresol	ND	380	77	ug/kg		
95-48-7	2-Methylphenol	ND	190	38	ug/kg		
	3&4-Methylphenol	ND	190	38	ug/kg		
88-75-5	2-Nitrophenol	ND	190	38	ug/kg		
100-02-7	4-Nitrophenol	ND	960	380	ug/kg		
87-86-5	Pentachlorophenol	ND	960	380	ug/kg		
108-95-2	Phenol	ND	190	38	ug/kg		
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg		
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg		
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg		
85-68-7	Butyl benzyl phthalate	ND	380	96	ug/kg		
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg		
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg		
106-47-8	4-Chloroaniline	ND	190	77	ug/kg		
86-74-8	Carbazole	ND	190	38	ug/kg		
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg		
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg		
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg		
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg		
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg		
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg		
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg		
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg		
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg		
91-94-1	3,3'-Dichlorobenzidine	ND	380	77	ug/kg		
132-64-9	Dibenzofuran	105	190	38	ug/kg	J	J

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
84-74-2	Di-n-butyl phthalate	96.4	380	96	ug/kg	J	J
117-84-0	Di-n-octyl phthalate	ND	380	96	ug/kg		
84-66-2	Diethyl phthalate	210	380	190	ug/kg	J	J
131-11-3	Dimethyl phthalate	ND	380	96	ug/kg		
117-81-7	bis(2-Ethylhexyl)phthalate	707	380	190	ug/kg		
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg		
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg		
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg		
67-72-1	Hexachloroethane	ND	190	38	ug/kg		
78-59-1	Isophorone	ND	190	38	ug/kg		
88-74-4	2-Nitroaniline	ND	380	77	ug/kg		
99-09-2	3-Nitroaniline	ND	380	77	ug/kg		
100-01-6	4-Nitroaniline	ND	380	77	ug/kg		
98-95-3	Nitrobenzene	ND	190	38	ug/kg		
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg		
86-30-6	N-Nitrosodiphenylamine	280	190	38	ug/kg		
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	72%		41-100%
118-79-6	2,4,6-Tribromophenol	74%		42-108%
4165-60-0	Nitrobenzene-d5	61%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	77%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09707.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
83-32-9	Acenaphthene	152	310	77	ug/kg	J	J
208-96-8	Acenaphthylene	ND	310	77	ug/kg		
120-12-7	Anthracene	ND	310	46	ug/kg		
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg		
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg		
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg		
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg		
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg		
218-01-9	Chrysene	ND	61	15	ug/kg		
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg		
206-44-0	Fluoranthene	77.7	310	54	ug/kg	J	J
86-73-7	Fluorene	160	310	46	ug/kg	J	J
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg		
90-12-0	1-Methylnaphthalene	95.9	310	46	ug/kg	J	J
91-57-6	2-Methylnaphthalene	152	310	46	ug/kg	J	J
91-20-3	Naphthalene	92.1	310	46	ug/kg	J	J
85-01-8	Phenanthrene	347	310	46	ug/kg		
129-00-0	Pyrene	ND	310	54	ug/kg		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003814.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	74	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	74	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

3.26
B

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
84-74-2	Di-n-butyl phthalate	ND	370	93	ug/kg		
117-84-0	Di-n-octyl phthalate	ND	370	93	ug/kg		
84-66-2	Diethyl phthalate	ND	370	190	ug/kg		
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg		
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg		
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg		
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg		
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg		
67-72-1	Hexachloroethane	ND	190	37	ug/kg		
78-59-1	Isophorone	ND	190	37	ug/kg		
88-74-4	2-Nitroaniline	ND	370	74	ug/kg		
99-09-2	3-Nitroaniline	ND	370	74	ug/kg		
100-01-6	4-Nitroaniline	ND	370	74	ug/kg		
98-95-3	Nitrobenzene	ND	190	37	ug/kg		
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg		
86-30-6	N-Nitrosodiphenylamine	124	190	37	ug/kg	J	J
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	59%		40-102%
4165-62-2	Phenol-d5	61%		41-100%
118-79-6	2,4,6-Tribromophenol	57%		42-108%
4165-60-0	Nitrobenzene-d5	56%		40-105%
321-60-8	2-Fluorobiphenyl	53%		43-107%
1718-51-0	Terphenyl-d14	59%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09710.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	74	ug/kg	
208-96-8	Acenaphthylene	ND	300	74	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg	
218-01-9	Chrysene	ND	59	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003815.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003815.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	76	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	76	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	95	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	76	ug/kg	
99-09-2	3-Nitroaniline	ND	380	76	ug/kg	
100-01-6	4-Nitroaniline	ND	380	76	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	74%		41-100%
118-79-6	2,4,6-Tribromophenol	63%		42-108%
4165-60-0	Nitrobenzene-d5	62%		40-105%
321-60-8	2-Fluorobiphenyl	60%		43-107%
1718-51-0	Terphenyl-d14	67%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09711.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	76	ug/kg	
208-96-8	Acenaphthylene	ND	300	76	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003816.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	75	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	75	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	75	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	93	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	93	ug/kg	
84-66-2	Diethyl phthalate	ND	370	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg	
67-72-1	Hexachloroethane	ND	190	37	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	75	ug/kg	
99-09-2	3-Nitroaniline	ND	370	75	ug/kg	
100-01-6	4-Nitroaniline	ND	370	75	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	65%		40-102%
4165-62-2	Phenol-d5	73%		41-100%
118-79-6	2,4,6-Tribromophenol	68%		42-108%
4165-60-0	Nitrobenzene-d5	68%		40-105%
321-60-8	2-Fluorobiphenyl	65%		43-107%
1718-51-0	Terphenyl-d14	73%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09712.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	75	ug/kg	
208-96-8	Acenaphthylene	ND	300	75	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	60	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	60	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	60	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	60	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	60	15	ug/kg	
218-01-9	Chrysene	ND	60	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	60	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	60	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003817.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	990	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	990	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	80	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	990	400	ug/kg	
87-86-5	Pentachlorophenol	ND	990	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	99	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	200	80	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	40	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	40	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	40	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	80	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	99	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	99	ug/kg	
84-66-2	Diethyl phthalate	ND	400	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	99	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	40	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	40	ug/kg	
67-72-1	Hexachloroethane	ND	200	40	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	80	ug/kg	
99-09-2	3-Nitroaniline	ND	400	80	ug/kg	
100-01-6	4-Nitroaniline	ND	400	80	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	40	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	66%		40-102%
4165-62-2	Phenol-d5	71%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	77%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09713.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	80	ug/kg	
208-96-8	Acenaphthylene	ND	320	80	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	64	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	64	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	64	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	64	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	64	16	ug/kg	
218-01-9	Chrysene	ND	64	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	64	16	ug/kg	
206-44-0	Fluoranthene	ND	320	56	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	64	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	56	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003818.D	1	08/07/07	NJ	08/03/07	OP21737	SU185
Run #2							

	Initial Weight	Final Volume
Run #1	29.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	990	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	990	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	79	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	990	390	ug/kg	
87-86-5	Pentachlorophenol	ND	990	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	99	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	79	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	79	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	99	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	99	ug/kg	
84-66-2	Diethyl phthalate	ND	390	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	99	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg	
67-72-1	Hexachloroethane	ND	200	39	ug/kg	
78-59-1	Isophorone	ND	200	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	79	ug/kg	
99-09-2	3-Nitroaniline	ND	390	79	ug/kg	
100-01-6	4-Nitroaniline	ND	390	79	ug/kg	
98-95-3	Nitrobenzene	ND	200	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	63%		40-102%
4165-62-2	Phenol-d5	66%		41-100%
118-79-6	2,4,6-Tribromophenol	60%		42-108%
4165-60-0	Nitrobenzene-d5	57%		40-105%
321-60-8	2-Fluorobiphenyl	57%		43-107%
1718-51-0	Terphenyl-d14	62%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09714.D	4	08/08/07	NJ	08/03/07	OP21738	SR458
Run #2							

	Initial Weight	Final Volume
Run #1	29.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	79	ug/kg	
208-96-8	Acenaphthylene	ND	320	79	ug/kg	
120-12-7	Anthracene	ND	320	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	320	55	ug/kg	
86-73-7	Fluorene	ND	320	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	47	ug/kg	
91-57-6	2-Methylnaphthalene	ND	320	47	ug/kg	
91-20-3	Naphthalene	ND	320	47	ug/kg	
85-01-8	Phenanthrene	ND	320	47	ug/kg	
129-00-0	Pyrene	ND	320	55	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L037578.D	1	08/02/07	RB	07/31/07	OP21675	SL1922
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.6	1.1	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.6	2.2	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.6	1.1	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.6	2.2	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	2.2	ug/l	
95-48-7	2-Methylphenol	ND	5.6	1.1	ug/l	
	3&4-Methylphenol	ND	5.6	1.5	ug/l	
88-75-5	2-Nitrophenol	ND	5.6	1.1	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.6	2.2	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.6	1.1	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.6	1.1	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.6	1.3	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.6	2.2	ug/l	
100-51-6	Benzyl Alcohol	ND	5.6	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.6	1.5	ug/l	
106-47-8	4-Chloroaniline	ND	5.6	2.2	ug/l	
86-74-8	Carbazole	ND	5.6	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.6	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.6	1.1	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.6	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.6	1.5	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.6	1.7	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.6	1.8	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.6	1.7	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.6	1.1	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.6	1.1	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	2.2	ug/l	
132-64-9	Dibenzofuran	ND	5.6	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.6	2.2	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.6	2.2	ug/l	
84-66-2	Diethyl phthalate	ND	5.6	2.2	ug/l	
131-11-3	Dimethyl phthalate	ND	5.6	2.2	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.6	2.2	ug/l	
118-74-1	Hexachlorobenzene	ND	5.6	1.3	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.6	1.9	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.6	1.7	ug/l	
67-72-1	Hexachloroethane	ND	5.6	2.1	ug/l	
78-59-1	Isophorone	ND	5.6	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	2.2	ug/l	
99-09-2	3-Nitroaniline	ND	11	2.2	ug/l	
100-01-6	4-Nitroaniline	ND	11	2.2	ug/l	
98-95-3	Nitrobenzene	ND	5.6	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.6	1.1	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.6	1.1	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.6	1.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	44%		14-62%
4165-62-2	Phenol-d5	30%		10-40%
118-79-6	2,4,6-Tribromophenol	90%		33-118%
4165-60-0	Nitrobenzene-d5	81%		42-108%
321-60-8	2-Fluorobiphenyl	80%		40-106%
1718-51-0	Terphenyl-d14	84%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	**Date Sampled:**	07/25/07
Matrix:	AQ - Equipment Blank	**Date Received:**	07/26/07
Method:	SW846 8270C BY SIM SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09531.D	1	08/02/07	NJ	07/31/07	OP21676	SR451
Run #2							

	Initial Volume	Final Volume
Run #1	890 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.56	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.56	ug/l	
120-12-7	Anthracene	ND	1.1	0.56	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	0.056	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	0.056	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	0.11	ug/l	
218-01-9	Chrysene	ND	0.22	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	0.056	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	0.056	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.56	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F51300

DATE: December 21, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. Samples were analyzed for pesticides using USEPA Methods 3550B/8081A (soils) and 3510C/8081A (waters); and for PCBs using USEPA Methods 3550B/8082 (soils) and 3510C/8082 (waters), respectively. A total of 1 aqueous and 30 soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59SB06A	F51300-1	43SB06C	F51300-17
59SB06B	F51300-2	43SB07A	F51300-18
59SB06C	F51300-3	43SB07B	F51300-19
59SB05A	F51300-4	43SB07C	F51300-20
59SB05B	F51300-5	43SB08A	F51300-21
59SB05C	F51300-6	43SB08B	F51300-22
59SB04A	F51300-7	43SB08C	F51300-23
59SB04B	F51300-8	43SB09A	F51300-24
59SB04C	F51300-9	43SB09B	F51300-25
TMSB04C	F51300-10	43SB09C	F51300-26
59SB02A	F51300-11	43SB10A	F51300-27
59SB02B	F51300-12	43SB10B	F51300-28
TMSB02B	F51300-13	43SB10C	F51300-29
59SB02C	F51300-14	TMSB10B	F51300-30
43SB06A	F51300-15	072507R	F51300-31
43SB06B	F51300-16		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

12/21/07

Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F51300

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: Solid samples must be stored @4°C ± 2°C with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/25/07. The aqueous sample was extracted for pesticides and PCBs on 7/30/07, analyzed for pesticides on 8/10/07, and analyzed for PCBs on 8/1/07. The solid samples were extracted for pesticides and PCBs on 8/2/07 & 8/3/07, analyzed for pesticides on 8/8/07, 8/9/07, 8/10/07, & 8/11/07, and analyzed for PCBs on 8/6/07, 8/7/07, 8/8/07, & 8/13/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- During the analysis beginning 8/6/07 @0925, endrin and 4,4'-DDT percent breakdowns were 11.2% and 7.1% on signal #1, and 10.7% and 5.6% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/8/07 @1046, endrin and 4,4'-DDT percent breakdowns were 4.6% and 4.2% on signal #1, and 4.6% and 3.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/9/07 @1538, endrin and 4,4'-DDT percent breakdowns were 3.8% and 3.5% on signal #1, and 4.0% and 2.8% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/10/07 @1538, endrin and 4,4'-DDT percent breakdowns were 3.7% and 2.5% on signal #1, and 3.9% and 2.0% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/11/07 @1054, endrin and 4,4'-DDT percent breakdowns were 3.4% and 2.3% on signal #1, and 3.5% and 2.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/13/07 @1116, endrin and 4,4'-DDT percent breakdowns were 2.7% and 1.4% on signal #1, and 2.6% and 1.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- During the pesticide initial calibration performed on 8/6/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples F51300-1 thru -17 were analyzed following this initial calibration.

- During the pesticide initial calibration performed on 8/9/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples F51300-18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, and -30 were analyzed following this initial calibration.

- During the pesticide initial calibration performed on 8/10/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample F51300-31 analysis plus the reanalyses of samples F51300-9, -10, -11, -12, -13, -14, -15, -16, -17, and -22 were performed following this initial calibration.

- During the PCB initial calibration performed on 7/28/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed following this initial calibration.

- During the PCB initial calibration performed on 8/6/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-1 thru -17 were analyzed following this initial calibration.

- During the PCB initial calibration performed on 8/7/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-18 thru -30 were analyzed following this initial calibration.

- During the PCB initial calibration performed on 8/13/07 on instrument ECD3, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-16, -17, and -22 were performed following this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the calibration should be no greater than ±20%.

- During the pesticide initial calibration verification performed on 8/6/07 @1229 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples were analyzed in conjunction with this ICV.

- During the pesticide continuing calibration performed on 8/8/07 @1131 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5 -6, -7, and -8 were analyzed following this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1153 on instrument ECD6, the 4th chlordane peak (20.4%) from signal #2 had a %D outside criteria, but the average %D of all six chlordane peaks was 7.9% which met criteria. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5 -6, -7, and -8 were analyzed following this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1209 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5 -6, -7, and -8 were analyzed following this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1528 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5 -6, -7, and -8 were analyzed before this continuing calibration, while samples F51300-9, -10, -11, -12, -13, -14, -15, and -16 were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1838 on instrument ECD6, endrin aldehyde (21.3%) had a high %D on signal #1, while 4,4'-DDT (28.3%, 25.2%) and methoxychlor (25.6%, 24.4%) had a high %D on both signals. The results for these compounds have been qualified "J/UJ" in associated samples. All other compounds met criteria. Samples F51300-9, -10, -11, -12, -13, -14, -15, and -16 were analyzed before this continuing calibration, while sample F51300-17 was analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1926 on instrument ECD6, heptachlor (24.0%, 23.1%), endrin aldehyde (21.9%, 22.4%), 4,4'-DDT(31.8%, 31.8%), and methoxychlor (31.3%, 32.5%) had a high %D on both signals. The results for these compounds have been qualified "J/UJ" in associated samples. All other compounds met criteria. Sample F51300-17 was analyzed before this continuing calibration.

- During the pesticide initial calibration verification performed on 8/9/07 @1840 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples F51300-18, -19, -20, -21, -22, -23, -24, and -25 were analyzed following this ICV.

- During the pesticide continuing calibration performed on 8/9/07 @2134 on instrument ECD6, 4,4'-DDT(26.7%) and methoxychlor (22.2%) had a high %D on signal #1. The results for these compounds have been qualified "J/UJ" in associated samples. All other compounds met criteria. Samples F51300-18, -19, -20, -21, -22, -23, -24, and -25 were analyzed before this continuing calibration, while samples F51300-26, -27, -28, -29, and -30 were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/9/07 @2356 on instrument ECD6, methoxychlor (20.6%) had a high %D on signal #1. The methoxychlor results have been qualified "J/UJ" in associated samples. All other compounds met criteria. Samples F51300-26, -27, -28, -29, and -30 were analyzed before this continuing calibration.

- During the pesticide initial calibration verification performed on 8/10/07 @1840 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples were analyzed following this ICV.

- During the pesticide continuing calibration performed on 8/10/07 @2015 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed following with this continuing calibration.

- During the pesticide continuing calibration performed on 8/10/07 @2205 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed before with this continuing calibration.

- During the pesticide continuing calibration performed on 8/10/07 @2309 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-9, -10, -11, -12, -13, -14, and -15 were performed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @ 0202 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-9, -10, -11, -12, -13, -14, and -15 were performed before this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1110 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-14, 16, and 17 were performed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1132 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-14, 16, and 17 were performed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1148 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-14, 16, and 17 were performed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1400 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-14, 16, and 17 were performed before this continuing calibration, while the reanalysis of F51300-22 was performed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1447 on instrument ECD6, all criteria were met. No qualifiers were applied. The reanalysis of F51300-22 was performed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 7/28/07 @1459 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/1/07 @1521 on instrument ECD3, all criteria were met. No qualifiers were applied. The aqueous method blank, the aqueous LCS, and the aqueous MS/MSD were analyzed following this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/1/07 @1833 on instrument ECD3, all criteria were met. No qualifiers were applied. The aqueous method blank, the aqueous LCS, and the aqueous MS/MSD were analyzed before this continuing calibration, while sample F51300-31 was analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/1/07 @2015 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 8/6/07 @1556 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/6/07 @1906 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-1 thru -3 plus a solid method blank, a solid LCS, and a solid MS/MSD were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/6/07 @2214 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-1 thru -3 plus a solid method blank, a solid LCS, and a solid MS/MSD were analyzed before this continuing calibration, while samples F51300-4, -5, -6, -7, -8, -9, -10, -11, and -12 were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/7/07 @0121 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-4, -5, -6, -7, -8, -9, -10, -11, and -12 were analyzed before this continuing calibration, while samples F51300-13, -14, -15, -16, and -17 were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/7/07 @0321 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-13, -14, -15, -16, and -17 were analyzed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 8/7/07 @1923 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-18, -19, -20, -21, -22, -23, -24, and -25 were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/7/07 @2231 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-18, -19, -20, -21, -22, -23, -24, and -25 were analyzed before this continuing calibration, while samples F51300-26, -27, -28, -29, and -30 plus an MS/MSD were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/8/07 @0155 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples F51300-26, -27, -28, -29, and -30 plus an MS/MSD were analyzed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 8/13/07 @1416 on instrument ECD3, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-16, -17, and -22 were performed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/13/07 @1719 on instrument ECD3, all criteria were met. No qualifiers were applied. The reanalyses of samples F51300-16, -17, and -22 were performed before this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	8/10/07	OP21657-MB	All target <½MRL	NA	NA	None
Pesticides	8/8/07	OP21716-MB	All target <½MRL	NA	NA	None
Pesticides	8/10/07	OP21716-MB	All target <½MRL	NA	NA	None
Pesticides	8/11/07	OP21716-MB	All target <½MRL	NA	NA	None
Pesticides	8/9/07	OP21730-MB	All target <½MRL	NA	NA	None
Pesticides	8/11/07	OP21730-MB	All target <½MRL	NA	NA	None
Pesticides	8/10/07	072507R	All target <½MRL	NA	NA	None
Pesticides	8/10/07	072607R	All target <½MRL	NA	NA	None
PCBs	8/1/07	OP21658-MB	All target <½MRL	NA	NA	None
PCBs	8/6/07	OP21715-MB	All target <½MRL	NA	NA	None
PCBs	8/13/07	OP21715-MB	All target <½MRL	NA	NA	None
PCBs	8/7/07	OP21731-MB	All target <½MRL	NA	NA	None
PCBs	8/13/07	OP21731-MB	All target <½MRL	NA	NA	None
PCBs	8/1/07	072507R	All target <½MRL	NA	NA	None
PCBs	8/1/07	072607R	All target <½MRL	NA	NA	None

072507R and 072607R are rinsate blanks.
NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Pesticides:	Tetrachloro-m-xylene: 42-127% (DoD QSM 25-140%) Decachlorobiphenyl: 27-127% (DoD QSM 30-135%)
	PCBs:	Tetrachloro-m-xylene: 38-127% (DoD QSM Not Listed) Decachlorobiphenyl: 25-137% (DoD QSM 40-135%)
Solid Criteria:	Pesticides:	Tetrachloro-m-xylene: 46-122% (DoD QSM 70-125%) Decachlorobiphenyl: 50-133% (DoD QSM 55-130%)
	PCBs:	Tetrachloro-m-xylene: 44-126% (DoD QSM Not Listed) Decachlorobiphenyl: 39-157% (DoD QSM 60-125%)

- Sample F51300-1 had low tetrachloro-m-xylene recoveries (65.26%, 66.78%) from both signals during pesticide analysis. The pesticide results in F51300-1 have been qualified "J/UJ".
- Sample F51300-16 had low tetrachloro-m-xylene recoveries (61.38%, 61.83%) from both signals during pesticide analysis. The pesticide results in F51300-16 have been qualified "J/UJ".
- Sample F51300-18 had a low tetrachloro-m-xylene recovery (68.79%) from signal #1 during pesticide analysis. No data qualification is required unless two surrogates are outside criteria.
- Sample F51300-19 had low tetrachloro-m-xylene recoveries (56.59%, 54.33%) from both signals during pesticide analysis. The pesticide results in F51300-19 have been qualified "J/UJ".
- Sample F51300-25 had low tetrachloro-m-xylene recoveries (54.02%, 53.34%) from both signals during pesticide analysis. The pesticide results in F51300-25 have been qualified "J/UJ".

- Sample F51300-26 had low tetrachloro-m-xylene recoveries (69.57%, 69.36%) from both signals during pesticide analysis. The pesticide results in F51300-26 have been qualified "J/UJ".

- Sample F51300-27 had low tetrachloro-m-xylene recoveries (68.12%, 67.60%) from both signals during pesticide analysis. The pesticide results in F51300-27 have been qualified "J/UJ".

- Sample F51300-28 had low tetrachloro-m-xylene recoveries (68.09%, 68.42%) from both signals during pesticide analysis. The pesticide results in F51300-28 have been qualified "J/UJ".

- Sample F51300-30 had low tetrachloro-m-xylene recoveries (67.97%, 68.90%) from both signals during pesticide analysis. The pesticide results in F51300-30 have been qualified "J/UJ".

- All other samples met surrogate recovery criteria during pesticide analysis.

- Sample F51300-25 had a low decachlorobiphenyl recovery (47.60%) from signal #1 during PCB analysis. No data qualification is required unless two surrogates are outside criteria.

- All samples met surrogate recovery criteria during PCB analysis.

VII-Laboratory Control Samples

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM solid matrix LCS recovery limits are specified in Tables D-15 and D-17 of the DoD QSM (DoD, 2006), while aqueous LCS recovery limits are specified in Tables D-14 and D-16 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21657-BS was used as the aqueous LCS during the 8/10/07 pesticide analysis. Endrin aldehyde (15%) had a low recovery, and was not detected in any field samples – the endrin aldehyde results have been qualified "UL" as estimated in associated samples. All other pesticides met recovery criteria. Sample F51300-31 was analyzed in conjunction with this LCS.

- Sample OP21716-BS was used as the solid LCS during the 8/8/07 pesticide analysis. Delta-BHC (53%) and endrin aldehyde (12%) had low recoveries, and were not detected in any field samples. The results for both compounds have been qualified "UL" as estimated in associated samples. All other pesticides met recovery criteria. Samples F51300-1 thru -17 were analyzed in conjunction with this LCS.

- Sample OP21730-BS was used as the solid LCS during the 8/9/07 pesticide analysis. Endrin aldehyde (11%) had a low recovery, and was not detected in any field samples – the endrin aldehyde results have been qualified "UL" as estimated in associated samples. All other pesticides met recovery criteria. Samples F51300-18 thru -30 were analyzed in conjunction with this LCS.

- Sample OP21658-BS was used as the aqueous LCS during the 8/1/07 PCB analysis. All criteria were met. No qualifiers were applied.

- Sample OP21715-BS was used as the solid LCS during the 8/6/07 PCB analysis. All criteria were met. No qualifiers were applied.

- Sample OP21731-BS was used as the solid LCS during the 8/7/07 PCB analysis. All criteria were met. No qualifiers were applied.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid matrix MS/MSD recovery limits follow the LCS criteria specified in Tables D-15 and D-17 of the DoD QSM (DoD, 2006), while aqueous MS/MSD recovery limits follow the LCS criteria specified in Tables D-14 and D-16 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51353-8 was used for the aqueous pesticide MS/MSD analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

- Sample F51300-11 was used for the solid matrix pesticide MS/MSD analysis. Delta-BHC (51%) and endrin aldehyde (0%, 0%) had low recoveries in the MS and MSD, as well as having low recoveries in the associated LCS. All sample results have already been qualified "UL", no further qualification is required. All other pesticides met criteria. Samples F51300-1 thru -17 were analyzed in conjunction with this MS/MSD.

- Sample F51300-29 was used for the solid matrix pesticide MS/MSD analysis. Endrin aldehyde (16%, 16%) had low recoveries in the MS and MSD, as well as having low recoveries in the associated LCS. All sample results have already been qualified "UL", no further qualification is required. All other pesticides met criteria. Samples F51300-18 thru -30 were analyzed in conjunction with this MS/MSD.

- Sample F51314-1 was used for the aqueous PCB MS/MSD analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

- Sample F51300-1 was used for the solid matrix PCB MS/MSD analysis. All PCBs met criteria. No data qualifiers were applied. Samples F51300-1 thru -17 were analyzed in conjunction with this MS/MSD.

- Sample F51300-29 was used for the solid matrix PCB MS/MSD analysis. All PCBs met criteria. No data qualifiers were applied. Samples F51300-1 thru -17 were analyzed in conjunction with this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included 59SB04C (F51300-9) & TMSB04C (F51300-10), 59SB02B (F51300-12) & TMSB02B (F51300-13), and 43SB10B (F51300-28) & TMSB10B (F51300-30). All compounds detected above the reporting limit (RL) met RPD criteria.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

- During analysis of F51300-16, dieldrin (100%) %D was outside criteria. All other target compounds were within criteria. The dieldrin results have been qualified "J" as estimated.

Sample: OP21716-BS, beta-BHC

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (705390 * 10000 * 1) / (19750 * 1 * 30 * 1 * 1000)
= 11.9 ug/kg

Reported Conc. = 11.9 µg/kg
%D = 0.0%
Values were within 10% difference

Sample: OP21715-BS, Aroclor 1260

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Signal #1
Conc1 µg/L = (3211932 * 10000* 1) / (8380 * 1 * 30 * 1000) = 127.76 µg/kg
Conc2 µg/L = (4273339 * 10000* 1) / (10410 * 1 * 30 * 1000) = 136.83 µg/kg
Conc3 µg/L = (4293784 * 10000* 1) / (10450 * 1 * 30 * 1000) = 136.96 µg/kg
Conc4 µg/L = (2923739 * 10000* 1) / (7516 * 1 * 30 * 1000) = 129.67 µg/kg
Conc5 µg/L = (6792273 * 10000* 1) / (17360 * 1 * 30 * 1000) = 130.42 µg/kg
Conc6 µg/L = (3912029 * 10000* 1) / (9980 * 1 * 30 * 1000) = 130.66 µg/kg
Average concentration = 132 µg/kg

Reported Value = 132 µg/kg (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: TT08215.D

Accutest LabLink@72038 11:39 19-Dec-2007

Report of Analysis

3.1

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08215.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.43	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.50	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.78	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.60	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.35	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.39	ug/kg	
72-54-8	4,4'-DDD	ND	3.5	0.71	ug/kg	
72-55-9	4,4'-DDE	ND	3.5	0.71	ug/kg	
50-29-3	4,4'-DDT	ND	3.5	0.82	ug/kg	
72-20-8	Endrin	ND	3.5	0.71	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.5	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.5	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.5	0.71	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.5	0.53	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.50	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.8	0.35	ug/kg	
72-43-5	Methoxychlor	ND	3.5	0.71	ug/kg	
8001-35-2	Toxaphene	ND	89	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	65%		46-122%
2051-24-3	Decachlorobiphenyl	62%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64548.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64548.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	8.9	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	8.9	ug/kg	
12672-29-6	Aroclor 1248	ND	18	8.9	ug/kg	
11097-69-1	Aroclor 1254	ND	18	8.9	ug/kg	
11096-82-5	Aroclor 1260	ND	18	8.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		44-126%
2051-24-3	Decachlorobiphenyl	79%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08216.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08216.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.83	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.64	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.75	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.75	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.86	ug/kg	
72-20-8	Endrin	ND	3.8	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.8	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.56	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.75	ug/kg	
8001-35-2	Toxaphene	ND	94	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%		46-122%
2051-24-3	Decachlorobiphenyl	67%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64551.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64551.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.4	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.4	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	83%		44-126%
2051-24-3	Decachlorobiphenyl	87%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08217.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08217.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.83	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.64	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.75	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.75	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.87	ug/kg	
72-20-8	Endrin	ND	3.8	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.8	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.56	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.75	ug/kg	
8001-35-2	Toxaphene	ND	94	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		46-122%
2051-24-3	Decachlorobiphenyl	69%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64552.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64552.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.4	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.4	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	88%		44-126%
2051-24-3	Decachlorobiphenyl	89%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08218.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08218.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.48	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.82	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.74	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.74	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	0.86	ug/kg	
72-20-8	Endrin	ND	3.7	0.74	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.7	0.74	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.52	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.74	ug/kg	
8001-35-2	Toxaphene	ND	93	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		46-122%
2051-24-3	Decachlorobiphenyl	70%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64555.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.3	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.3	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.3	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.3	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		44-126%
2051-24-3	Decachlorobiphenyl	93%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08219.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08219.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	2.0	0.47	ug/kg		
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg		
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg		
319-86-8	delta-BHC	ND	2.0	0.86	ug/kg		UL
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.67	ug/kg		
5103-71-9	alpha-Chlordane	ND	2.0	0.39	ug/kg		
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg		
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg		
72-54-8	4,4'-DDD	ND	3.9	0.78	ug/kg		
72-55-9	4,4'-DDE	ND	3.9	0.78	ug/kg		
50-29-3	4,4'-DDT	ND	3.9	0.90	ug/kg		
72-20-8	Endrin	ND	3.9	0.78	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg		UL
53494-70-5	Endrin ketone	ND	3.9	0.78	ug/kg		
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg		
33213-65-9	Endosulfan-II	ND	3.9	0.59	ug/kg		
76-44-8	Heptachlor	ND	2.0	0.55	ug/kg		
1024-57-3	Heptachlor epoxide	ND	2.0	0.39	ug/kg		
72-43-5	Methoxychlor	ND	3.9	0.78	ug/kg		
8001-35-2	Toxaphene	ND	98	49	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		46-122%
2051-24-3	Decachlorobiphenyl	70%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64556.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.8	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.8	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.8	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.8	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	92%		44-126%
2051-24-3	Decachlorobiphenyl	93%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08220.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08220.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.84	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.76	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.76	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.87	ug/kg	
72-20-8	Endrin	ND	3.8	0.76	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.8	0.76	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.76	ug/kg	
8001-35-2	Toxaphene	ND	95	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		46-122%
2051-24-3	Decachlorobiphenyl	73%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64557.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64557.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.5	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.5	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.5	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.5	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	88%		44-126%
2051-24-3	Decachlorobiphenyl	94%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08221.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08221.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	1.9	0.45	ug/kg		
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg		
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg		
319-86-8	delta-BHC	ND	1.9	0.83	ug/kg		UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.64	ug/kg		
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg		
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg		
60-57-1	Dieldrin	ND	1.9	0.41	ug/kg		
72-54-8	4,4'-DDD	ND	3.8	0.75	ug/kg		
72-55-9	4,4'-DDE	ND	3.8	0.75	ug/kg		
50-29-3	4,4'-DDT	ND	3.8	0.87	ug/kg		
72-20-8	Endrin	ND	3.8	0.75	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.8	1.2	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg		UL
53494-70-5	Endrin ketone	ND	3.8	0.75	ug/kg		
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg		
33213-65-9	Endosulfan-II	ND	3.8	0.56	ug/kg		
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg		
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg		
72-43-5	Methoxychlor	ND	3.8	0.75	ug/kg		
8001-35-2	Toxaphene	ND	94	47	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		46-122%
2051-24-3	Decachlorobiphenyl	70%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64558.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64558.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.4	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.4	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		44-126%
2051-24-3	Decachlorobiphenyl	89%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08222.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08222.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
50-29-3	4,4'-DDT	ND	4.0	0.92	ug/kg	
72-20-8	Endrin	ND	4.0	0.80	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	4.0	1.2	ug/kg	UL
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.56	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND	4.0	0.80	ug/kg	
8001-35-2	Toxaphene	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		46-122%
2051-24-3	Decachlorobiphenyl	72%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64559.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254	ND	20	10	ug/kg	
11096-82-5	Aroclor 1260	ND	20	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		44-126%
2051-24-3	Decachlorobiphenyl	93%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08225.D TT08319.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08225.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08319.D	5	08/10/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2	30.2 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.85	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.66	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.9	0.77	ug/kg	
72-55-9	4,4'-DDE	ND	3.9	0.77	ug/kg	
50-29-3	4,4'-DDT	ND	3.9	0.89	ug/kg	UJ
72-20-8	Endrin	ND	3.9	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg	UJ
53494-70-5	Endrin ketone	ND	3.9	0.77	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.9	0.58	ug/kg	
76-44-8	Heptachlor	ND [a]	9.6	2.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.39	ug/kg	
72-43-5	Methoxychlor	ND	3.9	0.77	ug/kg	UJ
8001-35-2	Toxaphene	ND	96	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%	81%	46-122%
2051-24-3	Decachlorobiphenyl	71%	96%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64560.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		44-126%
2051-24-3	Decachlorobiphenyl	91%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08226.D TT08320.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08226.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08320.D	5	08/11/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	2.0	0.47	ug/kg		
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg		
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg		
319-86-8	delta-BHC	ND	2.0	0.87	ug/kg		UL
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.67	ug/kg		
5103-71-9	alpha-Chlordane	ND	2.0	0.39	ug/kg		
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg		
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg		
72-54-8	4,4'-DDD	ND	3.9	0.79	ug/kg		
72-55-9	4,4'-DDE	ND	3.9	0.79	ug/kg		
50-29-3	4,4'-DDT	ND	3.9	0.90	ug/kg		UT
72-20-8	Endrin	ND	3.9	0.79	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg		UJ
53494-70-5	Endrin ketone	ND	3.9	0.79	ug/kg		
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg		
33213-65-9	Endosulfan-II	ND	3.9	0.59	ug/kg		
76-44-8	Heptachlor	ND [a]	9.8	2.8	ug/kg		
1024-57-3	Heptachlor epoxide	ND	2.0	0.39	ug/kg		
72-43-5	Methoxychlor	ND	3.9	0.79	ug/kg		UT
8001-35-2	Toxaphene	ND	98	49	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%	72%	46-122%
2051-24-3	Decachlorobiphenyl	70%	89%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64561.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.8	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.8	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.8	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.8	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		44-126%
2051-24-3	Decachlorobiphenyl	88%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08227.D TT08321.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08227.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08321.D	5	08/11/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2	30.2 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	1.8	0.44	ug/kg		
319-84-6	alpha-BHC	ND	1.8	0.52	ug/kg		
319-85-7	beta-BHC	ND	1.8	0.48	ug/kg		
319-86-8	delta-BHC	ND	1.8	0.81	ug/kg		UL
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.63	ug/kg		
5103-71-9	alpha-Chlordane	ND	1.8	0.37	ug/kg		
5103-74-2	gamma-Chlordane	ND	1.8	0.41	ug/kg		
60-57-1	Dieldrin	ND	1.8	0.41	ug/kg		
72-54-8	4,4'-DDD	ND	3.7	0.74	ug/kg		
72-55-9	4,4'-DDE	ND	3.7	0.74	ug/kg		
50-29-3	4,4'-DDT	ND	3.7	0.85	ug/kg		UJ
72-20-8	Endrin	ND	3.7	0.74	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg		UJ
53494-70-5	Endrin ketone	ND	3.7	0.74	ug/kg		
959-98-8	Endosulfan-I	ND	1.8	0.41	ug/kg		
33213-65-9	Endosulfan-II	ND	3.7	0.55	ug/kg		
76-44-8	Heptachlor	ND [a]	9.2	2.6	ug/kg		
1024-57-3	Heptachlor epoxide	ND	1.8	0.37	ug/kg		
72-43-5	Methoxychlor	ND	3.7	0.74	ug/kg		UJ
8001-35-2	Toxaphene	ND	92	46	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%	78%	46-122%
2051-24-3	Decachlorobiphenyl	70%	93%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64562.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64562.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.2	ug/kg	
11104-28-2	Aroclor 1221	ND	18	15	ug/kg	
11141-16-5	Aroclor 1232	ND	18	15	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.2	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.2	ug/kg	
11097-69-1	Aroclor 1254	ND	18	9.2	ug/kg	
11096-82-5	Aroclor 1260	ND	18	9.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		44-126%
2051-24-3	Decachlorobiphenyl	82%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08228.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08324.D	5	08/11/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2	30.1 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	2.0	0.48	ug/kg		
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg		
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg		
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg		UL
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg		
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg		
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg		
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg		
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg		
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg		
50-29-3	4,4'-DDT	ND	4.0	0.92	ug/kg		UJ
72-20-8	Endrin	ND	4.0	0.80	ug/kg		
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg		
7421-93-4	Endrin aldehyde	ND	4.0	1.2	ug/kg		UJ
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg		
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg		
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg		
76-44-8	Heptachlor	ND [a]	10	2.8	ug/kg		
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg		
72-43-5	Methoxychlor	ND	4.0	0.80	ug/kg		UJ
8001-35-2	Toxaphene	ND	100	50	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%	86%	46-122%
2051-24-3	Decachlorobiphenyl	72%	100%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64563.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64563.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.9	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.9	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.9	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.9	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		44-126%
2051-24-3	Decachlorobiphenyl	92%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08229.D TT08325.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08229.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08325.D	5	08/11/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2	30.6 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.84	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.77	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.77	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.88	ug/kg	UJ
72-20-8	Endrin	ND	3.8	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg	UJ
53494-70-5	Endrin ketone	ND	3.8	0.77	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg	
76-44-8	Heptachlor	ND [a]	9.6	2.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.77	ug/kg	UJ
8001-35-2	Toxaphene	ND	96	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%	80%	46-122%
2051-24-3	Decachlorobiphenyl	71%	93%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64566.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64566.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		44-126%
2051-24-3	Decachlorobiphenyl	93%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08230.D TT08338.D TT08326.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08230.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08338.D	5	08/11/07	FS	08/02/07	OP21716	GTT282
Run #3	TT08326.D	5	08/11/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2	30.9 g	10.0 ml
Run #3	30.2 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
~~50-29-3~~	~~4,4'-DDT~~	~~ND~~	~~4.0~~	~~0.92~~	~~ug/kg~~	R
50-29-3	4,4'-DDT	ND [a]	19	4.5	ug/kg	
72-20-8	Endrin	ND	4.0	0.80	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	4.0	1.2	ug/kg	UJ
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
~~76-44-8~~	~~Heptachlor~~	~~ND [b]~~	~~9.9~~	~~2.8~~	~~ug/kg~~	R
76-44-8	Heptachlor	ND [a]	9.7	2.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
~~72-43-5~~	~~Methoxychlor~~	~~ND~~	~~4.0~~	~~0.80~~	~~ug/kg~~	R
72-43-5	Methoxychlor	ND [a]	19	3.9	ug/kg	
8001-35-2	Toxaphene	ND	99	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
877-09-8	Tetrachloro-m-xylene	71%	81%	78%	46-122%
2051-24-3	Decachlorobiphenyl	67%	85%	93%	50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q

(a) Result is from Run# 2
(b) Result is from Run# 3

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64567.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64567.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.7	ug/kg	
11104-28-2	Aroclor 1221	ND	19	16	ug/kg	
11141-16-5	Aroclor 1232	ND	19	16	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.7	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.7	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.7	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		44-126%
2051-24-3	Decachlorobiphenyl	94%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08233.D TT08318.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08233.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08318.D	5	08/10/07	FS	08/02/07	OP21716	GTT281

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2	30.6 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.84	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.76	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.76	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.88	ug/kg	UJ
72-20-8	Endrin	ND	3.8	0.76	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg	UJ
53494-70-5	Endrin ketone	ND	3.8	0.76	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg	
76-44-8	Heptachlor	ND [a]	9.5	2.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.76	ug/kg	UJ
8001-35-2	Toxaphene	ND	95	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%	80%	46-122%
2051-24-3	Decachlorobiphenyl	70%	90%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64568.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64568.D	1	08/07/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.5	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.5	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.5	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.5	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		44-126%
2051-24-3	Decachlorobiphenyl	88%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08369.D	1	08/11/07	FS	08/02/07	OP21716	GTT282
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
309-00-2	Aldrin	ND	2.0	0.49	ug/kg		UJ
319-84-6	alpha-BHC	ND	2.0	0.57	ug/kg		
319-85-7	beta-BHC	ND	2.0	0.53	ug/kg		
319-86-8	delta-BHC	ND	2.0	0.90	ug/kg		
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.69	ug/kg		
5103-71-9	alpha-Chlordane	ND	2.0	0.41	ug/kg		
5103-74-2	gamma-Chlordane	ND	2.0	0.45	ug/kg		
60-57-1	Dieldrin	0.85	2.0	0.45	ug/kg	J	J
72-54-8	4,4'-DDD	ND	4.1	0.82	ug/kg		UJ
72-55-9	4,4'-DDE	ND	4.1	0.82	ug/kg		
50-29-3	4,4'-DDT	ND	4.1	0.94	ug/kg		
72-20-8	Endrin	ND	4.1	0.82	ug/kg		
1031-07-8	Endosulfan sulfate	ND	4.1	1.3	ug/kg		
7421-93-4	Endrin aldehyde	ND	4.1	1.2	ug/kg		
53494-70-5	Endrin ketone	ND	4.1	0.82	ug/kg		
959-98-8	Endosulfan-I	ND	2.0	0.45	ug/kg		
33213-65-9	Endosulfan-II	ND	4.1	4.1	ug/kg		
76-44-8	Heptachlor	ND	2.0	0.57	ug/kg		
1024-57-3	Heptachlor epoxide	ND	2.0	0.41	ug/kg		
72-43-5	Methoxychlor	ND	4.1	0.82	ug/kg		
8001-35-2	Toxaphene	ND	100	51	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	61%		46-122%
2051-24-3	Decachlorobiphenyl	86%		50-133%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64789.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64789.D	1	08/13/07	JB	08/02/07	OP21715	GST1707
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254 [b]	29.9	20	10	ug/kg	J
11096-82-5	Aroclor 1260 [b]	39.8	20	10	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	53%		44-126%
2051-24-3	Decachlorobiphenyl	70%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08370.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08370.D	1	08/11/07	FS	08/02/07	OP21716	GTT282
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.44	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.48	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.81	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.74	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.74	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	0.85	ug/kg	UJ
72-20-8	Endrin	ND	3.7	0.74	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	UJ
53494-70-5	Endrin ketone	ND	3.7	0.74	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.55	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.52	ug/kg	UJ
1024-57-3	Heptachlor epoxide	ND	1.8	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.74	ug/kg	UJ
8001-35-2	Toxaphene	ND	92	46	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		46-122%
2051-24-3	Decachlorobiphenyl	84%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64790.D	1	08/13/07	JB	08/02/07	OP21715	GST1707
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.2	ug/kg	
11104-28-2	Aroclor 1221	ND	18	15	ug/kg	
11141-16-5	Aroclor 1232	ND	18	15	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.2	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.2	ug/kg	
11097-69-1	Aroclor 1254	ND	18	9.2	ug/kg	
11096-82-5	Aroclor 1260	ND	18	9.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		44-126%
2051-24-3	Decachlorobiphenyl	79%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08261.D

Accutest LabLink@72038 11:39 19-Dec-2007

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08261.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.44	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.48	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.81	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.74	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.74	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	3.7	ug/kg	UJ
72-20-8	Endrin	ND	3.7	0.74	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.7	0.74	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.55	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.52	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.8	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.74	ug/kg	UJ
8001-35-2	Toxaphene	ND	92	46	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		46-122%
2051-24-3	Decachlorobiphenyl	76%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64628.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.2	ug/kg	
11104-28-2	Aroclor 1221	ND	18	15	ug/kg	
11141-16-5	Aroclor 1232	ND	18	15	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.2	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.2	ug/kg	
11097-69-1	Aroclor 1254	71.2	18	9.2	ug/kg	
11096-82-5	Aroclor 1260	ND	18	9.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	73%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08262.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08262.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	UJ
319-84-6	alpha-BHC	ND	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.85	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.66	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.43	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	3.9	0.77	ug/kg	
72-55-9	4,4'-DDE	ND	3.9	0.77	ug/kg	
50-29-3	4,4'-DDT	ND	3.9	0.89	ug/kg	
72-20-8	Endrin	ND	3.9	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	3.9	0.77	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.43	ug/kg	
33213-65-9	Endosulfan-II	ND	3.9	0.58	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.39	ug/kg	
72-43-5	Methoxychlor	ND	3.9	0.77	ug/kg	
8001-35-2	Toxaphene	ND	97	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	57%		46-122%
2051-24-3	Decachlorobiphenyl	72%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64629.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64629.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.7	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.7	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.7	ug/kg	
11097-69-1	Aroclor 1254 [b]	43.0	19	9.7	ug/kg	J
11096-82-5	Aroclor 1260 [b]	17.4	19	9.7	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	55%		44-126%
2051-24-3	Decachlorobiphenyl	63%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08263.D

Accutest Laboratories

Report of Analysis

3320

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08263.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.47	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.86	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.67	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	3.9	0.78	ug/kg	
72-55-9	4,4'-DDE	ND	3.9	0.78	ug/kg	
50-29-3	4,4'-DDT	ND	3.9	0.90	ug/kg	UJ
72-20-8	Endrin	ND	3.9	0.78	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.9	0.78	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg	
33213-65-9	Endosulfan-II	ND	3.9	0.59	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.39	ug/kg	
72-43-5	Methoxychlor	ND	3.9	0.78	ug/kg	UJ
8001-35-2	Toxaphene	ND	98	49	ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%		46-122%
2051-24-3	Decachlorobiphenyl	80%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64630.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64630.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.8	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.8	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.8	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.8	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		44-126%
2051-24-3	Decachlorobiphenyl	89%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08264.D

Accutest Laboratories

Report of Analysis

3.21
3

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08264.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	1.7	0.41	ug/kg		
319-84-6	alpha-BHC	ND	1.7	0.48	ug/kg		
319-85-7	beta-BHC	ND	1.7	0.45	ug/kg		
319-86-8	delta-BHC	ND	1.7	0.76	ug/kg		
58-89-9	gamma-BHC (Lindane)	ND	1.7	0.58	ug/kg		
5103-71-9	alpha-Chlordane	ND	1.7	0.34	ug/kg		
5103-74-2	gamma-Chlordane	ND	1.7	0.38	ug/kg		
60-57-1	Dieldrin	ND	1.7	0.38	ug/kg		
72-54-8	4,4'-DDD	ND	3.4	0.69	ug/kg		
72-55-9	4,4'-DDE	ND	3.4	0.69	ug/kg		
50-29-3	4,4'-DDT	ND	3.4	0.79	ug/kg		UJ
72-20-8	Endrin	ND	3.4	0.69	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.4	1.1	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.4	1.0	ug/kg		UL
53494-70-5	Endrin ketone	ND	3.4	0.69	ug/kg		
959-98-8	Endosulfan-I	ND	1.7	0.38	ug/kg		
33213-65-9	Endosulfan-II	ND	3.4	0.52	ug/kg		
76-44-8	Heptachlor	ND	1.7	0.48	ug/kg		
1024-57-3	Heptachlor epoxide	ND	1.7	0.34	ug/kg		
72-43-5	Methoxychlor	ND	3.4	0.69	ug/kg		
8001-35-2	Toxaphene	ND	86	43	ug/kg		UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		46-122%
2051-24-3	Decachlorobiphenyl	75%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64631.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64631.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	17	8.6	ug/kg	
11104-28-2	Aroclor 1221	ND	17	14	ug/kg	
11141-16-5	Aroclor 1232	ND	17	14	ug/kg	
53469-21-9	Aroclor 1242	ND	17	8.6	ug/kg	
12672-29-6	Aroclor 1248	ND	17	8.6	ug/kg	
11097-69-1	Aroclor 1254	ND	17	8.6	ug/kg	
11096-82-5	Aroclor 1260	ND	17	8.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		44-126%
2051-24-3	Decachlorobiphenyl	76%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08343.D

Accutest Laboratories

Report of Analysis

3-22
3

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08343.D	1	08/11/07	FS	08/03/07	OP21730	GTT282
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	2.0	0.47	ug/kg		
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg		
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg		
319-86-8	delta-BHC	ND	2.0	0.86	ug/kg		
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.67	ug/kg		
5103-71-9	alpha-Chlordane	ND	2.0	0.39	ug/kg		
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg		
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg		
72-54-8	4,4'-DDD	ND	3.9	0.78	ug/kg		
72-55-9	4,4'-DDE	ND	3.9	0.78	ug/kg		
50-29-3	4,4'-DDT	ND	3.9	0.90	ug/kg		UJ
72-20-8	Endrin	ND	3.9	0.78	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg		UL
53494-70-5	Endrin ketone	ND	3.9	0.78	ug/kg		
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg		
33213-65-9	Endosulfan-II	ND	3.9	0.59	ug/kg		
76-44-8	Heptachlor	ND	2.0	0.55	ug/kg		
1024-57-3	Heptachlor epoxide	ND	2.0	0.39	ug/kg		
72-43-5	Methoxychlor	ND	3.9	0.78	ug/kg		UJ
8001-35-2	Toxaphene	ND	98	49	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		46-122%
2051-24-3	Decachlorobiphenyl	81%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64793.D	1	08/13/07	JB	08/03/07	OP21731	GST1707
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016 [b]	84.8	20	9.8	ug/kg	J
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.8	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.8	ug/kg	
11097-69-1	Aroclor 1254 [b]	220	20	9.8	ug/kg	J
11096-82-5	Aroclor 1260	ND	20	9.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		44-126%
2051-24-3	Decachlorobiphenyl	65%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08266.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08266.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
309-00-2	Aldrin	ND	1.9	0.45	ug/kg		
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg		
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg		
319-86-8	delta-BHC	ND	1.9	0.83	ug/kg		
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.64	ug/kg		
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg		
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg		
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg		
72-54-8	4,4'-DDD	ND	3.8	0.76	ug/kg		
72-55-9	4,4'-DDE	ND	3.8	0.76	ug/kg		
50-29-3	4,4'-DDT	ND	3.8	0.87	ug/kg		UJ
72-20-8	Endrin	ND	3.8	0.76	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.8	1.2	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg		UL
53494-70-5	Endrin ketone	ND	3.8	0.76	ug/kg		
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg		
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg		
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg		
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg		
72-43-5	Methoxychlor	ND	3.8	0.76	ug/kg		UJ
8001-35-2	Toxaphene	ND	95	47	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%		46-122%
2051-24-3	Decachlorobiphenyl	79%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64633.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.5	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.5	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.5	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.5	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		44-126%
2051-24-3	Decachlorobiphenyl	81%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08267.D

Accutest Laboratories

Report of Analysis

3.2.4 3

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08267.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.44	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.51	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.48	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.81	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.62	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.40	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.40	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.73	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.73	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	0.84	ug/kg	UJ
72-20-8	Endrin	ND	3.7	0.73	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	UL
53494-70-5	Endrin ketone	ND	3.7	0.73	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.40	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.55	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.51	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.8	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.73	ug/kg	UJ
8001-35-2	Toxaphene	ND	92	46	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%		46-122%
2051-24-3	Decachlorobiphenyl	77%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64634.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.2	ug/kg	
11104-28-2	Aroclor 1221	ND	18	15	ug/kg	
11141-16-5	Aroclor 1232	ND	18	15	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.2	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.2	ug/kg	
11097-69-1	Aroclor 1254	ND	18	9.2	ug/kg	
11096-82-5	Aroclor 1260	ND	18	9.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		44-126%
2051-24-3	Decachlorobiphenyl	61%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08268.D

Accutest Laboratories

Report of Analysis

3.2.5 3

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08268.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	UJ
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.82	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.64	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.9	1.9	ug/kg	
72-54-8	4,4'-DDD [b]	ND	7.4	7.4	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.75	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	0.86	ug/kg	
72-20-8	Endrin	ND	3.7	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.7	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.52	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.75	ug/kg	
8001-35-2	Toxaphene	ND	94	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	54%		46-122%
2051-24-3	Decachlorobiphenyl	66%		50-133%

(a) All hits confirmed by dual column analysis.
(b) Elevated reporting limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64635.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016 [b]	49.3	19	9.4	ug/kg	J
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254 [b]	112	19	9.4	ug/kg	J
11096-82-5	Aroclor 1260	ND	19	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	49%		44-126%
2051-24-3	Decachlorobiphenyl	48%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08271.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08271.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

UJ

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.84	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.76	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.76	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.88	ug/kg	
72-20-8	Endrin	ND	3.8	0.76	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.8	0.76	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.76	ug/kg	
8001-35-2	Toxaphene	ND	95	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		46-122%
2051-24-3	Decachlorobiphenyl	75%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64638.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64638.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.5	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.5	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.5	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.5	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		44-126%
2051-24-3	Decachlorobiphenyl	80%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08272.D

Accutest Laboratories

Report of Analysis

3.27
3

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08272.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

UJ

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.48	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.82	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.75	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.75	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	0.86	ug/kg	
72-20-8	Endrin	ND	3.7	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.7	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.52	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.75	ug/kg	
8001-35-2	Toxaphene	ND	93	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		46-122%
2051-24-3	Decachlorobiphenyl	71%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64639.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64639.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.3	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.3	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.3	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.3	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%		44-126%
2051-24-3	Decachlorobiphenyl	80%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08273.D

Accutest Laboratories

Report of Analysis

3.2.8

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08273.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
309-00-2	Aldrin	ND	1.9	0.45	ug/kg		UJ
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg		
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg		
319-86-8	delta-BHC	ND	1.9	0.83	ug/kg		
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.64	ug/kg		
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg		
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg		
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg		
72-54-8	4,4'-DDD	ND	3.8	0.75	ug/kg		
72-55-9	4,4'-DDE	ND	3.8	0.75	ug/kg		
50-29-3	4,4'-DDT	ND	3.8	0.87	ug/kg		
72-20-8	Endrin	ND	3.8	0.75	ug/kg		
1031-07-8	Endosulfan sulfate	ND	3.8	1.2	ug/kg		
7421-93-4	Endrin aldehyde	ND	3.8	1.1	ug/kg		
53494-70-5	Endrin ketone	ND	3.8	0.75	ug/kg		
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg		
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg		
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg		
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg		
72-43-5	Methoxychlor	ND	3.8	0.75	ug/kg		
8001-35-2	Toxaphene	ND	94	47	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		46-122%
2051-24-3	Decachlorobiphenyl	78%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64640.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.4	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.4	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%		44-126%
2051-24-3	Decachlorobiphenyl	87%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08274.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.47	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.87	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.67	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.79	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.79	ug/kg	
50-29-3	4,4'-DDT	ND	4.0	0.91	ug/kg	UJ
72-20-8	Endrin	ND	4.0	0.79	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	4.0	1.2	ug/kg	UL
53494-70-5	Endrin ketone	ND	4.0	0.79	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.59	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND	4.0	0.79	ug/kg	UJ
8001-35-2	Toxaphene	ND	99	49	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%		46-122%
2051-24-3	Decachlorobiphenyl	74%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64641.D	1	08/07/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.9	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.9	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.9	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.9	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	84%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08277.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08277.D	1	08/09/07	FS	08/03/07	OP21730	GTT280
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	UJ
319-84-6	alpha-BHC	ND	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.85	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.66	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.9	0.77	ug/kg	
72-55-9	4,4'-DDE	ND	3.9	0.77	ug/kg	
50-29-3	4,4'-DDT	ND	3.9	0.89	ug/kg	
72-20-8	Endrin	ND	3.9	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.9	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	3.9	0.77	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.9	0.58	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.39	ug/kg	
72-43-5	Methoxychlor	ND	3.9	0.77	ug/kg	
8001-35-2	Toxaphene	ND	96	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		46-122%
2051-24-3	Decachlorobiphenyl	74%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64644.D	1	08/08/07	JB	08/03/07	OP21731	GST1702
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		44-126%
2051-24-3	Decachlorobiphenyl	82%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08308.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08308.D	1	08/10/07	FS	07/30/07	OP21657	GTT281
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		42-127%
2051-24-3	Decachlorobiphenyl	79%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64321.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64321.D	1	08/01/07	JB	07/30/07	OP21658	GST1698
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		38-127%
2051-24-3	Decachlorobiphenyl	84%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F51300

DATE: January 2, 2008

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. The samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3010A/6010B (aqueous) and 3050B/6010B (solid matrix) for ICP metals; and SW-846 7470A (aqueous) and 7471A (solid matrix) for mercury. A total of 1 aqueous and 30 soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	**Field Sample ID**	Lab Sample ID
59SB06A	F51300-1	43SB06C	F51300-17
59SB06B	F51300-2	43SB07A	F51300-18
59SB06C	F51300-3	43SB07B	F51300-19
59SB05A	F51300-4	43SB07C	F51300-20
59SB05B	F51300-5	43SB08A	F51300-21
59SB05C	F51300-6	43SB08B	F51300-22
59SB04A	F51300-7	43SB08C	F51300-23
59SB04B	F51300-8	43SB09A	F51300-24
59SB04C	F51300-9	43SB09B	F51300-25
TMSB04C	F51300-10	43SB09C	F51300-26
59SB02A	F51300-11	43SB10A	F51300-27
59SB02B	F51300-12	43SB10B	F51300-28
TMSB02B	F51300-13	43SB10C	F51300-29
59SB02C	F51300-14	TMSB10B	F51300-30
43SB06A	F51300-15	072507R	F51300-31
43SB06B	F51300-16		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
X		Laboratory Sample Duplicate
X		Matrix Spike and Spike Duplicate
X		ICP Serial Dilution
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

1/2/08
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F51300

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Solid samples must be cooled @4°C±2°C with a maximum holding time of 180 days for ICP metals and 28 days for mercury. Aqueous samples must be preserved to pH<2 with HNO_3 and cooled @4°C±2°C, with a maximum holding time of 180 days for ICP metals and 28 days for mercury.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected 7/25/07 for metals analysis, digested for mercury on 7/27/07 and 7/28/07, analyzed for mercury on 7/27/07 and 7/28/07, digested for ICP metals on 7/27/07 and 7/30/07, and analyzed for ICP metals on 7/28/07, 7/30/07, & 7/31/07. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (DoD QSM <½ MRL) 3 – standards (r≥0.995) ICV/CCV (90-110%) (DoD QSM 90-110%) MRL (70-130%) (DoD QSM 80-120%) High Std. (95-105%)	Hg:	1 – blank (DoD QSM <½ MRL) 5 – standards (r≥0.995) ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%) MRL (80-120%) (DoD QSM 80-120%) High Std. (95-105%)

- Mercury analysis was performed on 7/27/07, with a correlation coefficient of 0.999.

- Mercury analysis was performed on 7/28/07, with a correlation coefficient of 0.999.

- The mercury ICVs and CCVs met recovery criteria.

- Sample F51300-31 was analyzed for ICP metals on 7/28/07 between CCV21 and CCV22. Both CCVs met recovery criteria.

- Samples F51300-1 thru -30 were analyzed for ICP metals between CCV6 and CCV11 during the 7/30/07 metals run. All CCVs in this interval met recovery criteria.

- Selected samples were analyzed for iron and manganese between CCV3 and CCV6 during the 7/31/07 metals run. All CCVs in this interval met recovery criteria.

- All metals met recovery criteria during the High Standard analysis.

- **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
7/27/07	Hg	0.2 ug/l	150.0	F51300-17, -23	K
7/28/07	Hg	0.2 ug/l	Met criteria	None	None
7/27/07	ICP-Al	200 ug/l	79.0	F51300-31	J
7/27/07	ICP-Sb	5 ug/l	0	F51300-31	J
7/27/07	ICP-Be	5 ug/l	126.0	None	None
7/27/07	ICP-Tl	10 ug/l	139.0	None	None
7/30/07	ICP-Sb	5 ug/l	130.0	None	None
7/30/07	ICP-Be	5 ug/l	124.0	None	None
7/30/07	ICP-Pb	5 ug/l	124.0	None	None
7/30/07	ICP-Tl	10 ug/l	125.0	None	None
7/31/07	ICP metals	Various	Met criteria	None	None

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc.	Action Level	B qualified samples
7/27/07	ICP-Sb	ICB/CCB	9.2 ug/l	46.0	None
7/27/07	ICP-Fe	ICB/CCB	25.2 ug/l	126.0	None
7/27/07	ICP-K	ICB/CCB	1780 ug/l	8900	F51300-31
7/27/07	ICP-Mg	ICB/CCB	10.6	53.0	None
7/27/07	ICP-Na	ICB/CCB	2120 ug/l	10600	F51300-31
7/27/07	ICP-Se	ICB/CCB	5.0 ug/l	25.0	None
7/27/07	ICP-Tl	ICB/CCB	8.1 ug/l	40.5	None
7/30/07	ICP-Al	ICB/CCB	0.902 mg/kg	4.51	None
7/30/07	ICP-Sb	ICB/CCB	0.264 mg/kg	1.32	F51300-2 thru -30
7/30/07	ICP-Be	ICB/CCB	0.048 mg/kg	0.24	None
7/30/07	ICP-K	ICB/CCB	9.06 mg/kg	45.3	None
7/30/07	ICP-Tl	ICB/CCB	0.288 mg/kg	1.44	None
7/30/07	ICP-Zn	ICB/CCB	0.080 mg/kg	0.40	None
7/31/07	ICP-Fe, Mn	ICB/CCB	<2*MDL	NA	None
7/27/07	Mercury	ICB/CCB	<2*MDL	NA	None
7/28/07	Mercury	ICB/CCB	<2*MDL	NA	None
7/27/07	ICP Metals	MP12593-MB	<½MRL	NA	None
7/30/07	ICP-Be	MP12608-MB	0.14 mg/kg	0.70	F51300-2, -3, -4, -5, -6, -8, -9, -10, -12, -13, -14, -16, -17
7/30/07	ICP-Be	MP12609-MB	0.14 mg/kg	0.70	F51300-2, -3, -4, -5, -6, -8, -9, -10, -12, -13, -14, -16, -17
7/28/07	Mercury	MP12585-MB	<½MRL	NA	None
7/28/07	Mercury	MP12586-MB	<½MRL	NA	None
7/28/07	Mercury	MP12598-MB	<½MRL	<2*MDL	None
7/27/07	Potassium	F51300-31	1700 ug/l	170	None
7/27/07	Sodium	F51300-31	2130 ug/l	213	F51300-1, -2, -3, -4, -6, -9, -10, -11
7/28/07	Mercury	F51300-31	<½MRL	NA	None
7/31/07	Nickel	F51353-8	1.3 ug/l	0.13	None
7/31/07	Potassium	F51353-8	1730 ug/l	173	None
7/31/07	Sodium	F51353-8	1950 ug/l	195	F51300-1, -2, -3, -9, -10, -11

F51300-31 and F51353-8 are rinsate blanks.
J = Estimated value <MRL and >MDL.

IV-ICP Interference Check Sample (ICS)
The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)
The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. The DoD LCS recovery limits are specified in Tables D-18 (aqueous) and D-19 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12593-BS was used as an aqueous LCS during ICP metals analysis. All criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed in conjunction with this LCS.

- Sample MP12608-BS was used as a solid matrix LCS during ICP metals analysis. All criteria were met. No qualifiers were applied. Samples F51300-1 thru -19 and -25 were analyzed in conjunction with this LCS.

- Sample MP12609-BS was used as a solid matrix LCS during ICP metals analysis. All criteria were met. No qualifiers were applied. Samples F51300-20 thru -24, and -26 thru -30 were analyzed in conjunction with this LCS.

- Sample MP12585-BS was used as a solid matrix LCS during mercury analysis. All criteria were met. No qualifiers were applied. Samples F51300-1 thru -12 and -25 were analyzed in conjunction with this LCS.

- Sample MP12586-BS was used as a solid matrix LCS during mercury analysis. All criteria were met. No qualifiers were applied. Samples F51300-13 thru -24 and -26 thru -30 were analyzed in conjunction with this LCS.

- Sample MP12598-BS was used as the LCS during aqueous ICP metals analysis. All criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed in conjunction with this LCS.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample F51300-25 was analyzed in duplicate during solid matrix ICP metals analysis. Antimony (27.8%), arsenic (92.5%), calcium (108.9%), copper (34.1%), iron (48.0%), lead (83.5%), magnesium (65.7%), and zinc (35.4%) had RPDs above criteria – all results for these metals have been qualified "J/UJ". The other metals met RPD criteria. Samples F51300-1 thru -19 and -25 were analyzed in conjunction with this laboratory duplicate.

- Sample F51300-29 was analyzed in duplicate during solid matrix ICP metals analysis. Calcium (21.4%), cobalt (64.0%), lead (21.4%), manganese (67.0%), and selenium (40.0%) had RPDs above criteria – all results for these metals have been qualified "J/UJ". The other metals met RPD criteria. Samples F51300-20 thru -24, and -26 thru -30 were analyzed in conjunction with this laboratory duplicate.

- Sample F51289-13 was analyzed in duplicate during aqueous ICP metals analysis. The sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this laboratory duplicate.

- Sample F51300-25 was analyzed in duplicate during solid matrix mercury analysis, and met RPD criteria. Samples F51300-1 thru -12 and -25 were analyzed in conjunction with this laboratory duplicate.

- Sample F51300-29 was analyzed in duplicate during solid matrix mercury analysis, and met RPD criteria. Samples F51300-13 thru -24 and -26 thru -30 were analyzed in conjunction with this laboratory duplicate.

- Sample F51314-1 was analyzed in duplicate during aqueous mercury analysis. The sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this laboratory duplicate.

VII-Matrix Spike/Spike Duplicate

MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD MS/MSD recovery limits follow the LCS criteria specified in Tables D-18 (aqueous) and D-19 (sold matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample F51300-25 was used as an MS/MSD during solid matrix ICP metals analysis. Antimony (19.1%, 18.3%), arsenic (55.1%, 58.9%), barium (68.0%, 73.8%), cadmium (69.3%, 71.6%), calcium (0%, 0%), cobalt (69.3%, 75.9%), copper (38.7%, 46.5%), iron (140.4%, 27.5%), lead (48.9%, 60.1%), magnesium (0%, 0%), nickel (69.3%, 77.0%), potassium (72.3%, 77.3%), selenium (56.8%, 60.9%), thallium (67.2%, 70.0%), and zinc (0%, 18.3%) had low recoveries in the MS & MSD, while chromium (70.3%), manganese (0%), silver (73.0%), and sodium (79.4%) had low recoveries in the MS or MSD. The sample concentration was >4 times the spike added for calcium, iron, magnesium, and manganese; therefore, no qualifiers were applied for these four metals. The results for the other metals listed have been qualified "L/UL". The other metals met recovery criteria, and all metals met RPD criteria. Samples F51300-1 thru -19 and -25 were analyzed in conjunction with this MS/MSD.

- Sample F51300-29 was used as an MS/MSD during solid matrix ICP metals analysis. Aluminum (0%, 49.7%), antimony (29.0%, 27.1%), arsenic (69.6%, 71.4%), barium (73.4%, 75.2%), cadmium (74.5%, 73.7%), cobalt (61.3%, 53.3%), lead (76.2%, 78.4%), magnesium (68.4%, 69.1%), manganese (0%, 0%), nickel (74.1%, 77.8%), potassium (71.1%, 77.8%), selenium (66.5%, 68.5%), and thallium (75.8%, 77.4%) had low recoveries in the MS & MSD, while chromium (77.0%), iron (6.4%), vanadium (79.1%), and zinc (78.5%) had low recoveries in the MS or MSD. The sample concentration was >4 times the spike added for aluminum, iron, and manganese; therefore, no qualifiers were applied for these three metals. The results for the other metals listed have been qualified "L/UL". The other metals met recovery criteria, and all metals met RPD criteria. Samples F51300-20 thru -24, and -26 thru -30 were analyzed in conjunction with this MS/MSD.

- Sample F51289-3 was used as an MS/MSD during aqueous ICP metals analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

- Sample F51300-25 was used as an MS/MSD during solid matrix mercury analysis. Both MS and the MSD (0%, 0%) had low recoveries. The sample concentration was >4 times the spike added; therefore, no qualifiers were applied. Samples F51300-1 thru -12 and -25 were analyzed in conjunction with this laboratory duplicate.

- Sample F51300-29 was used as an MS/MSD during solid matrix mercury analysis, and met the recovery and RPD criteria. Samples F51300-13 thru -24 and -26 thru -30 were analyzed in conjunction with this MS/MSD.

- Sample F51314-1 was used as the MS/MSD during aqueous mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

VIII-ICP Serial Dilution

An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- Sample F51300-25 was used as the serial dilution during solid matrix ICP metals analysis. Aluminum (24.4%), barium (25.0%), calcium (32.4%), chromium (29.6%), cobalt (28.2%), copper (13.4%), iron (32.3%), lead (34.2%), magnesium (38.0%), manganese (32.8%), nickel (33.8%), potassium (17.2%), vanadium (28.3%), and zinc (28.6%) had %D > 10%. All detections for these metals have been qualified "J/UJ". The other metals met criteria. Samples F51300-1 thru -19 and -25 were analyzed in conjunction with this serial dilution.

- Sample F51300-29 was used as the serial dilution during solid matrix ICP metals analysis. Aluminum (23.4%), barium (23.9%), calcium (24.5%), chromium (22.8%), cobalt (23.5%), copper (12.1%), iron (27.6%), lead (37.4%), magnesium (35.3%), manganese (27.2%), nickel (26.4%), potassium (21.5%), vanadium (22.5%), and zinc (24.4%) had %D > 10%. All detections for these metals have been qualified "J/UJ". The other metals met criteria. Samples F51300-20 thru -24, and -26 thru -30 were analyzed in conjunction with this serial dilution.

- Sample F51289-3 was used as the serial dilution during aqueous ICP metals analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this serial dilution.

- Sample F51300-25 was used as the serial dilution during solid matrix mercury analysis, and met %D criteria. No data qualifiers were applied. Samples F51300-1 thru -12 and -25 were analyzed in conjunction with this laboratory duplicate.

- Sample F51300-29 was used as the serial dilution during solid matrix mercury analysis, and met %D criteria. No data qualifiers were applied. Samples F51300-13 thru -24 and -26 thru -30 were analyzed in conjunction with this laboratory duplicate.

- Sample F51314-1 was used as the serial dilution during aqueous mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample F51300-31 was analyzed in conjunction with this serial dilution.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included 59SB04C (F51300-9) & TMSB04C (F51300-10), 59SB02B (F51300-12) & TMSB02B (F51300-13), and 43SB10B (F51300-28) & TMSB10B (F51300-30). All compounds detected above the reporting limit (RL) met RPD criteria.

X-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: F51300-13, Chromium

Conc. (mg/kg) = (conc. μg/L) *(Final Volume L) * (DF) / (Sample weight g) * (Percent solids/100)

Conc. (mg/kg) = (275.8 μg/L)*(0.05 L)*(1) / (1.01)*(0.853) = 16.0 mg/kg

Reported concentration = 16.0 mg/kg
%D = 0.0%
Values were within 10% difference.

CVAA Sample: F51300-13, Mercury

Conc. (mg/kg) = (conc. μg/L) *(Final Volume L) * (DF) / (Sample weight g) * (Percent solids/100)

Conc. (mg/kg) = (1.20 μg/L)*(0.05 L)*(1) / (0.69)*(0.853) = 0.10 mg/kg

Reported concentration = 0.10 mg/kg
%D = 0.0%.
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	7210 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.29 U UJ	3.2	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.3 J	0.43	0.21	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	178 J	11	0.27	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.3	0.27	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.054 U UL	0.22	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	411 J	270	3.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	9.2	0.54	0.048	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	6.6	2.7	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	3.3	1.3	0.048	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	6270	5.4	0.65	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	15.1	5.4	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	295	270	0.40	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	3630	16	1.1	mg/kg	20	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.041 J J	0.088	0.0070	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	5.2 J	2.2	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	302 J J	540	5.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.70 J L	5.4	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.048 U UL	0.54	0.048	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	109 J BJ	540	44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.4 U UL	4.4	2.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	15.1 J	2.7	0.032	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	12.9 J	1.1	0.070	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	12200	J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.83	J B J	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.7	J	0.44	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	56.4	J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.45	B	0.28	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.55	U VL	1.1	0.55	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	531	J	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	33.0		0.55	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.0		2.8	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	6.3		1.4	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	13800		5.5	0.66	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	11.6		5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	563		280	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	1320		8.3	0.55	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.10		0.091	0.0073	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	6.1	J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	607	J	550	5.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.39	J L	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050	U VL	0.55	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	162	J B J	550	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6	U VL	4.4	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	34.6	J	2.8	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	19.6	J	1.1	0.072	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	12900 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.87 J BJ	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.9 J	0.44	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	56.6 J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.42 B	0.28	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.55 U UL	1.1	0.55	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	545 J	280	3.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	25.9	0.55	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.5	2.8	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	6.6	1.4	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	13700	5.5	0.66	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	10.6	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	503	280	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	943	8.3	0.55	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.12	0.084	0.0067	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	6.0 J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	586 J	550	5.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.38 J L	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050 U UL	0.55	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	195 J BJ	550	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	1.3 U UL	2.2	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	34.2 J	2.8	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	20.3 J	1.1	0.072	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	15500 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.0 J BJ	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.4 J	0.44	0.21	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	88.6 J	11	0.27	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.60 B	0.27	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.55 U VL	1.1	0.55	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	596 J	270	3.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	21.5	0.55	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.2	2.7	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	8.3	1.4	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	19200	5.5	0.66	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	9.7	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	609	270	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	446	4.1	0.27	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.12	0.085	0.0068	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	6.8 J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	656 J	550	5.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.26 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.049 U VL	0.55	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	230 J BJ	550	45	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.26 U VL	1.1	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	47.2 J	2.7	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	22.9 J	1.1	0.071	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	24800 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Antimony	1.1 J BJ	3.6	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.2 J	0.48	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Barium	38.7 J	12	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.63 B	0.30	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	0.60 U UL	1.2	0.60	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Calcium	245 J J	300	3.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Chromium	20.0	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.3	3.0	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Copper	13.6	1.5	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Iron	27800	5.9	0.71	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Lead	7.6	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	983	300	0.44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Manganese	119	0.89	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.068 J J	0.097	0.0078	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	9.8 J	2.4	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Potassium	1250 J	590	5.9	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.12 U UL	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.053 U UL	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Sodium	383 J L	590	49	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	0.28 U UL	1.2	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	64.9 J	3.0	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Zinc	32.3 J	1.2	0.077	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Prep QC Batch: MP12585
(4) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18600 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.63 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	0.97 J	0.45	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	31.6 J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.61 B	0.28	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.56 U UL	1.1	0.56	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	40.7 J J	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	22.9	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	6.2	2.8	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.3	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	14600	5.6	0.67	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	3.8 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	648	280	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	296	1.7	0.11	mg/kg	2	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.039 J J	0.089	0.0071	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	8.1 J	2.2	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	718 J	560	5.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.19 J L	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U UL	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	227 J B J	560	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.26 U UL	1.1	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	24.3 J	2.8	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	20.0 J	1.1	0.073	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

317
3

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	17800 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.72 J BJ	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.6 J	0.44	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Barium	94.7 J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	1.1	0.28	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	0.56 U UL	1.1	0.56	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Calcium	937 J	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Chromium	28.8	0.56	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	9.6	2.8	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.8	1.4	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Iron	24400	5.6	0.67	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Lead	8.3	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	1830	280	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Manganese	216	0.83	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.082 J	0.084	0.0067	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	11.5	2.2	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Potassium	935	560	5.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.11 U UL	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.050 U UL	0.56	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Sodium	370 J L	560	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	0.26 U UL	1.1	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	50.6 J	2.8	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Zinc	42.8 J	1.1	0.072	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Prep QC Batch: MP12585
(4) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	25900 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.84 J B J	3.6	0.32	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.2 J	0.48	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	43.6 J	12	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.66 B	0.30	0.060	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.60 U UL	1.2	0.60	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	530 J	300	3.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	21.0 J	0.60	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	2.9 J	3.0	0.060	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	12.8	1.5	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	37000	12	1.7	mg/kg	2	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Lead	8.4	6.0	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	806	300	0.44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	112	0.89	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.087 J	0.094	0.0075	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.6	2.4	0.060	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1050	600	6.0	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.12 U UL	6.0	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.054 U UL	0.60	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	396 J L	600	49	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.28 U UL	1.2	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	74.5 J	3.0	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	32.5 J	1.2	0.077	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	17100 J	11	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.61 J BJ	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.3 J	0.46	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	44.6 J	11	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.67 B	0.29	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.57 U UL	1.2	0.57	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	184 J J	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	16.7	0.57	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.2	2.9	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	7.3	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	14900	5.7	0.69	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	4.7 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	714	290	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	452	4.3	0.29	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.030 J	0.096	0.0076	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	8.1	2.3	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	813	570	5.7	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.20 J L	5.7	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U UL	0.57	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	225 J BJ	570	47	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.26 U UL	1.1	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	27.4 J	2.9	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	18.9 J	1.1	0.074	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.10
3

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DAM VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	19100 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.72 J B	3.5	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.3 J	0.47	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	41.8 J	12	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.65 B	0.29	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.58 U UL	1.2	0.58	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	209 J J	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	18.0	0.58	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.0	2.9	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	9.4	1.5	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	15700	5.8	0.70	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	5.4 J	5.8	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	641	290	0.43	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	388	4.4	0.29	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.050 J	0.099	0.0079	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	8.0	2.3	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	781	580	5.8	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.13 J L	5.8	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.053 U UL	0.58	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	229 J B J	580	48	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.26 U UL	1.2	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	29.1 J	2.9	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	20.3 J	1.2	0.076	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	7210 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.37 J B	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	5.2 J	0.44	0.21	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	140 J	11	0.27	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.0	0.27	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.55 U UL	1.1	0.55	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	192 J J	270	3.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	11.6	0.55	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	2.9	2.7	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.9	1.4	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	10800	5.5	0.66	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	9.9	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	382	270	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	337 V	4.1	0.27	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.24	0.089	0.0071	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	5.3 J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	365 J J	550	5.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.63 J L	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.049 U UL	0.55	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	187 J B J	550	45	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.26 U UL	1.1	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	20.5 J	2.7	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	22.6 J	1.1	0.071	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	22900 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.76 J	3.5	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.3	0.47	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Barium	45.5	12	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.70	0.29	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	0.59 U	1.2	0.59	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Calcium	539	290	3.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Chromium	16.8	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.7	2.9	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.1	1.5	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Iron	26400	5.9	0.71	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Lead	10.1	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	1010	290	0.44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Manganese	167	0.88	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.10	0.097	0.0077	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	9.5	2.4	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Potassium	1080	590	5.9	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.12 U	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.053 U	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Sodium	366 J	590	49	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	0.28 U	1.2	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	63.4	2.9	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Zinc	30.6	1.2	0.077	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Prep QC Batch: MP12585
(4) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	21600 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.80 J BJ	3.5	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	0.94 J	0.46	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Barium	42.7 J	12	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.66 B	0.29	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	0.58 U UL	1.2	0.58	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Calcium	541 J	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Chromium	16.0	0.58	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.6	2.9	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.1	1.5	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Iron	26300	5.8	0.70	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Lead	10.7	5.8	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	1000	290	0.43	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Manganese	161 J	0.87	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.10	0.085	0.0068	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	9.1 J	2.3	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Potassium	1050 J	580	5.8	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.12 U UL	5.8	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.052 U UL	0.58	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Sodium	357 J L	580	48	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	0.26 U UL	1.2	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	61.8 J	2.9	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Zinc	28.4 J	1.2	0.075	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Prep QC Batch: MP12586
(4) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.14

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	19800 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.86 J	3.6	0.32	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.4	0.48	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	38.6	12	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.71	0.30	0.060	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.60 U	1.2	0.60	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	323	300	3.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	17.3	0.60	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.8	3.0	0.060	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	9.7	1.5	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	20000	6.0	0.71	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	6.6	6.0	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	1060	300	0.44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	378	4.5	0.30	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.066 J	0.095	0.0076	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	8.6	2.4	0.060	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	948	600	6.0	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.29 J	6.0	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.054 U	0.60	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	315 J	600	49	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.28 U	1.2	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	42.3	3.0	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	24.4	1.2	0.077	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	15600 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.71 J	3.5	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.4	0.46	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	192	12	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.3	0.29	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.29 U	0.46	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	2150	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	24.3	0.58	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	9.9	2.9	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	14.0	1.4	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	19800	5.8	0.69	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	16.4	5.8	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	3130	290	0.43	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	428	4.3	0.29	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.061 J	0.087	0.0070	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	12.6	2.3	0.058	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1030	580	5.8	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.12 U	5.8	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.052 U	0.58	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	369 J	580	48	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [b]	0.26 U	1.2	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	42.4	2.9	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	89.9	1.2	0.075	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	6990 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.73 J BJ	3.6	0.32	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	6.8 J	0.48	0.24	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Barium	83.9 J	12	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.77 B	0.30	0.061	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cadmium	0.061 U UL	0.24	0.061	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Calcium	15200 J	300	3.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Chromium	13.2	0.61	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	5.0	3.0	0.061	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Copper	45.1	1.5	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Iron	21000	6.1	0.73	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Lead	19.6	6.1	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	5670	300	0.45	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Manganese	238	0.91	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.40	0.096	0.0076	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	10.5 J	2.4	0.061	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Potassium	886 J	610	6.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.51 J L	6.1	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.18 J L	0.61	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Sodium	390 J L	610	50	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Thallium [a]	0.28 U UL	1.2	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	17.6 J	3.0	0.036	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]
Zinc	111 J	1.2	0.079	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Prep QC Batch: MP12586
(4) Prep QC Batch: MP12608

(a) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.1.7 S

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	7010 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.47 J BJ	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.5 J	0.44	0.21	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	54.7 J	11	0.27	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.77 B	0.27	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.55 U UL	1.1	0.55	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	773 J	270	3.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	13.4	0.55	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.3	2.7	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	9.9	1.4	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	14300	5.5	0.66	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	5.8	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2180	270	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	411 V	4.1	0.27	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.015 J K	0.089	0.0071	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.9 J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	840 J	550	5.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.19 J L	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.049 U UL	0.55	0.049	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	340 J L	550	45	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	1.3 U UL	2.2	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	22.8 J	2.7	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	29.3 J	1.1	0.071	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11900 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.67 J BJ	3.2	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	17.7 J	0.43	0.21	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	142 J	11	0.27	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.1	0.27	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.054 U UL	0.22	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1840 J	270	3.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	18.4	0.54	0.048	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	10.7	2.7	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	16.8	1.3	0.048	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	19800	5.4	0.65	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	16.2	5.4	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2400	270	0.40	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	708	8.1	0.54	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.31	0.092	0.0074	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	11.7 J	2.2	0.054	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1090 J	540	5.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.31 J L	5.4	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.048 U UL	0.54	0.048	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	381 J L	540	44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	1.2 U UL	2.2	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	33.0 J	2.7	0.032	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	68.4 J	1.1	0.070	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8040 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.54 J B J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.1 J	0.45	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	104 J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.89	0.28	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.056 U UL	0.23	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	3090 J	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	14.3	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.1	2.8	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	8.9	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	13700	5.6	0.68	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	28.4	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2800	280	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	655	8.4	0.56	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.47	0.091	0.0073	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.6 J	2.3	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1040 J	560	5.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.27 J L	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U UL	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	356 J L	560	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	4.4	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	21.3 J	2.8	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	115 J	1.1	0.073	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.20

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11500 J	11	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.59 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.3	0.46	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	67.6	11	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.0	0.29	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.57 U	1.2	0.57	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	765	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	16.9	0.57	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.2	2.9	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	12.4	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	17700	5.7	0.68	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	5.0 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2760	290	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	404	4.3	0.29	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.023 J	0.086	0.0069	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	10.6	2.3	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1310	570	5.7	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.17 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U	0.57	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	557 J	570	47	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U	4.4	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	33.7	2.9	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	39.3	1.1	0.074	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8690 J	10	1.1	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.53 J BJ	3.1	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.8 L	0.42	0.20	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	98.9 J	10	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.75	0.26	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.93 L	0.21	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	15900 J	260	3.0	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	14.4	0.52	0.047	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	6.6	2.6	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.3	1.3	0.047	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	12600	5.2	0.62	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	13.5	5.2	0.10	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	8180	260	0.39	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	349	3.9	0.26	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.071 J	0.087	0.0069	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.1	2.1	0.052	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1220	520	5.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	1.3 J	5.2	0.10	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.047 U	0.52	0.047	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	348 J J	520	43	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.4 U UL	4.0	2.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	22.3 J	2.6	0.031	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	92.5 J	1.0	0.068	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.22
S

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11800 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.83 J BJ	3.5	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.9 L	0.47	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	97.1 J	12	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.99	0.29	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.059 U UL	0.23	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1910 J	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	20.4	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	9.8	2.9	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	20.3	1.5	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	18500	5.9	0.70	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	29.2	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	3030	290	0.43	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	377	4.4	0.29	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.087	0.087	0.0070	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	12.3 J	2.3	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1430 J	590	5.9	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.38 J J	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.053 U	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	514 J J	590	48	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	4.8	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	33.6 J	2.9	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	77.0 J	1.2	0.076	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	9260 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.67 J BJ	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.5 L	0.45	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	69.1 J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.88	0.28	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.56 U UL	1.1	0.56	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	747 J	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	15.0	0.56	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.9	2.8	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	11.3	1.4	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	16000	5.6	0.67	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	3.4 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2380	280	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	455	4.2	0.28	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.015 J K	0.091	0.0073	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	10.3 J	2.2	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1270 J	560	5.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.25 J J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050 U	0.56	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	462 J J	560	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	4.8	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	28.5 J	2.8	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	34.1 J	1.1	0.073	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11900 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.65 J BJ	3.2	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.1 L	0.42	0.21	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	199 J	11	0.26	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.0	0.26	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.53 U UL	1.0	0.53	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	3470 J	260	3.0	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	22.1	0.53	0.047	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	12.6	2.6	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.5	1.3	0.047	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	20100	5.3	0.63	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	12.6	5.3	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2490	260	0.39	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	1710	7.9	0.53	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.037 J	0.091	0.0073	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.8	2.1	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	856	530	5.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.70 J	5.3	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.047 U	0.53	0.047	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	313 J	530	44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.4 U UL	4.0	2.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	34.9 J	2.6	0.032	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	66.0 J	1.1	0.069	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.25 B

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11300 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.68 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	6.1	0.45	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	90.5	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.97	0.28	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.056 U	0.23	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	9430	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	18.5	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.8	2.8	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	19.2	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	17900	5.6	0.68	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	11.2	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	6490	280	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	383	1.7	0.11	mg/kg	2	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	1.9	0.52	0.042	mg/kg	6	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	11.4	2.3	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1630	560	5.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.11 U	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	472 J	560	47	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U	4.4	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	31.6	2.8	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	69.5	1.1	0.073	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12585
(5) Prep QC Batch: MP12608

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.26

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	10500 J	11	1.2	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.68 J BJ	3.3	0.30	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.4 L	0.45	0.22	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Barium	72.4 J	11	0.28	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.92	0.28	0.056	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	0.56 U UL	1.1	0.56	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Calcium	633 J	280	3.2	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Chromium	17.4	0.56	0.050	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	9.3	2.8	0.056	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.4	1.4	0.050	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Iron	18000	5.6	0.67	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Lead	4.0 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	2700	280	0.41	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Manganese	169	0.84	0.033	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.029 J	0.091	0.0073	mg/kg	1	07/27/07	07/27/07 MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	12.0	2.2	0.056	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Potassium	1350	560	5.6	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Selenium	0.14 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.050 U	0.56	0.050	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Sodium	482 J	560	46	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Thallium [b]	0.26 U UL	1.1	0.26	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	31.3 J	2.8	0.033	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]
Zinc	39.5 J	1.1	0.072	mg/kg	1	07/30/07	07/30/07 MS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Prep QC Batch: MP12586
(4) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.27 3

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	14400 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.89 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.2	0.45	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	121	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.2	0.28	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.056 U	0.23	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1690	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	22.2	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	10.9	2.8	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	12.9	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	19900	5.6	0.68	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	7.0	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	3500	280	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	521	4.2	0.28	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.042 J	0.094	0.0075	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	13.6	2.3	0.056	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1440	560	5.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.11 U	5.6	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U	0.56	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	523 J	560	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U	4.8	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	39.6	2.8	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	57.1	1.1	0.073	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.28
S

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11100 J	11	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.89 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.2	0.46	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	89.5 J	11	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.99	0.29	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.28 U	0.46	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	945 J	290	3.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	17.4	0.57	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	10.4	2.9	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	11.0	1.4	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	17000	5.7	0.69	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	4.0 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2890	290	0.42	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	490	4.3	0.29	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.028 J	0.086	0.0069	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	11.0	2.3	0.057	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1260	570	5.7	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.22 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U	0.57	0.051	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	495 J	570	47	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U	4.8	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	31.5 J	2.9	0.034	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	45.9 J	1.1	0.074	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
		Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	10600 J	12	1.3	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.72 J BJ	3.5	0.31	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.9 L	0.47	0.23	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	94.3 J	12	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.97	0.30	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.30 U UL	0.48	0.30	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1880 J	300	3.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	18.3	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	16.5	3.0	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.5	1.5	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	15400	5.9	0.71	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	5.7 J	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	3250	300	0.44	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	337	1.8	0.12	mg/kg	2	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.036 J	0.086	0.0069	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	12.0	2.4	0.059	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1070	590	5.9	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.24 J	5.9	0.12	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.053 U	0.59	0.053	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	399 J	590	49	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	1.4 U UL	2.4	1.4	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	26.9 J	3.0	0.035	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	43.4 J	1.2	0.077	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
		Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11100 J	11	1.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.76 J	3.3	0.29	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.1	0.44	0.22	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Barium	92.5 J	11	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	1.0	0.28	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.28 U UL	0.44	0.28	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Calcium	955 J	280	3.2	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Chromium	17.2	0.55	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	9.6	2.8	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Copper	11.2	1.4	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Iron	17200	5.5	0.67	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Lead	4.2 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2990	280	0.41	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Manganese	492	4.2	0.28	mg/kg	5	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.024 J	0.090	0.0072	mg/kg	1	07/27/07	07/27/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	11.2	2.2	0.055	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1230	550	5.5	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.23 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050 U	0.55	0.050	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Sodium	476 J	550	46	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	4.4	2.6	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	31.4 J	2.8	0.033	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]
Zinc	46.7 J	1.1	0.072	mg/kg	1	07/30/07	07/30/07	MS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5879
(2) Instrument QC Batch: MA5884
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12586
(5) Prep QC Batch: MP12609

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3131

3

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18 U UJ	200	18	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Antimony	3.4 U UJ	6.0	3.4	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Arsenic	2.8 U	10	2.8	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Barium	5.0 U	200	5.0	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Calcium	42 U	1000	42	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Chromium	0.60 U	10	0.60	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Cobalt	1.0 U	50	1.0	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Copper	1.0 U	25	1.0	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Iron	15 U	300	15	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Lead	1.7 U	5.0	1.7	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Magnesium	4.3 U	5000	4.3	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Manganese	1.5 U	15	1.5	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Mercury	0.10 U	1.0	0.10	ug/l	1	07/28/07	07/28/07	MS	SW846 7470A [1]	SW846 7470A [4]
Nickel	1.0 U	40	1.0	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Potassium	1770 J BJ	10000	100	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Selenium	2.8 U	10	2.8	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Silver	0.90 U	10	0.90	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Sodium	2130 J BJ	10000	500	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Thallium [a]	5.8 U	20	5.8	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Vanadium	1.1 U	50	1.1	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]
Zinc	1.6 U	20	1.6	ug/l	1	07/27/07	07/28/07	RS	SW846 6010B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA5882
(2) Instrument QC Batch: MA5883
(3) Prep QC Batch: MP12593
(4) Prep QC Batch: MP12598

(a) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Richard McCracken, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F51300

DATE: December 28, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. The samples were analyzed for chlorinated herbicides using USEPA SW846 Method 8151A. A total of 1 aqueous and 30 soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59SB06A	F51300-1	43SB06C	F51300-17
59SB06B	F51300-2	43SB07A	F51300-18
59SB06C	F51300-3	43SB07B	F51300-19
59SB05A	F51300-4	43SB07C	F51300-20
59SB05B	F51300-5	43SB08A	F51300-21
59SB05C	F51300-6	43SB08B	F51300-22
59SB04A	F51300-7	43SB08C	F51300-23
59SB04B	F51300-8	43SB09A	F51300-24
59SB04C	F51300-9	43SB09B	F51300-25
TMSB04C	F51300-10	43SB09C	F51300-26
59SB02A	F51300-11	43SB10A	F51300-27
59SB02B	F51300-12	43SB10B	F51300-28
TMSB02B	F51300-13	43SB10C	F51300-29
59SB02C	F51300-14	TMSB10B	F51300-30
43SB06A	F51300-15	072507R	F51300-31
43SB06B	F51300-16		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/28/08
Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F51300

I-Holding Times

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Solid samples must be cooled @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/25/07; extracted on 7/31/07 (water & soils) & 8/2/07 (soils only); and analyzed on 8/2/07, 8/3/07, 8/4/07, & 8/6/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration data was provided for MCPP or MCPA. During discussions with the laboratory, they indicated that they perform a one-point calibration each day that analysis for MCPP or MCPA is conducted. A five-point initial calibration was not performed, therefore all data for these two compounds has been qualified "J/UJ".

- During the initial calibration performed on 8/1/07 on instrument GC-GG, pentachlorophenol (20.65%) and 2,4,5-TP (Silvex) (20.32%) had %RSD > 20% on signal #1 - the results for these two compounds have been qualified "J/UJ". The other target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. All samples were analyzed following this initial calibration.

III-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A one-point daily calibration from 8/2/07 @1149, 8/3/07 @1729, and was provided for MCPP and MCPA, indicating that the lab is able to detect and quantitate both compounds. %D data was not supplied since a five-point initial calibration was not performed. All MCPP and MCPA data has already been qualified (see initial calibration), no additional qualification is required.

- During continuing calibration performed on 8/2/07 @1244 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Samples F51300-1, -2, -3, -4, and -5 were analyzed after this continuing calibration.

- During continuing calibration performed on 8/2/07 @2009 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Samples F51300-1, -2, -3, -4, and -5 were analyzed before this continuing calibration, while samples F51300-7, -8, -9, -10, -11, -12, -13, -14, -15, and -16 were analyzed after this continuing calibration.

- During continuing calibration performed on 8/3/07 @0134 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Samples F51300-7, -8, -9, -10, -11, -12, -13, -14, -15, and -16 were analyzed before this continuing calibration, while sample F51300-25 was analyzed after this continuing calibration.

- During continuing calibration performed on 8/3/07 @0350 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample F51300-25 was analyzed before this continuing calibration, while sample F51300-6 was analyzed after this continuing calibration.

- During continuing calibration performed on 8/3/07 @0805 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample F51300-6 was analyzed before this continuing calibration.

- During continuing calibration performed on 8/3/07 @1756 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Samples F51300-31 and -17 were analyzed after this continuing calibration.

- During continuing calibration performed on 8/3/07 @2322 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample F51300-31 and -17 were analyzed before this continuing calibration, while samples F51300-18, -22, -23, -28, -29, and -30 were analyzed after this continuing calibration.

- During continuing calibration performed on 8/6/07 @1221 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample F51300-19, -20, -21, -24, -26, and -27 were analyzed after this continuing calibration.

- During continuing calibration performed on 8/6/07 @1722 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample F51300-19, -20, -21, -24, -26, and -27 were analyzed before this continuing calibration.

IV-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L or ug/kg	Action Level µg/L	B qualified samples
8/2/07	OP7785-MB	All target compounds <½MRL	NA	NA	None
8/3/07	OP7790-MB	All target compounds <½MRL	NA	NA	None
8/3/07	OP7792-MB	All target compounds <½MRL	NA	NA	None
8/3/07	072507R	All target compounds <½MRL	NA	NA	None
8/3/07	072607R	All target compounds <½MRL	NA	NA	None

072507R and 072607R are rinsate blanks.
NA = Not applicable. MRL = Method reporting limit.

V-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Control Limit: 2,4-DCAA (34-179%)

- All samples met recovery criteria.

VI-Laboratory Control Samples
Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD LCS recovery limits are specified in Tables D-8 (aqueous) and D-9 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP7785-BS was used as a solid matrix LCS during the 8/2/07 run. All herbicides were within criteria, no data qualifiers were applied. Samples F51300-1 thru -16 and -25 were analyzed in conjunction with this LCS.

- Sample OP7790-BS was used as a aqueous LCS during the 8/3/07 run. All herbicides were within criteria, no data qualifiers were applied. Sample F51300-31 was analyzed in conjunction with this LCS.

- Sample OP7792-BS was used as a solid matrix LCS during the 8/2/07 run. All herbicides were within criteria, no data qualifiers were applied. Samples F51300-17 thru -24 and -26 thru -30 were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD MS/MSD recovery limits follow the LCS criteria specified in Tables D-8 (aqueous) and D-9 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Solid matrix MS/MSD analysis was performed on F51300-25. Dichloroprop (65%) had a low recovery in the MS – the dichloroprop results in associated samples have been qualified "J/UJ". 2,4,5-TP (Silvex), 2,4,5-T, and dalapon had high RPDs – no data qualification is performed on RPD data alone. All other herbicides met recovery and RPD criteria. Samples F51300-1 thru -16 and -25 were analyzed in conjunction with this MS/MSD.

- Aqueous MS/MSD analysis was performed on F51275-1 (an RFAAP sample analyzed in Accutest project F51275). Dinoseb (13%, 14%) had a low recovery in the MS & MSD, the dinoseb results in associated samples have been qualified "J/UJ". All other herbicides met recovery and RPD criteria. Sample F51300-31 was analyzed in conjunction with this LCS.

- Solid matrix MS/MSD analysis was performed on F51300-29. 2,4,5-TP (Silvex) (30%), 2,4,5-T (35%), dinoseb (0%, 0%), dalapon (0%, 0%), dichloroprop (49%), and 2,4-DB (44%) had low recoveries in the MS or both the MS & MSD – the results for these compounds in associated samples have been qualified "J/UJ". 2,4-D, 2,4,5-TP (Silvex), 2,4,5-T, dicamba, dichloroprop, and 2,4-DB had high RPDs – no data qualification is performed on RPD data alone. All other herbicides met recovery and RPD criteria. Samples F51300-17 thru -24 and -26 thru -30 were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included 59SB04C (F51300-9) & TMSB04C (F51300-10), 59SB02B (F51300-12) & TMSB02B (F51300-13), and 43SB10B (F51300-28) & TMSB10B (F51300-30). All compounds detected above the reporting limit (RL) met RPD criteria.

IX-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL is qualified as estimated, "J." All criteria were met. No qualifiers were applied.

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: OP7785-BS, 2,4-D

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where:
- Ax = Area response for the compound being measured
- Vt = Total volume of extract, taking into account dilutions (uL)
- DF = Dilution factor
- CF = Calibration Factor from initial calibration (area/pg)
- Vi = Volume of extract injected (uL)
- Ws = weight of sample (g)
- Ps = percent solids/100

Conc. µg/kg = (1643574 * 10000 * 1) / (9670 * 1 * 30.11 * 1 * 1000)
= 56.5 ug/kg

Reported Conc. = 56.6 µg/kg
%D = 0.2%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36495.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.3	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.3	5.4	ug/kg	
88-85-7	Dinoseb	ND	7.3	4.7	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.8	ug/kg	UJ
94-82-6	2,4-DB	ND	73	59	ug/kg	
93-65-2	MCPP	ND	180		ug/kg	UJ
94-74-6	MCPA	ND	180		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	90%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36496.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.5	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.5	5.6	ug/kg	
88-85-7	Dinoseb	ND	7.5	4.9	ug/kg	
75-99-0	Dalapon	ND	38	26	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	UJ
94-82-6	2,4-DB	ND	75	61	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	104%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36497.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	4.9	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	UJ
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	105%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36498.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.4	3.7	ug/kg	
1918-00-9	Dicamba	ND	7.4	5.5	ug/kg	
88-85-7	Dinoseb	ND	7.4	4.8	ug/kg	
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	10	ug/kg	UJ
94-82-6	2,4-DB	ND	74	60	ug/kg	
93-65-2	MCPP	ND	180		ug/kg	UJ
94-74-6	MCPA	ND	180		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	60%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36499.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.9	4.0	ug/kg	
1918-00-9	Dicamba	ND	7.9	5.9	ug/kg	
88-85-7	Dinoseb	ND	7.9	5.1	ug/kg	
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	UJ
94-82-6	2,4-DB	ND	79	65	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	104%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36520.D	1	08/03/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	UJ
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	105%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36503.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	UJ
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	98%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36504.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.9	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.9	5.9	ug/kg	
88-85-7	Dinoseb	ND	7.9	5.1	ug/kg	
75-99-0	Dalapon	ND	39	28	ug/kg	
120-36-5	Dichloroprop	ND	39	11	ug/kg	UJ
94-82-6	2,4-DB	ND	79	64	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	77%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36505.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	38	15	ug/kg		
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg		
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg		
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg		
88-85-7	Dinoseb	ND	7.6	4.9	ug/kg		
75-99-0	Dalapon	ND	38	27	ug/kg		
120-36-5	Dichloroprop	ND	38	10	ug/kg		UJ
94-82-6	2,4-DB	ND	76	62	ug/kg		
93-65-2	MCPP	ND	190		ug/kg		UJ
94-74-6	MCPA	ND	190		ug/kg		UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	95%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36506.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.8	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.8	5.9	ug/kg	
88-85-7	Dinoseb	ND	7.8	5.1	ug/kg	
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	11	ug/kg	UJ
94-82-6	2,4-DB	ND	78	64	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	103%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36507.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	37	15	ug/kg		
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg		
93-76-5	2,4,5-T	ND	7.4	3.7	ug/kg		
1918-00-9	Dicamba	ND	7.4	5.6	ug/kg		
88-85-7	Dinoseb	ND	7.4	4.8	ug/kg		
75-99-0	Dalapon	ND	37	26	ug/kg		
120-36-5	Dichloroprop	ND	37	10	ug/kg		UJ
94-82-6	2,4-DB	ND	74	61	ug/kg		
93-65-2	MCPP	ND	190		ug/kg		UJ
94-74-6	MCPA	ND	190		ug/kg		UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	103%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36508.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	8.0	4.0	ug/kg	
1918-00-9	Dicamba	ND	8.0	6.0	ug/kg	
88-85-7	Dinoseb	ND	8.0	5.2	ug/kg	
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	UJ
94-82-6	2,4-DB	ND	80	65	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	95%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36509.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	39	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	UJ
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	116%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36510.D	1	08/03/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	8.0	4.0	ug/kg	
1918-00-9	Dicamba	ND	8.0	6.0	ug/kg	
88-85-7	Dinoseb	ND	8.0	5.2	ug/kg	
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	UJ
94-82-6	2,4-DB	ND	80	65	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	127%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36511.D	1	08/03/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	38	15	ug/kg		
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg		
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg		
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg		
88-85-7	Dinoseb	ND	7.6	5.0	ug/kg		
75-99-0	Dalapon	ND	38	27	ug/kg		
120-36-5	Dichloroprop	ND	38	10	ug/kg		UJ
94-82-6	2,4-DB	ND	76	62	ug/kg		
93-65-2	MCPP	ND	190		ug/kg		UJ
94-74-6	MCPA	ND	190		ug/kg		UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	100%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36512.D	1	08/03/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	41	16	ug/kg		
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg		
93-76-5	2,4,5-T	ND	8.1	4.1	ug/kg		
1918-00-9	Dicamba	ND	8.1	6.1	ug/kg		
88-85-7	Dinoseb	ND	8.1	5.3	ug/kg		
75-99-0	Dalapon	ND	41	29	ug/kg		
120-36-5	Dichloroprop	ND	41	11	ug/kg		UJ
94-82-6	2,4-DB	ND	81	66	ug/kg		
93-65-2	MCPP	ND	200		ug/kg		UJ
94-74-6	MCPA	ND	200		ug/kg		UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	97%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36541.D	1	08/03/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q (DATA VAL QUALIFIER)
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.4	3.7	ug/kg	UJ
1918-00-9	Dicamba	ND	7.4	5.6	ug/kg	
88-85-7	Dinoseb	ND	7.4	4.8	ug/kg	UJ
75-99-0	Dalapon	ND	37	26	ug/kg	UJ
120-36-5	Dichloroprop	ND	37	10	ug/kg	UJ
94-82-6	2,4-DB	ND	74	61	ug/kg	UJ
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	99%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36544.D	1	08/04/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.2	3.6	ug/kg	UJ
1918-00-9	Dicamba	ND	7.2	5.4	ug/kg	
88-85-7	Dinoseb	ND	7.2	4.7	ug/kg	UJ
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.7	ug/kg	
94-82-6	2,4-DB	ND	72	59	ug/kg	
93-65-2	MCPP	ND	180		ug/kg	
94-74-6	MCPA	ND	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	59%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36564.D	1	08/06/07	ATX	08/02/07	T:OP7792	T:GGG1142
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.7	3.9	ug/kg	UJ
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	UJ
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	82%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36565.D	1	08/06/07	ATX	08/02/07	T:OP7792	T:GGG1142
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.7	3.9	ug/kg	UJ
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	UJ
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	78%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36566.D	1	08/06/07	ATX	08/02/07	T:OP7792	T:GGG1142
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	34	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	12	ug/kg	UJ
93-76-5	2,4,5-T	ND	6.9	3.4	ug/kg	UJ
1918-00-9	Dicamba	ND	6.9	5.1	ug/kg	
88-85-7	Dinoseb	ND	6.9	4.5	ug/kg	UJ
75-99-0	Dalapon	ND	34	24	ug/kg	
120-36-5	Dichloroprop	ND	34	9.3	ug/kg	
94-82-6	2,4-DB	ND	69	56	ug/kg	
93-65-2	MCPP	ND	170		ug/kg	
94-74-6	MCPA	ND	170		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	60%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36545.D	1	08/04/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	14	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.7	3.9	ug/kg	UJ
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	UJ
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	66%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36547.D	1	08/04/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	UJ
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	5.0	ug/kg	UJ
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	73%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.24

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36567.D	1	08/06/07	ATX	08/02/07	T:OP7792	T:GGG1142
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.4	3.7	ug/kg	UJ
1918-00-9	Dicamba	ND	7.4	5.5	ug/kg	
88-85-7	Dinoseb	ND	7.4	4.8	ug/kg	UJ
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	9.9	ug/kg	
94-82-6	2,4-DB	ND	74	60	ug/kg	
93-65-2	MCPP	ND	180		ug/kg	
94-74-6	MCPA	ND	180		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	54%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36515.D	1	08/03/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	UJ
94-82-6	2,4-DB	ND	77	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	UJ
94-74-6	MCPA	ND	190		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	141%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36568.D	1	08/06/07	ATX	08/02/07	T:OP7792	T:GGG1142
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	UJ
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	4.9	ug/kg	UJ
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	94%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36569.D	1	08/06/07	ATX	08/02/07	T:OP7792	T:GGG1142
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	U
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	U
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	4.9	ug/kg	U
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	38%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36548.D	1	08/04/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	UJ
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	5.0	ug/kg	UJ
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	72%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	**Date Sampled:**	07/25/07
Matrix:	SO - Soil	**Date Received:**	07/26/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36549.D	1	08/04/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.9	4.0	ug/kg	UJ
1918-00-9	Dicamba	ND	7.9	6.0	ug/kg	
88-85-7	Dinoseb	ND	7.9	5.2	ug/kg	UJ
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	
94-82-6	2,4-DB	ND	79	65	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	
94-74-6	MCPA	ND	200		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	100%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36550.D	1	08/04/07	ATX	08/02/07	T:OP7792	T:GGG1141
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	UJ
1918-00-9	Dicamba	ND	7.7	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	UJ
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	77	62	ug/kg	
93-65-2	MCPP	ND	190		ug/kg	
94-74-6	MCPA	ND	190		ug/kg	

DATA VAL QUALIFIER

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	92%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	**Date Sampled:**	07/25/07
Matrix:	AQ - Equipment Blank	**Date Received:**	07/26/07
Method:	SW846 8151 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36537.D	1	08/03/07	ATX	07/31/07	T:OP7790	T:GGG1141
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q	DATA VAL QUALIFIER
94-75-7	2,4-D	ND	1.5	0.80	ug/l		
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l		
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l		
1918-00-9	Dicamba	ND	0.20	0.080	ug/l		
88-85-7	Dinoseb	ND	0.20	0.090	ug/l		UJ
75-99-0	Dalapon	ND	1.0	1.0	ug/l		
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l		
94-82-6	2,4-DB	ND	2.0	1.9	ug/l		
93-65-2	MCPP	ND	50		ug/l		UJ
94-74-6	MCPA	ND	50		ug/l		UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	66%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. Project G383-585
(Accutest SDG F51300)

DATE: January 8, 2008

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. The samples were analyzed for Dioxin and Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of 1 aqueous and 17 soil samples were validated, as follows:

Field Sample ID	Lab Sample ID	**Field Sample ID**	Lab Sample ID
59SB06A	F51300-1	TMSB04C	F51300-10
59SB06B	F51300-2	59SB02A	F51300-11
59SB06C	F51300-3	59SB02B	F51300-12
59SB05A	F51300-4	TMSB02B	F51300-13
59SB05B	F51300-5	59SB02C	F51300-14
59SB05C	F51300-6	43SB08A	F51300-21
59SB04A	F51300-7	43SB08B	F51300-22
59SB04B	F51300-8	43SB08C	F51300-23
59SB04C	F51300-9	072507R	F51300-31

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
X		Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

1/8/08

Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-587
(Accutest SDG F51300)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Dioxin and furan samples must be shipped @4°C ± 2°C, with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied. Accutest shipped the dioxin aliquots to SGS Paradigm Analytical Laboratories on 7/27/07, and they were received by SGS Paradigm on 7/31/07 at 4.6°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/25/07; the water sample was extracted on 8/1/07; the soil samples were extracted on 8/5/07, 8/7/07, & 8/13/07; the water sample was analyzed on 8/3/07; and the soil samples were analyzed on 8/8/07, 8/9/07, 8/10/07, & 8/20/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. pg/g	Action Level pg/g	B qualified samples
8/2/07	LMB14393	All	ND	NA	None
8/8/07	LMB14398	OCDD	3.63	36.3	F51300-23
8/8/07	LMB14398	1,2,3,4,6,7,8-HpCDF	0.966	4.83	F51300-1 thru -5, -7 thru -14, -23
8/8/07	LMB14398	OCDF	1.78	17.8	F51300-1, -4, -6, -7, -8, -10 thru -14, -23
8/9/07	LMB14402	1,2,3,4,6,7,8-HpCDD	0.446	2.23	F51300-9, -10, -23
8/9/07	LMB14402	OCDD	2.84	28.4	None
8/9/07	LMB14402	1,2,3,4,7,8-HxCDF	0.258	1.29	F51300-4, -5, -9, -10, -12, -13, -14, -21
8/9/07	LMB14402	1,2,3,6,7,8-HxCDF	0.126	0.63	F51300-4, -9, -11, -21
8/9/07	LMB14402	1,2,3,4,6,7,8-HpCDF	1.23	6.15	F51300-1 thru -5, -7 thru -14, -23
8/9/07	LMB14402	OCDF	1.95	19.5	F51300-1, -4, -6, -7, -8, -10 thru -14, -21 -23
8/16/07	LMB14410	All	ND	NA	None
8/3/07	F51300-31	1,2,3,4,6,7,8-HpCDF	0.00849 ng/L	0.000017	None
8/3/07	F51300-31	OCDF	0.0142 ng/L	0.000028	None
8/3/07	F51353-8	1,2,3,4,6,7,8-HpCDF	0.0137 ng/L	0.000027	None
8/3/07	F51353-8	OCDF	0.0254 ng/L	0.000051	None

F51300-31 and F51353-8 are rinsate blanks
J = Estimated value <MRL and >EDL.

III-Instrument Performance Check
Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

  - The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
  - The signal to noise ratio ≥10% for all target ions;
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During initial calibration performed on 07/10/07 using instrument HRMS1, all compounds met criteria. No qualifiers were applied. Sample F51300-2, -3, was analyzed in conjunction with this initial calibration.

- During initial calibration performed on 11/2/06 using instrument HRMS3, all compounds met criteria. No qualifiers were applied. Samples F51300-1, -4 thru -14, and -21 thru -23 were analyzed in conjunction with this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

  - The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
  - The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During the continuing calibration performed on 8/2/07 @1603 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed after this continuing calibration.

- During the continuing calibration performed on 8/3/07 @0324 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample F51300-31 was analyzed before this continuing calibration.

- During the continuing calibration performed on 8/8/07 @0947 on instrument HRMS3, 13C-1,2,3,4-TCDD (38.9%) and 13C-1,2,3,7,8,9-HxCDD (35.8%) had high %D. These labeled standards are injection standards only, the standards used for quantitation met criteria, so no data qualifiers were applied. All other standards met criteria. No field samples were analyzed after this continuing calibration.

- During the continuing calibration performed on 8/8/07 @1436 on instrument HRMS3, 13C-1,2,3,4-TCDD (46.8%) and 13C-1,2,3,7,8,9-HxCDD (47.6%) had high %D. These labeled standards are injection standards only, the standards used for quantitation met criteria, so no data qualifiers were applied. All other standards met criteria. Samples F51300-1, -4, -5, -6, -7, -8, were analyzed after this continuing calibration.

- During the continuing calibration performed on 8/9/07 @0159 on instrument HRMS3, 13C-1,2,3,4-TCDD (46.6 %) and 13C-1,2,3,7,8,9-HxCDD (48.0%) had high %D. These labeled standards are injection standards only, the standards used for quantitation met criteria, so no data qualifiers were applied. All other standards met criteria. Samples F51300-1, -4, -5, -6, -7, -8, were analyzed before this continuing calibration, while samples F51300-9 and -10 were analyzed after this continuing calibration.

- During the continuing calibration performed on 8/9/07 @1323 on instrument HRMS3, all criteria were met. No qualifiers were applied. Samples F51300-9 and -10 were analyzed before this continuing calibration.

- During the continuing calibration performed on 8/9/07 @2234 on instrument HRMS3, 13C-1,2,3,4-TCDD (37.2%) and 13C-1,2,3,7,8,9-HxCDD (36.4%) had high %D. These labeled standards are injection standards only, the standards used for quantitation met criteria, so no data qualifiers were applied. All other standards met criteria. Samples F51300-11 thru -17 were analyzed after this continuing calibration.

- During the continuing calibration performed on 8/10/07 @0555 on instrument HRMS3, 13C-1,2,3,4-TCDD (36.6%) and 13C-1,2,3,7,8,9-HxCDD (31.0%) had high %D. These labeled standards are injection standards only, the standards used for quantitation met criteria, so no data qualifiers were applied. All other standards met criteria. Samples F51300-11 thru -17 were analyzed before this continuing calibration.

- During the continuing calibration performed on 8/20/07 @0949 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples F51300-2 and -3 were analyzed after this continuing calibration.

- During the continuing calibration performed on 8/20/07 @2111 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples F51300-2 and -3 were analyzed before this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All field samples met criteria. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All field samples met criteria. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within $\pm$35% when spiked at the method quantitation limit and within $\pm$30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within $\pm$20% when spiked above 20 times the method quantitation limit.

- Sample OPR14393 was used as the aqueous LCS/LCSD during the 8/2/07 analytical run. All criteria were met. No qualifiers were applied. Sample F51300-31 was were analyzed in conjunction with this LCS.

- Sample OPR14398 was used as the solid LCS/LCSD during the 8/8/07 analytical run. All criteria were met. No qualifiers were applied. Samples F51300-1, -4 thru -14, and -21 thru -23 were analyzed in conjunction with this LCS.

- Sample OPR14402 was used as the solid LCS/LCSD during the 8/9/07 analytical run. All criteria were met. No qualifiers were applied. Samples F51300-1, -4 thru -14, and -21 thru -23 were analyzed in conjunction with this LCS.

- Sample OPR14410 was used as the solid LCS/LCSD during the 8/16/07 analytical run. All criteria were met. No qualifiers were applied. Samples F51300-2 and -3 were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD $\leq$20%.

- MS/MSD analysis was not performed on an RFAAP sample. No data qualification was required.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included F51300-9 & F51300-10, and F51300-12 & F51300-13. Analytes with high RPDs included OCDD (83%) in duplicate pair F51300-9/10; and 1,2,3,4,6,7,8-HpCDD (119%), OCDD (133%), 1,2,3,4,6,7,8-HpCDF (54%), and OCDF (85%). All results for these four compounds have been qualified "J/UJ".

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". When the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". If of quantitation interference was present (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- The 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-1 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

- The 1,2,3,4,6,7,8-HpCDF result in F51300-2 has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit, while the OCDD result has been qualified "J" as estimated because the detected amount exceeded the Upper Calibration Limit.

- The 1,2,3,4,6,7,8-HpCDF result in F51300-3 has been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The lab reported 1,2,3,4,7,8,9-HpCDF as an EMPC, but with a EMPC of 0.00 pg/g – the result should therefore be used as a non-detect (ND) at an EDL of 1.22 pg/g.

- The 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-4 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,4,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, and 1,2,3,4,7,8-HxCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required. The OCDD result has been qualified "J" as estimated because the detected amount exceeded the Upper Calibration Limit.

- The 2,3,7,8-TCDF, 1,2,3,4,7,8-HxCDF, and 1,2,3,4,6,7,8-HpCDF results in F51300-5 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for 2,3,7,8-TCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The 2,3,7,8-TCDF and OCDF results in F51300-6 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for 2,3,7,8-TCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-7 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for 1,2,3,7,8,9-HxCDD did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required. The OCDD result has been qualified "J" as estimated because the detected amount exceeded the Upper Calibration Limit.

- The 1,2,3,7,8,9-HxCDD, 2,3,7,8-TCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-8 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDF, and OCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 2,3,7,8-TCDD, 1,2,3,4,6,7,8-HpCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, and 1,2,3,4,6,7,8-HpCDF results in F51300-9 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, and 1,2,3,4,7,8-HxCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 1,2,3,4,6,7,8-HpCDD, 2,3,7,8-TCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, OCDF results in F51300-10 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,4,6,7,8-HpCDD, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF results in F51300-11 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 2,3,7,8-TCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-12 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for 2,3,7,8-TCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The 1,2,3,7,8,9-HxCDD, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-13 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The OCDD result has been qualified "J" as estimated because the detected amount exceeded the Upper Calibration Limit.

- The 1,2,3,6,7,8-HxCDD, 1,2,3,4,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-14 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for 1,2,3,6,7,8-HxCDD did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, and 1,2,3,4,7,8,9-HpCDF results in F51300-21 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, and 1,2,3,4,7,8,9-HpCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, and 1,2,3,4,6,7,8-HpCDF results in F51300-22 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 2,3,7,8-TCDD and 1,2,3,7,8-PeCDD did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 1,2,3,4,6,7,8-HpCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-23 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,7,8-PeCDF and OCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51300-31 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit.

Sample: F51300-3, OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
Avg. RRF = calculated mean relative response factor for the unlabeled analyte.
Ws = weight of sample (g)
Ps = percent solids/100

$$\text{Conc. (ng/L)} = \frac{(A(x)) * Q(is) * 1000}{A(is) * \text{Avg. RRF} * Ws * Ps} = \frac{(232000000) * 4.0 * 1000}{(41200000) * 1.0783 * 11.94 * 0.824} = 2120 \text{ pg/g}$$

Reported Value = 2120 pg/g
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Method 8290
F51300-1
Accutest

DATA VAL

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier	QUALIFIER
2,3,7,8-TCDD	ND	0.369					
1,2,3,7,8-PeCDD	ND	0.475					
1,2,3,4,7,8-HxCDD	ND	0.475					
1,2,3,6,7,8-HxCDD	ND	0.475					
1,2,3,7,8,9-HxCDD	ND	0.475					
1,2,3,4,6,7,8-HpCDD	9.48			39.91	1.03		J
OCDD	441			44.03	0.91		J
2,3,7,8-TCDF	0.340			30.25	0.69	A	J
1,2,3,7,8-PeCDF	ND	0.475					
2,3,4,7,8-PeCDF	ND	0.475					
1,2,3,4,7,8-HxCDF	ND	0.475					
1,2,3,6,7,8-HxCDF	ND	0.475					
2,3,4,6,7,8-HxCDF	ND	0.475					
1,2,3,7,8,9-HxCDF	ND	0.475					
1,2,3,4,6,7,8-HpCDF	0.838			38.68	1.10	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.475					
OCDF	2.11			44.32	0.89	A	BJ
Total TCDDs	ND	0.369					
Total PeCDDs	ND	0.475					
Total HxCDDs	0.927		2.01				
Total HpCDDs	29.5						
Total TCDFs	0.340						
Total PeCDFs	ND	0.475					
Total HxCDFs	ND	0.475	0.450				
Total HpCDFs	2.03						
WHO-2005 TEQ (ND=0)	0.270		0.270				
WHO-2005 TEQ (ND=½)	0.939		0.939				

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-1		Weight / Volume:	11.59 g
			Solids / Lipids:	90.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14398
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-1B		Filename:	c08aug07a_2-6
Collection Date/Time:	07/25/07	7:25	Retchk:	c08aug07a-7
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a-7
Extraction Date:	08/05/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/08/07	19:33	Initial Cal:	m8290-c110206a

Method 8290
F51300-2
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount pg/g	EDL pg/g	EMPC pg/g	RT (min.)	Ratio	Qualifier	
2,3,7,8-TCDD	ND	0.532					
1,2,3,7,8-PeCDD	ND	0.637					
1,2,3,4,7,8-HxCDD	ND	0.859					
1,2,3,6,7,8-HxCDD	ND	0.874					
1,2,3,7,8,9-HxCDD	ND	0.887					
1,2,3,4,6,7,8-HpCDD	26.7			40:42	1.07		J
OCDD	4990			45:15	0.89	E	J
2,3,7,8-TCDF	ND	0.379					
1,2,3,7,8-PeCDF	ND	0.552					
2,3,4,7,8-PeCDF	ND	0.552					
1,2,3,4,7,8-HxCDF	ND	0.568					
1,2,3,6,7,8-HxCDF	ND	0.552					
2,3,4,6,7,8-HxCDF	ND	0.565					
1,2,3,7,8,9-HxCDF	ND	0.658					
1,2,3,4,6,7,8-HpCDF	0.845			39:24	1.11	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	1.14					
OCDF	ND	2.69					UJ
Total TCDDs	ND	0.532					
Total PeCDDs	ND	0.637					
Total HxCDDs	1.81						
Total HpCDDs	53.6						
Total TCDFs	ND	0.379					
Total PeCDFs	ND	0.552					
Total HxCDFs	ND	0.658					
Total HpCDFs	0.845						
WHO-2005 TEQ (ND=0)	1.77		1.77				
WHO-2005 TEQ (ND=½)	2.72		2.72				

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-2		Weight / Volume:	10.52 g
			Solids / Lipids:	86.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14410
Project ID:	G383-585		Instrument:	HRMS1
Sample ID:	G383-585-2C		Filename:	a18aug07a_5-8
Collection Date/Time:	07/25/07	7:35	Retchk:	a18aug07a_4-14
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	a18aug07a_4-14
Extraction Date:	08/13/07		End ConCal:	a18aug07a_5-14
Analysis Date/Time:	08/20/07	16:21	Initial Cal:	m8290-071007a

Method 8290
F51300-3
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount pg/g	EDL pg/g	EMPC pg/g	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.528						
1,2,3,7,8-PeCDD	ND	0.579						
1,2,3,4,7,8-HxCDD	ND	0.852						
1,2,3,6,7,8-HxCDD	ND	0.867						
1,2,3,7,8,9-HxCDD	ND	0.880						
1,2,3,4,6,7,8-HpCDD	11.0			40:42	1.02			J
OCDD	2120			45:15	0.90			J
2,3,7,8-TCDF	ND	0.357						
1,2,3,7,8-PeCDF	ND	0.508						
2,3,4,7,8-PeCDF	ND	0.508						
1,2,3,4,7,8-HxCDF	ND	0.575						
1,2,3,6,7,8-HxCDF	ND	0.542						
2,3,4,6,7,8-HxCDF	ND	0.571						
1,2,3,7,8,9-HxCDF	ND	0.665						
1,2,3,4,6,7,8-HpCDF	EMPC	0.959	0.821	39:22	0.81	*	A	BJ
1,2,3,4,7,8,9-HpCDF	EMPC	1.22	0.00	0:00	0.00	*		U
OCDF	ND	3.09						UJ
Total TCDDs	ND	0.528						
Total PeCDDs	ND	0.579						
Total HxCDDs	ND	0.880	0.648					
Total HpCDDs	25.3							
Total TCDFs	ND	0.357						
Total PeCDFs	ND	0.508						
Total HxCDFs	ND	0.665						
Total HpCDFs	1.53							
WHO-2005 TEQ (ND=0)	0.746		0.754					
WHO-2005 TEQ (ND=½)	1.66		1.66					

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-3		Weight / Volume:	11.94 g
			Solids / Lipids:	82.4 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14410
Project ID:	G383-585		Instrument:	HRMS1
Sample ID:	G383-585-3C		Filename:	a18aug07a_5-9
Collection Date/Time:	07/25/07	7:45	Retchk:	a18aug07a_4-14
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	a18aug07a_4-14
Extraction Date:	08/13/07		End ConCal:	a18aug07a_5-14
Analysis Date/Time:	08/20/07	17:09	Initial Cal:	m8290-071007a

Method 8290
F51300-4
Accutest

DATA VAL
QUALIFIER

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.240						
1,2,3,7,8-PeCDD	ND	0.548						
1,2,3,4,7,8-HxCDD	EMPC	0.548	0.235	36.57	0.68	*	A	J
1,2,3,6,7,8-HxCDD	0.318			36.67	1.33		A	
1,2,3,7,8,9-HxCDD	EMPC	0.548	0.432	36.89	1.45	*	A	
1,2,3,4,6,7,8-HpCDD	51.0			39.90	1.09			
OCDD	5350			44.04	0.91		E	
2,3,7,8-TCDF	ND	0.243						
1,2,3,7,8-PeCDF	ND	0.548						
2,3,4,7,8-PeCDF	ND	0.548						
1,2,3,4,7,8-HxCDF	EMPC	0.548	0.423	35.87	0.91	*	A	BJ
1,2,3,6,7,8-HxCDF	0.125			35.97	1.17		A	BJ
2,3,4,6,7,8-HxCDF	ND	0.548						
1,2,3,7,8,9-HxCDF	ND	0.548						
1,2,3,4,6,7,8-HpCDF	2.00			38.65	1.05		A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.548						
OCDF	2.83			44.32	0.84		A	BJ
Total TCDDs	ND	0.240						
Total PeCDDs	ND	0.548	0.248					
Total HxCDDs	2.68		3.97					
Total HpCDDs	133							
Total TCDFs	ND	0.243	0.189					
Total PeCDFs	ND	0.548						
Total HxCDFs	0.316		0.739					
Total HpCDFs	2.00		2.33					
WHO-2005 TEQ (ND=0)	2.18		2.29					
WHO-2005 TEQ (ND=½)	2.82		2.84					

Client Information			**Sample Information**		
Project Name:	F51300		Report Basis:	Dry	
			Matrix:	Solid	
Sample ID:	F51300-4		Weight / Volume:	12.68 g	
			Solids / Lipids:	72.0	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14398	
Project ID:	G383-585		Instrument:	HRMS3	
Sample ID:	G383-585-4B		Filename:	c08aug07a_2-9	
Collection Date/Time:	07/25/07	8:00	Retchk:	c08aug07a-7	
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a-7	
Extraction Date:	08/05/07		End ConCal:	c08aug07a_2-14	
Analysis Date/Time:	08/08/07	21:57	Initial Cal:	m8290-c110206a	

Method 8290
F51300-5
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.219					
1,2,3,7,8-PeCDD	ND	0.559					
1,2,3,4,7,8-HxCDD	ND	0.559					
1,2,3,6,7,8-HxCDD	ND	0.559					
1,2,3,7,8,9-HxCDD	ND	0.559					
1,2,3,4,6,7,8-HpCDD	11.8			39.90	1.07		J
OCDD	1830			44.03	0.91		J
2,3,7,8-TCDF	EMPC	0.264	0.320	30.22	0.51 *	A	J
1,2,3,7,8-PeCDF	ND	0.559					
2,3,4,7,8-PeCDF	ND	0.559					
1,2,3,4,7,8-HxCDF	0.137			35.88	1.22	A	BJ
1,2,3,6,7,8-HxCDF	ND	0.559					
2,3,4,6,7,8-HxCDF	ND	0.559					
1,2,3,7,8,9-HxCDF	ND	0.559					
1,2,3,4,6,7,8-HpCDF	0.723			38.67	1.19	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.559					
OCDF	ND	1.12					UJ
Total TCDDs	ND	0.219					
Total PeCDDs	ND	0.559					
Total HxCDDs	ND	0.559	0.911				
Total HpCDDs	31.9						
Total TCDFs	0.255		0.575				
Total PeCDFs	ND	0.559					
Total HxCDFs	0.137		0.273				
Total HpCDFs	0.985						
WHO-2005 TEQ (ND=0)	0.688		0.720				
WHO-2005 TEQ (ND=½)	1.35		1.37				

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-5		Weight / Volume:	11.14 g
			Solids / Lipids:	80.2 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-5B		Filename:	c08aug07a_2-10
Collection Date/Time:	07/25/07	8:10	Retchk:	c08aug07a-7
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a-7
Extraction Date:	08/07/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/08/07	22:46	Initial Cal:	m8290-c110206a

Method 8290
F51300-6
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.199						
1,2,3,7,8-PeCDD	ND	0.525						
1,2,3,4,7,8-HxCDD	ND	0.525						
1,2,3,6,7,8-HxCDD	ND	0.525						
1,2,3,7,8,9-HxCDD	ND	0.525						
1,2,3,4,6,7,8-HpCDD	7.69			39.91	1.02			J
OCDD	894			44.03	0.90			J
2,3,7,8-TCDF	EMPC	0.212	0.181	30.19	0.32	*	A	J
1,2,3,7,8-PeCDF	ND	0.525						
2,3,4,7,8-PeCDF	ND	0.525						
1,2,3,4,7,8-HxCDF	ND	0.525						
1,2,3,6,7,8-HxCDF	ND	0.525						
2,3,4,6,7,8-HxCDF	ND	0.525						
1,2,3,7,8,9-HxCDF	ND	0.525						
1,2,3,4,6,7,8-HpCDF	ND	0.525						UJ
1,2,3,4,7,8,9-HpCDF	ND	0.525						
OCDF	0.963			44.34	0.97		A	BJ
Total TCDDs	ND	0.199						
Total PeCDDs	ND	0.525						
Total HxCDDs	ND	0.525	0.462					
Total HpCDDs	19.3							
Total TCDFs	0.174		0.355					
Total PeCDFs	ND	0.525						
Total HxCDFs	0.172							
Total HpCDFs	ND	0.525						
WHO-2005 TEQ (ND=0)	0.345		0.363					
WHO-2005 TEQ (ND=½)	0.994		1.00					

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-6		Weight / Volume:	11.46 g
			Solids / Lipids:	83.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-6B		Filename:	c08aug07a_2-11
Collection Date/Time:	07/25/07	8:20	Retchk:	c08aug07a-7
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a-7
Extraction Date:	08/07/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/08/07	23:34	Initial Cal:	m8290-c110206a

Method 8290
F51300-7
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.294					
1,2,3,7,8-PeCDD	ND	0.528					
1,2,3,4,7,8-HxCDD	ND	0.528					
1,2,3,6,7,8-HxCDD	0.558			36.69	1.31		A
1,2,3,7,8,9-HxCDD	EMPC	0.543	0.682	36.91	1.50	*	A
1,2,3,4,6,7,8-HpCDD	46.4			39.90	1.03		
OCDD	5980			44.04	0.90		E
2,3,7,8-TCDF	0.378			30.22	0.76		A
1,2,3,7,8-PeCDF	ND	0.528					
2,3,4,7,8-PeCDF	ND	0.528					
1,2,3,4,7,8-HxCDF	ND	0.528					
1,2,3,6,7,8-HxCDF	ND	0.528					
2,3,4,6,7,8-HxCDF	ND	0.528					
1,2,3,7,8,9-HxCDF	ND	0.528					
1,2,3,4,6,7,8-HpCDF	2.19			38.68	1.07		A
1,2,3,4,7,8,9-HpCDF	ND	0.528					
OCDF	5.17			44.31	0.76		A
Total TCDDs	ND	0.294					
Total PeCDDs	0.714		1.04				
Total HxCDDs	4.20		5.28				
Total HpCDDs	125						
Total TCDFs	0.378		0.860				
Total PeCDFs	ND	0.528	0.177				
Total HxCDFs	1.02		1.42				
Total HpCDFs	5.52						
WHO-2005 TEQ (ND=0)	2.38		2.44				
WHO-2005 TEQ (ND=½)	3.03		3.08				

DATA VAL QUALIFIER

J

BJ

BJ

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-7		Weight / Volume:	11.29 g
			Solids / Lipids:	83.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-7B		Filename:	c08aug07a_2-12
Collection Date/Time:	07/25/07	8:15	Retchk:	c08aug07a-7
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a-7
Extraction Date:	08/07/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/09/07	0:23	Initial Cal:	m8290-c110206a

Method 8290
F51300-8
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.220					
1,2,3,7,8-PeCDD	ND	0.515					
1,2,3,4,7,8-HxCDD	ND	0.515					
1,2,3,6,7,8-HxCDD	ND	0.515					
1,2,3,7,8,9-HxCDD	EMPC	0.515	0.233	36.92	0.93	*	A
1,2,3,4,6,7,8-HpCDD	21.2			39.91	1.03		
OCDD	2990			44.04	0.89		
2,3,7,8-TCDF	0.328			30.25	0.85		A
1,2,3,7,8-PeCDF	ND	0.515					
2,3,4,7,8-PeCDF	ND	0.515					
1,2,3,4,7,8-HxCDF	ND	0.515					
1,2,3,6,7,8-HxCDF	ND	0.515					
2,3,4,6,7,8-HxCDF	ND	0.515					
1,2,3,7,8,9-HxCDF	ND	0.515					
1,2,3,4,6,7,8-HpCDF	EMPC	0.515	0.389	38.68	0.82	*	A
1,2,3,4,7,8,9-HpCDF	ND	0.515					
OCDF	EMPC	1.03	0.661	44.30	1.08	*	A
Total TCDDs	ND	0.220					
Total PeCDDs	ND	0.515	0.124				
Total HxCDDs	1.26		1.50				
Total HpCDDs	61.3						
Total TCDFs	0.328		0.649				
Total PeCDFs	ND	0.515					
Total HxCDFs	0.103						
Total HpCDFs	ND	0.515	0.707				
WHO-2005 TEQ (ND=0)	1.14		1.17				
WHO-2005 TEQ (ND=½)	1.78		1.78				

DATA VAL QUALIFIER

J

BJ

BJ

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-8		Weight / Volume:	12.15 g
			Solids / Lipids:	79.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-8B		Filename:	c08aug07a_2-13
Collection Date/Time:	07/25/07	8:25	Retchk:	c08aug07a-7
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a-7
Extraction Date:	08/07/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/09/07	1:11	Initial Cal:	m8290-c110206a

Method 8290
F51300-9
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	0.231	0.166	31.02	0.35	*	A
1,2,3,7,8-PeCDD	ND	0.531					
1,2,3,4,7,8-HxCDD	ND	0.531					
1,2,3,6,7,8-HxCDD	ND	0.531					
1,2,3,7,8,9-HxCDD	ND	0.531					
1,2,3,4,6,7,8-HpCDD	1.14			39.91	1.01		A
OCDD	56.8			44.04	0.93		
2,3,7,8-TCDF	EMPC	0.230	0.272	30.21	1.08	*	A
1,2,3,7,8-PeCDF	EMPC	0.531	0.0807	33.23	2.50	*	A
2,3,4,7,8-PeCDF	ND	0.531					
1,2,3,4,7,8-HxCDF	EMPC	0.531	0.159	35.90	1.60	*	A
1,2,3,6,7,8-HxCDF	0.0807			36.00	1.42		A
2,3,4,6,7,8-HxCDF	ND	0.531					
1,2,3,7,8,9-HxCDF	ND	0.531					
1,2,3,4,6,7,8-HpCDF	0.593			38.69	1.04		A
1,2,3,4,7,8,9-HpCDF	ND	0.531					
OCDF	ND	1.06					
Total TCDDs	ND	0.231	0.166				
Total PeCDDs	ND	0.531					
Total HxCDDs	ND	0.531					
Total HpCDDs	2.45						
Total TCDFs	ND	0.230	0.272				
Total PeCDFs	ND	0.531	0.0807				
Total HxCDFs	0.198		0.395				
Total HpCDFs	0.807						
WHO-2005 TEQ (ND=0)	0.0424		0.254				
WHO-2005 TEQ (ND=½)	0.685		0.735				

DATA VAL QUALIFIER
J
BJ
J
J
J
BJ
BJ
BJ
UJ

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-9		Weight / Volume:	11.42 g
			Solids / Lipids:	82.5 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-9B		Filename:	c08aug07a_3-4
Collection Date/Time:	07/25/07	8:35	Retchk:	c08aug07a_2-14
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_2-14
Extraction Date:	08/07/07		End ConCal:	c08aug07a_3-14
Analysis Date/Time:	08/09/07	5:20	Initial Cal:	m8290-c110206a

Method 8290
F51300-10
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.170						
1,2,3,7,8-PeCDD	ND	0.533						
1,2,3,4,7,8-HxCDD	ND	0.533						
1,2,3,6,7,8-HxCDD	ND	0.533						
1,2,3,7,8,9-HxCDD	ND	0.533						
1,2,3,4,6,7,8-HpCDD	EMPC	0.533	1.38	39.89	1.24	*	A	BJ
OCDD	138			44.02	0.87			J
2,3,7,8-TCDF	0.258			30.23	0.75		A	J
1,2,3,7,8-PeCDF	ND	0.533						
2,3,4,7,8-PeCDF	EMPC	0.533	0.0746	33.83	1.30	*	A	J
1,2,3,4,7,8-HxCDF	EMPC	0.533	0.141	35.88	0.79	*	A	BJ
1,2,3,6,7,8-HxCDF	ND	0.533						
2,3,4,6,7,8-HxCDF	ND	0.533						
1,2,3,7,8,9-HxCDF	ND	0.533						
1,2,3,4,6,7,8-HpCDF	EMPC	0.533	0.449	38.68	0.86	*	A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.533						
OCDF	1.16			44.32	0.80		A	BJ
Total TCDDs	ND	0.170						
Total PeCDDs	ND	0.533	0.102					
Total HxCDDs	ND	0.533						
Total HpCDDs	2.22		3.60					
Total TCDFs	0.354							
Total PeCDFs	ND	0.533	0.0746					
Total HxCDFs	ND	0.533	0.241					
Total HpCDFs	ND	0.533	0.449					
WHO-2005 TEQ (ND=0)	0.0675		0.122					
WHO-2005 TEQ (ND=½)	0.701		0.644					

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-10		Weight / Volume:	11.59 g
			Solids / Lipids:	81.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-10B		Filename:	c08aug07a_3-5
Collection Date/Time:	07/25/07	8:35	Retchk:	c08aug07a_2-14
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_2-14
Extraction Date:	08/07/07		End ConCal:	c08aug07a_3-14
Analysis Date/Time:	08/09/07	6:08	Initial Cal:	m8290-c110206a

Method 8290
F51300-11
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.137					
1,2,3,7,8-PeCDD	EMPC	0.446	0.119	34.01	0.84	*	A
1,2,3,4,7,8-HxCDD	EMPC	0.446	0.148	36.58	0.90	*	A
1,2,3,6,7,8-HxCDD	EMPC	0.446	0.310	36.66	0.92	*	A
1,2,3,7,8,9-HxCDD	0.308			36.90	1.36		A
1,2,3,4,6,7,8-HpCDD	14.8			39.89	1.12		
OCDD	736			44.03	0.91		
2,3,7,8-TCDF	EMPC	0.148	0.157	30.23	1.86	*	A
1,2,3,7,8-PeCDF	EMPC	0.446	0.291	33.21	1.97	*	A
2,3,4,7,8-PeCDF	0.282			33.81	1.34		A
1,2,3,4,7,8-HxCDF	1.92			35.87	1.40		A
1,2,3,6,7,8-HxCDF	0.683			35.96	1.07		A
2,3,4,6,7,8-HxCDF	0.246			36.46	1.06		A
1,2,3,7,8,9-HxCDF	0.121			37.24	1.26		A
1,2,3,4,6,7,8-HpCDF	3.51			38.67	1.02		A
1,2,3,4,7,8,9-HpCDF	0.287			40.57	0.92		A
OCDF	6.93			44.31	0.93		A
Total TCDDs	ND	0.137	0.0606				
Total PeCDDs	0.504		0.704				
Total HxCDDs	2.91		3.62				
Total HpCDDs	43.3						
Total TCDFs	0.225		1.24				
Total PeCDFs	0.877		2.01				
Total HxCDFs	5.71						
Total HpCDFs	8.43		8.60				
WHO-2005 TEQ (ND=0)	0.821		1.01				
WHO-2005 TEQ (ND=½)	1.17		1.08				

DATA VAL QUALIFIER

J
J
J
J
BJ
J
J
BJ
J
BJ

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-11		Weight / Volume:	14.27 g
			Solids / Lipids:	78.6 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-11B		Filename:	c08aug07a_5-2
Collection Date/Time:	07/25/07	8:50	Retchk:	c08aug07a_4-10
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9
Analysis Date/Time:	08/10/07	0:17	Initial Cal:	m8290-c110206a

Method 8290
F51300-12
Accutest

Analytical Data Summary Sheet

DAM VAL QUALIFIER

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.198						
1,2,3,7,8-PeCDD	ND	0.619						
1,2,3,4,7,8-HxCDD	ND	0.619						
1,2,3,6,7,8-HxCDD	ND	0.619						
1,2,3,7,8,9-HxCDD	ND	0.619						
1,2,3,4,6,7,8-HpCDD	9.87			39.90	1.08			J
OCDD	1490			44.03	0.90			J
2,3,7,8-TCDF	EMPC	0.182	0.260	30.25	0.92	*	A	J
1,2,3,7,8-PeCDF	ND	0.619						
2,3,4,7,8-PeCDF	ND	0.619						
1,2,3,4,7,8-HxCDF	0.144			35.87	1.12		A	BJ
1,2,3,6,7,8-HxCDF	ND	0.619						
2,3,4,6,7,8-HxCDF	ND	0.619						
1,2,3,7,8,9-HxCDF	ND	0.619						
1,2,3,4,6,7,8-HpCDF	0.617			38.68	0.98		A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.619						
OCDF	1.30			44.30	0.89		A	BJ
Total TCDDs	ND	0.198						
Total PeCDDs	ND	0.619	0.384					
Total HxCDDs	0.268							
Total HpCDDs	25.8							
Total TCDFs	ND	0.182	0.349					
Total PeCDFs	ND	0.619						
Total HxCDFs	0.235		0.384					
Total HpCDFs	1.23							
WHO-2005 TEQ (ND=0)	0.567		0.593					
WHO-2005 TEQ (ND=½)	1.28		1.29					

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-12		Weight / Volume:	10.02 g
			Solids / Lipids:	80.6 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-12B		Filename:	c08aug07a_5-3
Collection Date/Time:	07/25/07	8:50	Retchk:	c08aug07a_4-10
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9
Analysis Date/Time:	08/10/07	1:05	Initial Cal:	m8290-c110206a

Method 8290
F51300-13
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.172				
1,2,3,7,8-PeCDD	ND	0.594				
1,2,3,4,7,8-HxCDD	ND	0.594				
1,2,3,6,7,8-HxCDD	ND	0.594				
1,2,3,7,8,9-HxCDD	0.188			36.88	1.33	A
1,2,3,4,6,7,8-HpCDD	39.1			39.90	1.08	
OCDD	7470			44.03	0.90	E
2,3,7,8-TCDF	ND	0.196				
1,2,3,7,8-PeCDF	ND	0.594				
2,3,4,7,8-PeCDF	ND	0.594				
1,2,3,4,7,8-HxCDF	0.185			35.88	1.11	A
1,2,3,6,7,8-HxCDF	ND	0.594				
2,3,4,6,7,8-HxCDF	ND	0.594				
1,2,3,7,8,9-HxCDF	ND	0.594				
1,2,3,4,6,7,8-HpCDF	1.07			38.68	1.06	A
1,2,3,4,7,8,9-HpCDF	ND	0.594				
OCDF	3.23			44.30	0.91	A
Total TCDDs	ND	0.172				
Total PeCDDs	ND	0.594	0.330			
Total HxCDDs	0.625		1.70			
Total HpCDDs	98.7					
Total TCDFs	ND	0.196	0.200			
Total PeCDFs	ND	0.594	0.0689			
Total HxCDFs	0.575					
Total HpCDFs	3.19					
WHO-2005 TEQ (ND=0)	2.68		2.68			
WHO-2005 TEQ (ND=½)	3.32		3.32			

DATA VAL QUALIFIER

J

BJ

BJ

BJ

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-13		Weight / Volume:	10.51 g
			Solids / Lipids:	80.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-13B		Filename:	c08aug07a_5-4
Collection Date/Time:	07/25/07	9:00	Retchk:	c08aug07a_4-10
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9
Analysis Date/Time:	08/10/07	1:54	Initial Cal:	m8290-c110206a

Method 8290
F51300-14
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.192						
1,2,3,7,8-PeCDD	ND	0.540						
1,2,3,4,7,8-HxCDD	ND	0.540						
1,2,3,6,7,8-HxCDD	EMPC	0.540	0.106	36.69	0.98	*	A	J
1,2,3,7,8,9-HxCDD	ND	0.540						
1,2,3,4,6,7,8-HpCDD	7.82			39.90	1.05			J
OCDD	987			44.03	0.89			J
2,3,7,8-TCDF	ND	0.147						
1,2,3,7,8-PeCDF	ND	0.540						
2,3,4,7,8-PeCDF	ND	0.540						
1,2,3,4,7,8-HxCDF	0.177			35.87	1.11		A	BJ
1,2,3,6,7,8-HxCDF	ND	0.540						
2,3,4,6,7,8-HxCDF	ND	0.540						
1,2,3,7,8,9-HxCDF	ND	0.540						
1,2,3,4,6,7,8-HpCDF	0.984			38.69	1.19		A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.540						
OCDF	1.70			44.32	0.94		A	BJ
Total TCDDs	ND	0.192						
Total PeCDDs	ND	0.540	0.192					
Total HxCDDs	ND	0.540	0.650					
Total HpCDDs	17.8							
Total TCDFs	0.0669		0.246					
Total PeCDFs	0.0410							
Total HxCDFs	0.432		0.622					
Total HpCDFs	1.93							
WHO-2005 TEQ (ND=0)	0.402		0.413					
WHO-2005 TEQ (ND=½)	1.03		1.01					

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-14		Weight / Volume:	11.19 g
			Solids / Lipids:	82.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-14B		Filename:	c08aug07a_5-5
Collection Date/Time:	07/25/07	9:10	Retchk:	c08aug07a_4-10
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9
Analysis Date/Time:	08/10/07	2:42	Initial Cal:	m8290-c110206a

Method 8290
F51300-21
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.180					
1,2,3,7,8-PeCDD	EMPC	0.519	0.320	34.01	1.94	*	A
1,2,3,4,7,8-HxCDD	EMPC	0.519	0.521	36.61	0.92	*	A
1,2,3,6,7,8-HxCDD	1.78			36.69	1.14		A
1,2,3,7,8,9-HxCDD	1.25			36.92	1.27		A
1,2,3,4,6,7,8-HpCDD	42.8			39.90	1.06		
OCDD	764			44.04	0.90		
2,3,7,8-TCDF	0.415			30.22	0.80		A
1,2,3,7,8-PeCDF	0.178			33.21	1.61		A
2,3,4,7,8-PeCDF	0.369			33.84	1.49		A
1,2,3,4,7,8-HxCDF	0.934			35.88	1.19		A
1,2,3,6,7,8-HxCDF	0.417			35.97	1.22		A
2,3,4,6,7,8-HxCDF	0.562			36.47	1.23		A
1,2,3,7,8,9-HxCDF	ND	0.519					
1,2,3,4,6,7,8-HpCDF	8.29			38.68	1.00		
1,2,3,4,7,8,9-HpCDF	EMPC	0.519	0.502	40.57	1.25	*	A
OCDF	21.1			44.31	0.94		
Total TCDDs	0.237		1.05				
Total PeCDDs	1.05		2.55				
Total HxCDDs	8.90		9.92				
Total HpCDDs	91.3						
Total TCDFs	0.853		1.47				
Total PeCDFs	1.20		2.59				
Total HxCDFs	8.52		8.62				
Total HpCDFs	25.5		26.0				
WHO-2005 TEQ (ND=0)	1.40		1.78				
WHO-2005 TEQ (ND=½)	1.80		1.89				

DATA VAL QUALIFIER

J
BJ
BJ
J
J
J
B

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-21		Weight / Volume:	10.72 g
			Solids / Lipids:	89.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-15B		Filename:	c08aug07a_5-6
Collection Date/Time:	07/25/07	12:15	Retchk:	c08aug07a_4-10
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9
Analysis Date/Time:	08/10/07	3:30	Initial Cal:	m8290-c110206a

Method 8290
F51300-22
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	0.186	0.659	31.08	0.60	*	A
1,2,3,7,8-PeCDD	EMPC	0.590	0.576	34.03	1.03	*	A
1,2,3,4,7,8-HxCDD	0.468			36.60	1.22		A
1,2,3,6,7,8-HxCDD	5.62			36.69	1.25		A
1,2,3,7,8,9-HxCDD	2.37			36.92	1.21		A
1,2,3,4,6,7,8-HpCDD	169			39.91	1.04		
OCDD	2080			44.05	0.92		
2,3,7,8-TCDF	5.53			30.25	0.75		
1,2,3,7,8-PeCDF	0.593			33.22	1.47		A
2,3,4,7,8-PeCDF	0.924			33.85	1.66		A
1,2,3,4,7,8-HxCDF	2.14			35.90	1.30		A
1,2,3,6,7,8-HxCDF	1.09			35.99	1.17		A
2,3,4,6,7,8-HxCDF	1.02			36.46	1.11		A
1,2,3,7,8,9-HxCDF	0.508			37.25	1.27		A
1,2,3,4,6,7,8-HpCDF	24.3			38.69	1.04		
1,2,3,4,7,8,9-HpCDF	1.88			40.57	0.97		A
OCDF	103			44.33	0.89		
Total TCDDs	0.475		1.35				
Total PeCDDs	3.40		5.04				
Total HxCDDs	34.2		35.2				
Total HpCDDs	379						
Total TCDFs	15.8		17.1				
Total PeCDFs	4.97		6.56				
Total HxCDFs	22.0		23.8				
Total HpCDFs	108		108				
WHO-2005 TEQ (ND=0)	4.78		6.01				
WHO-2005 TEQ (ND=½)	5.16		6.01				

DATA VAL QUALIFIER
J
J

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Dry
			Matrix:	Solid
Sample ID:	F51300-22		Weight / Volume:	10.33 g
			Solids / Lipids:	82.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-585		Instrument:	HRMS3
Sample ID:	G383-585-16B		Filename:	c08aug07a_5-7
Collection Date/Time:	07/25/07	12:30	Retchk:	c08aug07a_4-10
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9
Analysis Date/Time:	08/10/07	4:19	Initial Cal:	m8290-c110206a

Method 8290
F51300-23
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	DATA VAL QUALIFIER
2,3,7,8-TCDD	ND	0.143						
1,2,3,7,8-PeCDD	ND	0.519						
1,2,3,4,7,8-HxCDD	ND	0.519						
1,2,3,6,7,8-HxCDD	ND	0.519						
1,2,3,7,8,9-HxCDD	ND	0.519						
1,2,3,4,6,7,8-HpCDD	1.65			39.92	0.98		A	BJ
OCDD	32.9			44.03	0.93			BJ
2,3,7,8-TCDF	0.268			30.19	0.80		A	J
1,2,3,7,8-PeCDF	EMPC	0.519	0.0914	33.22	1.08	*	A	J
2,3,4,7,8-PeCDF	ND	0.519						
1,2,3,4,7,8-HxCDF	ND	0.519						
1,2,3,6,7,8-HxCDF	ND	0.519						
2,3,4,6,7,8-HxCDF	ND	0.519						
1,2,3,7,8,9-HxCDF	ND	0.519						
1,2,3,4,6,7,8-HpCDF	0.515			38.68	1.08		A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.519						
OCDF	EMPC	1.04	1.54	44.32	1.06	*	A	BJ
Total TCDDs	ND	0.143						
Total PeCDDs	0.316							
Total HxCDDs	ND	0.519	0.453					
Total HpCDDs	4.47							
Total TCDFs	0.268		0.567					
Total PeCDFs	ND	0.519	0.143					
Total HxCDFs	0.0748		0.164					
Total HpCDFs	1.13							
WHO-2005 TEQ (ND=0)	0.0583		0.0615					
WHO-2005 TEQ (ND=½)	0.660		0.655					

Client Information			**Sample Information**		
Project Name:	F51300		Report Basis:	Dry	
			Matrix:	Solid	
Sample ID:	F51300-23		Weight / Volume:	11.19 g	
			Solids / Lipids:	86.1	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14402	
Project ID:	G383-585		Instrument:	HRMS3	
Sample ID:	G383-585-17B		Filename:	c08aug07a_5-8	
Collection Date/Time:	07/25/07	12:45	Retchk:	c08aug07a_4-10	
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_4-10	
Extraction Date:	08/07/07		End ConCal:	c08aug07a_5-9	
Analysis Date/Time:	08/10/07	5:07	Initial Cal:	m8290-c110206a	

Method 8290
F51300-31
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier	
2,3,7,8-TCDD	ND	0.00482					
1,2,3,7,8-PeCDD	ND	0.00605					
1,2,3,4,7,8-HxCDD	ND	0.00777					
1,2,3,6,7,8-HxCDD	ND	0.00791					
1,2,3,7,8,9-HxCDD	ND	0.00802					
1,2,3,4,6,7,8-HpCDD	ND	0.00702					
OCDD	ND	0.0186					
2,3,7,8-TCDF	ND	0.00376					
1,2,3,7,8-PeCDF	ND	0.00605					
2,3,4,7,8-PeCDF	ND	0.00605					
1,2,3,4,7,8-HxCDF	ND	0.00605					
1,2,3,6,7,8-HxCDF	ND	0.00605					
2,3,4,6,7,8-HxCDF	ND	0.00605					
1,2,3,7,8,9-HxCDF	ND	0.00605					
1,2,3,4,6,7,8-HpCDF	0.00849			39:19	0.95	A	J
1,2,3,4,7,8,9-HpCDF	ND	0.00714					
OCDF	0.0142			45:24	0.95	A	J
Total TCDDs	ND	0.00482					
Total PeCDDs	ND	0.00605					
Total HxCDDs	ND	0.00802					
Total HpCDDs	ND	0.00702					
Total TCDFs	ND	0.00376					
Total PeCDFs	ND	0.00605					
Total HxCDFs	ND	0.00605					
Total HpCDFs	0.00849						
WHO-2005 TEQ (ND=0)	0.0000892		0.0000892				
WHO-2005 TEQ (ND=½)	0.00918		0.00918				

Client Information			**Sample Information**	
Project Name:	F51300		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51300-31		Weight / Volume:	827 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14393
Project ID:	G383-585		Instrument:	HRMS1
Sample ID:	G383-585-18C		Filename:	a30jul07a_9-10
Collection Date/Time:	07/25/07	14:35	Retchk:	a30jul07a_8-4
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	a30jul07a_8-4
Extraction Date:	08/01/07		End ConCal:	a30jul07a_9-14
Analysis Date/Time:	08/03/07	0:11	Initial Cal:	m8290-071007a

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F51300

DATE: December 28, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 25, 2007. The samples were analyzed for explosives using USEPA SW846 Method 8330A, and nitroglycerin & PETN using USEPA SW-846 Method 8332A. A total of 1 aqueous and 30 soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
59SB06A	F51300-1	43SB06C	F51300-17
59SB06B	F51300-2	43SB07A	F51300-18
59SB06C	F51300-3	43SB07B	F51300-19
59SB05A	F51300-4	43SB07C	F51300-20
59SB05B	F51300-5	43SB08A	F51300-21
59SB05C	F51300-6	43SB08B	F51300-22
59SB04A	F51300-7	43SB08C	F51300-23
59SB04B	F51300-8	43SB09A	F51300-24
59SB04C	F51300-9	43SB09B	F51300-25
TMSB04C	F51300-10	43SB09C	F51300-26
59SB02A	F51300-11	43SB10A	F51300-27
59SB02B	F51300-12	43SB10B	F51300-28
TMSB02B	F51300-13	43SB10C	F51300-29
59SB02C	F51300-14	TMSB10B	F51300-30
43SB06A	F51300-15	072507R	F51300-31
43SB06B	F51300-16		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard McCracken, Chemist

12/28/07
Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F51300

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Solid samples must be cooled @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/25/07 were sent in five coolers, and were received by the laboratory on 7/26/07 at temperatures ranging from 2.6 °C to 4.0 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/25/07. The water sample was extracted on 7/31/07, while the soils were extracted on 8/7/07. The water sample was analyzed for all explosives on 8/1/07; the soils were analyzed for PETN & nitroglycerine on 8/8/07, and for all other explosives on 8/9/07 & 8/10/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
8/1/07	OP21682-MB	All target explosives <½MRL	NA	NA	None
8/1/07	OP21682-MB	PETN & NG <½MRL	NA	NA	None
8/9/07	OP21778-MB	All target explosives <½MRL	NA	NA	None
8/8/07	OP21778-MB	PETN & NG <½MRL	NA	NA	None
8/9/07	OP21779-MB	All target explosives <½MRL	NA	NA	None
8/8/07	OP21779-MB	PETN & NG <½MRL	NA	NA	None
8/1/07	072507R	All target explosives <½MRL	NA	NA	None
8/1/07	072507R	PETN & NG <½MRL	NA	NA	None
8/1/07	072607R	All target explosives <½MRL	NA	NA	None
8/1/07	072607R	PETN & NG <½MRL	NA	NA	None

072507R and 072606R are rinsate blanks.
MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient (r^2) must be ≥0.990 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration performed on 10/18/06 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- During the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration verification performed on 10/18/06 @1739 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed after this initial calibration verification.

- During the explosives initial calibration verification performed on 10/19/06 @1344 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed after this initial calibration verification.

- During the explosives continuing calibration verification performed on 8/1/07 @1220 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample F51300-31 was analyzed following this continuing calibration.

- During the explosives continuing calibration verification performed on 8/1/07 @1705 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample F51300-31 was analyzed before this continuing calibration.

- During the explosives continuing calibration verification performed on 8/8/07 @2354 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51300-19, -20, -21, -22, -23, -24, and -26 were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/9/07 @0457 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51300-19, -20, -21, -22, -23, -24, and -26 were analyzed before this continuing calibration, while samples 51300-27, -28, -29, and -30 were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/9/07 @0915 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51300-27, -28, -29, and -30 were analyzed before this continuing calibration.

- During the explosives continuing calibration verification performed on 8/9/07 @1050 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5, and -6 were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/9/07 @1553 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-1, -2, -3, -4, -5, and -6 were analyzed before this continuing calibration, while samples F51300-7, -8, -9, -10, -11, -12, -13, -14, -15, and -16 were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/9/07 @2123 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-7, -8, -9, -10, -11, -12, -13, -14, -15, and -16 were analyzed before this continuing calibration, while samples F51300-17, -18, -25, and -27 were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/10/07 @0254 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-17, -18, -25, and -27 were analyzed before this continuing calibration.

- During the PETN and nitroglycerin initial calibration verification performed on 3/15/07 @1235 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed in conjunction with this initial calibration verification.

- During the PETN and nitroglycerin continuing calibration performed on 8/1/07 @1027 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample F51300-31 was analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/1/07 @1136 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample F51300-31 was analyzed before this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/8/07 @1717 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51300-19, -20, -21, -22, -23, -24, and -26 were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/8/07 @1843 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 51300-19, -20, -21, -22, -23, -24, and -26 were analyzed before this continuing calibration, while samples F51300-27, -28, -29, -30, -1, and -2 were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/8/07 @2026 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-27, -28, -29, -30, -1, and -2 were analyzed before this continuing calibration, while samples F51300-3, -4, -5, -6, -7, -8, -9, -10, -11, and -12 were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/8/07 @2209 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-3, -4, -5, -6, -7, -8, -9, -10, -11, and -12 were analyzed before this continuing calibration, while samples F51300-13, -14, -15, -16, -17, -18, -25, and -27 were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/8/07 @2352 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples F51300-13, -14, -15, -16, -17, -18, -25, and -27 were analyzed before this continuing calibration.

V-System Monitoring Compound (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria: 3,4-dinitrotoluene (72-145%)

Aqueous Criteria: 3,4-dinitrotoluene (70-136%)

- Sample F51300-21 had high recoveries from both signals during explosives (202.54%, 202.18%), and PETN & nitroglycerin (211.59%, 217.05%) analyses. The lab reported that they suspected a double spike of the surrogate. No target compounds were detected in F51300-21, no data qualification was required.

- All other samples met surrogate recovery criteria during explosives, PETN, and nitroglycerin analyses. No qualifiers were applied.

VI-Laboratory Control Sample

Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM solid matrix LCS recovery limits are specified in Table D-13 of the DoD QSM (DoD, 2006), while the aqueous LCS recovery limits are specified in Table D-12 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21682-BS was used as the aqueous LCS for explosives, PETN, and nitroglycerin analysis. All compounds met recovery criteria. Sample F51300-31 was analyzed in conjunction with this LCS.

- Sample OP21778-BS was used as the solid LCS for explosives, PETN, and nitroglycerin analysis. All compounds met recovery criteria. Samples F51300-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -25, and -27 were analyzed in conjunction with this LCS.

- Sample OP21779-BS was used as the solid LCS for explosives, PETN, and nitroglycerin analysis. All compounds met recovery criteria. Samples F51300-19, -20, -21, -22, -23, -24, -26, -27, -28, -29, and -30 were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD MS/MSD recovery limits follow the LCS criteria specified in Table D-12 (aqueous) and D-13 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51300-31 was used as the aqueous MS/MSD during PETN & nitroglycerine analysis. All compounds met criteria. Sample F51300-31 was analyzed in conjunction with this MS/MSD.

- Sample F51300-27 was used as a solid MS/MSD during PETN & nitroglycerine analysis. All compounds met criteria. Sample F51300-27 was analyzed in conjunction with this MS/MSD.

- Sample F51300-29 was used as a solid MS/MSD during explosives analysis. p-Nitrotoluene (126%) had a high recovery, but no p-nitrotoluene was detected in any samples. All other compounds met criteria. Samples F51300-19, -20, -21, -22, -23, -24, -26, -28, -29, and -30 were analyzed in conjunction with this MS/MSD.

- Sample F51300-25 was used as a solid MS/MSD during explosives analysis. All compounds met criteria. Samples F51300-1 thru -18 and -25 were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field duplicate pairs in this data package included 59SB04C (F51300-9) & TMSB04C (F51300-10), 59SB02B (F51300-12) & TMSB02B (F51300-13), and 43SB10B (F51300-28) & TMSB10B (F51300-30). All compounds detected above the reporting limit (RL) met RPD criteria.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

Sample: OP21778-BS, HMX

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (1696865 * 20000 * 1) / (2764 * 1 * 2 * 1 * 1000)
= 6140 ug/kg

Reported Value = 6140 µg/kg
% Difference = 0.0%, values were within 10% difference

Sample: OP21779-BS2, nitroglycerin

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (3484549 * 20000 * 1) / (1228 * 1 * 2.0 * 1 * 1000)
= 28400 ug/kg

Reported Value = 28400 µg/kg
% Difference = 0.0%, values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: GG023257.D PP022134.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06A		
Lab Sample ID:	F51300-1	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	91.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023257.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022134.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.11 g	20.0 ml
Run #2	2.11 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	98	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023258.D PP022135.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06B		
Lab Sample ID:	F51300-2	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	88.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023258.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022135.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.14 g	20.0 ml
Run #2	2.14 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	49	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023259.D PP022138.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB06C		
Lab Sample ID:	F51300-3	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023259.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022138.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023260.D PP022139.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05A		
Lab Sample ID:	F51300-4	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023260.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022139.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.13 g	20.0 ml
Run #2	2.13 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	49	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	51	ug/kg	
98-95-3	Nitrobenzene	ND	230	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	97	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%	106%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023261.D PP022140.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05B		
Lab Sample ID:	F51300-5	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	84.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023261.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022140.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.17 g	20.0 ml
Run #2	2.17 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	46	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	46	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	82	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	46	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	46	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	65	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	71	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	95	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	460	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	54	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	46	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	690	ug/kg	
78-11-5	PETN	ND [a]	1800	690	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023262.D PP022141.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB05C		
Lab Sample ID:	F51300-6	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	86.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023262.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022141.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.14 g	20.0 ml
Run #2	2.14 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	49	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	107%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023265.D PP022142.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04A		
Lab Sample ID:	F51300-7	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023265.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022142.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	104%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023266.D PP022143.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04B		
Lab Sample ID:	F51300-8	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023266.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022143.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.25 g	20.0 ml
Run #2	2.25 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	220	46	ug/kg	
121-82-4	RDX	ND	220	44	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	220	44	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	79	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	220	44	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	220	44	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	220	48	ug/kg	
98-95-3	Nitrobenzene	ND	220	63	ug/kg	
88-72-2	o-Nitrotoluene	ND	220	68	ug/kg	
99-08-1	m-Nitrotoluene	ND	220	92	ug/kg	
99-99-0	p-Nitrotoluene	ND	220	61	ug/kg	
479-45-8	Tetryl	ND	440	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	220	52	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	220	44	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	670	ug/kg	
78-11-5	PETN	ND [a]	1800	670	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%	118%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023267.D PP022144.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB04C		
Lab Sample ID:	F51300-9	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	85.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023267.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022144.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.21 g	20.0 ml
Run #2	2.21 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	47	ug/kg	
121-82-4	RDX	ND	230	45	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	45	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	81	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	45	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	45	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	49	ug/kg	
98-95-3	Nitrobenzene	ND	230	64	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	70	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	93	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	62	ug/kg	
479-45-8	Tetryl	ND	450	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	53	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	45	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	680	ug/kg	
78-11-5	PETN	ND [a]	1800	680	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	113%	118%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB04C		
Lab Sample ID:	F51300-10	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	83.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023268.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022145.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.05 g	20.0 ml
Run #2	2.05 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	51	ug/kg	
121-82-4	RDX	ND	240	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	87	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	53	ug/kg	
98-95-3	Nitrobenzene	ND	240	69	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	75	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	67	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	730	ug/kg	
78-11-5	PETN	ND [a]	2000	730	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	111%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023269.D PP022146.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02A		
Lab Sample ID:	F51300-11	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	89.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023269.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022146.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.12 g	20.0 ml
Run #2	2.12 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	97	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%	111%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023270.D PP022147.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02B		
Lab Sample ID:	F51300-12	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	83.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023270.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022147.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.12 g	20.0 ml
Run #2	2.12 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	97	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB02B		
Lab Sample ID:	F51300-13	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023271.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022150.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.15 g	20.0 ml
Run #2	2.15 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023272.D PP022151.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB02C		
Lab Sample ID:	F51300-14	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	83.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023272.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022151.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.11 g	20.0 ml
Run #2	2.11 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	98	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023273.D PP022152.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06A		
Lab Sample ID:	F51300-15	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023273.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022152.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	101%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023274.D PP022153.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06B		
Lab Sample ID:	F51300-16	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	81.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023274.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022153.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.12 g	20.0 ml
Run #2	2.12 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	97	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	112%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023277.D PP022154.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB06C		
Lab Sample ID:	F51300-17	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	89.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023277.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022154.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.22 g	20.0 ml
Run #2	2.22 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	47	ug/kg	
121-82-4	RDX	ND	230	45	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	45	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	80	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	45	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	45	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	49	ug/kg	
98-95-3	Nitrobenzene	ND	230	64	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	69	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	93	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	62	ug/kg	
479-45-8	Tetryl	ND	450	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	53	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	45	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	680	ug/kg	
78-11-5	PETN	ND [a]	1800	680	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	114%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023278.D PP022155.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07A		
Lab Sample ID:	F51300-18	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	90.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023278.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022155.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.20 g	20.0 ml
Run #2	2.20 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	47	ug/kg	
121-82-4	RDX	ND	230	45	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	45	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	81	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	45	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	45	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	49	ug/kg	
98-95-3	Nitrobenzene	ND	230	65	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	70	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	94	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	63	ug/kg	
479-45-8	Tetryl	ND	450	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	54	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	45	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	680	ug/kg	
78-11-5	PETN	ND [a]	1800	680	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	112%	106%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07B		
Lab Sample ID:	F51300-19	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	86.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023234.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022117.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2	2.09 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	85	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	720	ug/kg	
78-11-5	PETN	ND [a]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%	102%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023235.D PP022118.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB07C		
Lab Sample ID:	F51300-20	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	84.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023235.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022118.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.11 g	20.0 ml
Run #2	2.11 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	98	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	95%	92%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023236.D PP022119.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08A		
Lab Sample ID:	F51300-21	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	96.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023236.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022119.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.04 g	20.0 ml
Run #2	2.04 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	87	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	75	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	203% [b]	212% [b]	72-145%

(a) Result is from Run# 2
(b) Outside control limits. Suspected double surrogate; however, sample was ND.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08B		
Lab Sample ID:	F51300-22	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	84.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023237.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022120.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.08 g	20.0 ml
Run #2	2.08 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	86	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	57	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	720	ug/kg	
78-11-5	PETN	ND [a]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	114%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB08C		
Lab Sample ID:	F51300-23	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023238.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022121.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.18 g	20.0 ml
Run #2	2.18 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	46	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	46	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	82	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	46	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	46	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	65	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	71	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	94	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	63	ug/kg	
479-45-8	Tetryl	ND	460	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	54	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	46	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	690	ug/kg	
78-11-5	PETN	ND [a]	1800	690	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%	115%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09A		
Lab Sample ID:	F51300-24	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023239.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022122.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2	2.09 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	85	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	720	ug/kg	
78-11-5	PETN	ND [a]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%	117%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023279.D PP022156.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09B		
Lab Sample ID:	F51300-25	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	86.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023279.D	1	08/09/07	NAF	08/07/07	OP21778	GGG996
Run #2	PP022156.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766

	Initial Weight	Final Volume
Run #1	2.11 g	20.0 ml
Run #2	2.11 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	98	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023240.D PP022123.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB09C		
Lab Sample ID:	F51300-26	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023240.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022123.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%	113%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10A		
Lab Sample ID:	F51300-27	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023243.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022126.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766
Run #3	PP022157.D	1	08/08/07	NAF	08/07/07	OP21778	GPP766
Run #4	GG023282.D	1	08/10/07	NAF	08/07/07	OP21778	GGG996

	Initial Weight	Final Volume
Run #1	2.02 g	20.0 ml
Run #2	2.02 g	20.0 ml
Run #3	2.02 g	20.0 ml
Run #4	2.02 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	50	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	50	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	50	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	50	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	500	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	50	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	106%	111%	110%	72-145%
610-39-9	3,4-Dinitrotoluene				72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10B		
Lab Sample ID:	F51300-28	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023244.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022129.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.22 g	20.0 ml
Run #2	2.22 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	47	ug/kg	
121-82-4	RDX	ND	230	45	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	45	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	80	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	45	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	45	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	49	ug/kg	
98-95-3	Nitrobenzene	ND	230	64	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	69	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	93	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	62	ug/kg	
479-45-8	Tetryl	ND	450	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	53	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	45	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	680	ug/kg	
78-11-5	PETN	ND [a]	1800	680	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023245.D PP022130.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	43SB10C		
Lab Sample ID:	F51300-29	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023245.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022130.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	104%	112%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSB10B		
Lab Sample ID:	F51300-30	Date Sampled:	07/25/07
Matrix:	SO - Soil	Date Received:	07/26/07
Method:	SW846 8330A SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023248.D	1	08/09/07	NAF	08/07/07	OP21779	GGG995
Run #2	PP022131.D	1	08/08/07	NAF	08/07/07	OP21779	GPP766

	Initial Weight	Final Volume
Run #1	2.15 g	20.0 ml
Run #2	2.15 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	114%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	072507R		
Lab Sample ID:	F51300-31	Date Sampled:	07/25/07
Matrix:	AQ - Equipment Blank	Date Received:	07/26/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023035.D	1	08/01/07	NAF	07/31/07	OP21682	GGG990
Run #2	PP021891.D	1	08/01/07	NAF	07/31/07	OP21682	GPP756

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.051	ug/l	
121-82-4	RDX	ND	0.20	0.060	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.056	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.071	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.097	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.20	0.065	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.20	0.056	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.073	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.078	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.10	ug/l	
479-45-8	Tetryl	ND	0.20	0.068	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.065	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.050	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.0	0.50	ug/l	
78-11-5	PETN	ND [a]	2.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	95%	91%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F51275

DATE: December 10, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B for aqueous samples and 5035A/8260B for soil samples. A total of three aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
072407R	F51275-1	59SB03C	F51275-4
59SB03A	F51275-2	TB072407S	F51275-5
59SB03B	F51275-3	TB072407W	F51275-6

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
X		System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

12/10/07

Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F51275

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: Aqueous samples must be cooled @ 4°C±2°C and acidified to pH<2 with HCl, with a maximum holding time of 14 days (7 days if no HCl added) from sample collection to analysis. Soil samples must be cooled @ 4°C±2°C, with a maximum holding time of 14 days from sample collection to analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied.

- Holding Time Review: All samples were collected for VOCs on 7/24/07. The rinsate blank (072407R) and associated trip blank (TB072407W) were analyzed on 7/31/07, all other samples were analyzed on 7/30/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For compounds with low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration performed on 07/16/07 on instrument MSVOA3 (GCMSH), target compounds acetone (18.53%), methylene chloride (32.02%), trichloroethene (24.48%), ethylbenzene (15.12%), m,p-xylene (16.56%), and o-xylene (15.44%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. Samples 59SB03A, 59SB03B, 59SB03C, and TB072407S were analyzed in conjunction with this initial calibration.

- During the initial calibration performed on 07/31/07 on instrument MSVOA6 (GCMSJ), target compounds bromomethane (22.0%), chloroethane (21.95%), methylene chloride (123.02%), and trans-1,3-dichloropropene (21.19%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. Samples 072407R and TB072407W were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for exceeding %Ds, and all non-detects are qualified as estimated "UJ" for grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration verification performed on 7/16/07 @1820 on instrument MSVOA3 (GCMSH), bromomethane (36.1%) had a %D outside criteria. No bromomethane (reported on Form I as methyl bromide) was detected in any samples so no data qualification was required. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification.

- During the continuing calibration performed on 7/30/07 @1207 on instrument MSVOA3 (GCMSH), acetone (43.7%), trichloroethene (21.1%), and 2-hexanone (27.0%) had %D/%drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). None of these volatiles were detected in any of the associated samples, the acetone results have been qualified "UJ", no other data qualification was required. Samples 59SB03A, 59SB03B, 59SB03C, and TB072407S were analyzed following this continuing calibration.

- During the initial calibration verification performed on 7/31/07 @1339 on instrument MSVOA6 (GCMSJ), bromomethane (21.8%), acetone (22.5%), trans-1,3-dichloropropene (20.5%), had a %D outside criteria. None of these compounds were detected in any samples so no data qualification was required. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 072407R and TB072407W were analyzed following this initial calibration verification.

- During the continuing calibration performed on 7/31/07 @1427 on instrument MSVOA6 (GCMSJ), all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 072407R and TB072407W were analyzed following this initial calibration verification.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
7/30/07	VH1664-MB	All target <½MRL	NA	NA	None
7/31/07	VJ2191-MB	All target <½MRL	NA	NA	None
7/31/07	072407R	All target <½MRL	NA	NA	None
7/30/07	TB072407S	All target <½MRL	NA	NA	None
7/31/07	TB072407W	All target <½MRL	NA	NA	None

072407R is a rinsate blank.
NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample

Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. The aqueous LCS recovery limits are specified in Table D-4 of the DoD QSM (DoD, 2006), while the solid matrix LCS recovery limits are specified in Table D-5 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample VH1664-BS was used as the solid LCS for the VOC analysis on 7/30/07. All target compound recoveries were within criteria. Samples 59SB03A, 59SB03B, 59SB03C, and TB072407S were analyzed in conjunction with this LCS.

- Sample VJ2191-BS was used as the aqueous LCS for the VOC analysis on 7/31/07. All target compound recoveries were within criteria. Samples 072407R and TB072407W were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The MS/MSD aqueous recovery limits follow the LCS criteria specified in Table D-4 of the DoD QSM (DoD, 2006), while the solid matrix recovery limits follow the LCS criteria specified in Table D-5 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51247-13 was used for the solid MS/MSD analysis on 7/30/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Samples 59SB03A, 59SB03B, 59SB03C, and TB072407S were analyzed in conjunction with this MS/MSD.

- Sample F51154-17 (LFSW01, an RFAAP sample in data package F51154) was used for the aqueous MS/MSD analysis on 07/31/07. Bromomethane (146%, 148%) was outside DoD QSM criteria. The associated LCS was met recovery for bromomethane, and no bromomethane was detected in any associated samples; therefore, no qualifiers were applied. All other target compounds met recovery criteria. Samples 072407R and TB072407W were analyzed in conjunction with this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous criteria:	Dibromofluoromethane (87-116%) (DoD QSM = 85-115%) 1,2-Dichloroethane-d4 (76-127%) (DoD QSM = 70-120%) Toluene-d8 (86-112%) (DoD QSM = 85-120%) 4-Bromofluorobenzene (84-120%) (DoD QSM = 75-120%)
Solid matrix criteria:	Dibromofluoromethane (80-121%) (DoD QSM = none) 1,2-Dichloroethane-d4 (77-123%) (DoD QSM = none) Toluene-d8 (71-130%) (DoD QSM = 85-115%) 4-Bromofluorobenzene (59-148%) (DoD QSM = 85-120%)

- Sample 59SB03A had a high 4-bromofluorobenzene (130.0%) recovery. All results in 59SB03A have been qualified "J/UJ".

- All other solid matrix samples and all aqueous samples met surrogate recovery criteria. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- The solid matrix MS (F51247-13MS) had a low tert-butyl alcohol-d10 recovery, but no target compounds are quantitated from this internal standard. All other solid matrix samples and all aqueous samples met criteria. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: VH1664-BS, 1,1-dichloroethylene

Conc. (µg/kg) = (Ax * Is * DF)/(Ais * RRF * Ws * Ps)

where:	Conc	=	sample concentration in µg/kg
	Ax	=	area of characteristic ion for compound being measured
	Is	=	amount of internal standard added (ng)
	DF	=	dilution factor
	Ais	=	Area of characteristic ion for the internal standard
	RRF	=	average relative response factor
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (578404 * 250 ng * 1) / (1058832 * 0.634 * 5 * 1) = 43.1 µg/kg

Reported Conc. = 43.1 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031550.D	1	07/31/07	JG	n/a	n/a	VJ2191
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		87-116%
17060-07-0	1,2-Dichloroethane-D4	103%		76-127%
2037-26-5	Toluene-D8	96%		86-112%
460-00-4	4-Bromofluorobenzene	103%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044742.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.11 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	65	33	ug/kg	UJ
71-43-2	Benzene	ND	6.5	2.6	ug/kg	
75-27-4	Bromodichloromethane	ND	6.5	2.6	ug/kg	
75-25-2	Bromoform	ND	6.5	2.6	ug/kg	
108-90-7	Chlorobenzene	ND	6.5	2.6	ug/kg	
75-00-3	Chloroethane	ND	6.5	3.9	ug/kg	
67-66-3	Chloroform	ND	6.5	2.6	ug/kg	
75-15-0	Carbon disulfide	ND	6.5	2.6	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.5	2.6	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.5	2.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.5	2.6	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.5	2.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.5	2.6	ug/kg	
124-48-1	Dibromochloromethane	ND	6.5	2.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.5	2.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.5	2.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.5	2.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.5	2.6	ug/kg	
100-41-4	Ethylbenzene	ND	6.5	2.6	ug/kg	
591-78-6	2-Hexanone	ND	33	13	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	33	13	ug/kg	
74-83-9	Methyl bromide	ND	6.5	2.6	ug/kg	
74-87-3	Methyl chloride	ND	6.5	2.6	ug/kg	
75-09-2	Methylene chloride	ND	13	6.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	33	13	ug/kg	
100-42-5	Styrene	ND	6.5	2.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.5	2.6	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.5	2.6	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.5	2.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.5	2.6	ug/kg	
108-88-3	Toluene	ND	6.5	2.6	ug/kg	
79-01-6	Trichloroethylene	ND	6.5	2.6	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
75-01-4	Vinyl chloride	ND	6.5	2.6	ug/kg		UJ
	m,p-Xylene	ND	13	3.9	ug/kg		
95-47-6	o-Xylene	ND	6.5	2.6	ug/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	103%		71-130%
460-00-4	4-Bromofluorobenzene	130%		59-148%
17060-07-0	1,2-Dichloroethane-D4	118%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044743.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.35 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	59	29	ug/kg	UJ
71-43-2	Benzene	ND	5.9	2.4	ug/kg	
75-27-4	Bromodichloromethane	ND	5.9	2.4	ug/kg	
75-25-2	Bromoform	ND	5.9	2.4	ug/kg	
108-90-7	Chlorobenzene	ND	5.9	2.4	ug/kg	
75-00-3	Chloroethane	ND	5.9	3.5	ug/kg	
67-66-3	Chloroform	ND	5.9	2.4	ug/kg	
75-15-0	Carbon disulfide	ND	5.9	2.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.9	2.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.9	2.4	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.9	2.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.9	2.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.9	2.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.9	2.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.9	2.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.9	2.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.9	2.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.9	2.4	ug/kg	
100-41-4	Ethylbenzene	ND	5.9	2.4	ug/kg	
591-78-6	2-Hexanone	ND	29	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg	
74-83-9	Methyl bromide	ND	5.9	2.4	ug/kg	
74-87-3	Methyl chloride	ND	5.9	2.4	ug/kg	
75-09-2	Methylene chloride	ND	12	5.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg	
100-42-5	Styrene	ND	5.9	2.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.9	2.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.9	2.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.9	2.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.9	2.4	ug/kg	
108-88-3	Toluene	ND	5.9	2.4	ug/kg	
79-01-6	Trichloroethylene	ND	5.9	2.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.9	2.4	ug/kg	
	m,p-Xylene	ND	12	3.5	ug/kg	
95-47-6	o-Xylene	ND	5.9	2.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	95%		71-130%
460-00-4	4-Bromofluorobenzene	109%		59-148%
17060-07-0	1,2-Dichloroethane-D4	119%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044744.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044744.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.29 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	57	29	ug/kg	UJ
71-43-2	Benzene	ND	5.7	2.3	ug/kg	
75-27-4	Bromodichloromethane	ND	5.7	2.3	ug/kg	
75-25-2	Bromoform	ND	5.7	2.3	ug/kg	
108-90-7	Chlorobenzene	ND	5.7	2.3	ug/kg	
75-00-3	Chloroethane	ND	5.7	3.4	ug/kg	
67-66-3	Chloroform	ND	5.7	2.3	ug/kg	
75-15-0	Carbon disulfide	ND	5.7	2.3	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.7	2.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.7	2.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.7	2.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.7	2.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.7	2.3	ug/kg	
124-48-1	Dibromochloromethane	ND	5.7	2.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.7	2.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.7	2.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.7	2.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.7	2.3	ug/kg	
100-41-4	Ethylbenzene	ND	5.7	2.3	ug/kg	
591-78-6	2-Hexanone	ND	29	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	29	11	ug/kg	
74-83-9	Methyl bromide	ND	5.7	2.3	ug/kg	
74-87-3	Methyl chloride	ND	5.7	2.3	ug/kg	
75-09-2	Methylene chloride	ND	11	5.7	ug/kg	
78-93-3	Methyl ethyl ketone	ND	29	11	ug/kg	
100-42-5	Styrene	ND	5.7	2.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.7	2.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.7	2.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.7	2.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.7	2.3	ug/kg	
108-88-3	Toluene	ND	5.7	2.3	ug/kg	
79-01-6	Trichloroethylene	ND	5.7	2.3	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.7	2.3	ug/kg	
	m,p-Xylene	ND	11	3.4	ug/kg	
95-47-6	o-Xylene	ND	5.7	2.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	96%		71-130%
460-00-4	4-Bromofluorobenzene	109%		59-148%
17060-07-0	1,2-Dichloroethane-D4	119%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044745.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB072407S		
Lab Sample ID:	F51275-5	**Date Sampled:**	07/24/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044745.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	25	ug/kg	UJ
71-43-2	Benzene	ND	5.0	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	2.0	ug/kg	
75-25-2	Bromoform	ND	5.0	2.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	2.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	3.0	ug/kg	
67-66-3	Chloroform	ND	5.0	2.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	2.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	2.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	2.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	2.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	2.0	ug/kg	
591-78-6	2-Hexanone	ND	25	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	10	ug/kg	
74-83-9	Methyl bromide	ND	5.0	2.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
75-09-2	Methylene chloride	ND	10	5.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	10	ug/kg	
100-42-5	Styrene	ND	5.0	2.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	2.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	2.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	2.0	ug/kg	
108-88-3	Toluene	ND	5.0	2.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	2.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB072407S		
Lab Sample ID:	F51275-5	**Date Sampled:**	07/24/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.0	2.0	ug/kg	
	m,p-Xylene	ND	10	3.0	ug/kg	
95-47-6	o-Xylene	ND	5.0	2.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	96%		71-130%
460-00-4	4-Bromofluorobenzene	111%		59-148%
17060-07-0	1,2-Dichloroethane-D4	120%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB072407W		
Lab Sample ID:	F51275-6	**Date Sampled:**	07/24/07
Matrix:	AQ - Trip Blank Water	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031551.D	1	07/31/07	JG	n/a	n/a	VJ2191
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB072407W		
Lab Sample ID:	F51275-6	**Date Sampled:**	07/24/07
Matrix:	AQ - Trip Blank Water	**Date Received:**	07/25/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		87-116%
17060-07-0	1,2-Dichloroethane-D4	102%		76-127%
2037-26-5	Toluene-D8	95%		86-112%
460-00-4	4-Bromofluorobenzene	104%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F51275

DATE: December 10, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3550B/8270C (solids) and 3510C/8270C (aqueous). The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of one aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
072407R	F51275-1	59SB03B	F51275-3
59SB03A	F51275-2	59SB03C	F51275-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Surrogate Spikes
	X	Internal Standards
	X	Laboratory Control Sample
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/10/07
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F51275

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: Solid samples must be stored @4°C ± 2°C with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/24/07, extracted for SVOCs on 7/31/07 (aqueous) & 8/2/07 (solids), extracted for PAHs by SIM on 7/31/07 (aqueous) & 8/2/07 (solids), analyzed for SVOCs on 8/2/07 (aqueous) & 8/3/07 (solids), and analyzed for PAHs by SIM on 8/2/07 (aqueous) & 8/6/07 (solids). All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 7/5/07 using instrument MSBNA02 (GCMSL). Target compounds 2,4-dinitrophenol (19.68%) and 4,6-dinitro-2-methylphenol (25.87%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients ≥0.995; therefore no qualifiers were applied. Sample 072407R were analyzed in conjunction with this initial calibration.

- Initial calibration for the SVOCs was performed on 7/13/07 using instrument MSBNA04 (GCMSU). Target compounds 2,4-dinitrophenol (42.04%) and 4,6-dinitro-2-methylphenol (24.04%) had %RSDs outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). The compounds with high %RSD were quantified using linear or second order regression, and had correlation coefficients ≥0.995; therefore no qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this initial calibration.

- Initial calibration for the PAHs-SIM was performed on 7/18/07 using instrument MSBNA3 (GCMSR). All target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05); no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the SVOC initial calibration verification performed on 7/5/07 @1527 using instrument MSBNA02 (GCMSL), 3-nitroaniline (26.0%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC initial calibration verification performed on 7/5/07 @1555 using instrument MSBNA02 (GCMSL), all target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/1/07 @1616 using instrument MSBNA02 (GCMSL), 2,4-dinitrophenol (33.0%) and 4,6-dinitro-2-methylphenol (22.1%) had %D outside criteria. All other target compounds met criteria. The MS and MSD were the only samples analyzed following this continuing calibration. Therefore, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/2/07 @1324 using instrument MSBNA02 (GCMSL), all target compounds met criteria. No qualifiers were applied. Sample 072407R was analyzed following this continuing calibration.

- During the SVOC initial calibration verification performed on 7/13/07 @1348 using instrument MSBNA04 (GCMSU), 4-chloroaniline (38.2%) and 3-nitroaniline (39.0%) had %D outside criteria. All other target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC initial calibration verification performed on 7/13/07 @1419 using instrument MSBNA04 (GCMSU), all target compounds met criteria. No samples were analyzed following this initial calibration verification, no qualifiers were applied.

- During the SVOC continuing calibration performed on 8/3/07 @0952 using instrument MSBNA04 (GCMSU), all target compounds met criteria. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed following this continuing calibration.

- During the PAH-SIM initial calibration verification performed on 7/18/07 @0634 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PAH-SIM continuing calibration performed on 8/2/07 @1000 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. Sample 072407R was analyzed following this continuing calibration.

- During the PAH-SIM continuing calibration performed on 8/6/07 @2107 using instrument MSBNA3 (GCMSR), all criteria were met for all target compounds. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
8/2/07	OP21675-MB	All SVOC target <½MRL	NA	NA	None
8/3/07	OP21718-MB	All SVOC target <½MRL	NA	NA	None
8/2/07	OP21676-MB	All PAH SIM target <½MRL	NA	NA	None
8/6/07	OP21719-MB	All PAH SIM target <½MRL	NA	NA	None
8/2/07	072407R	All SVOC target <½MRL	NA	NA	None
8/2/07	072407R	All PAH SIM target <½MRL	NA	NA	None

072407R is a rinsate blank.
NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Tables D-2 & D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:
2-Fluorophenol (14-62%) – (DoD QSM = 20-110%)
Phenol-d5 (10-40%) – (DoD QSM = 10-115%)
2,4,6-Tribromophenol (33-118%) – (DoD QSM = 40-125%)
Nitrobenzene-d5 (42-108%) – (DoD QSM = 40-110%)
2-Fluorobiphenyl (40-106%) – (DoD QSM = 50-110%)
p-Terphenyl-d14 (39-121%) – (DoD QSM = 50-135%)

Solid Criteria:

2-Fluorophenol (40-102%) – (DoD QSM = 35-105%)
Phenol-d5 (41-100%) – (DoD QSM = 40-100%)
2,4,6-Tribromophenol (42-108%) – (DoD QSM = 35-125%)
Nitrobenzene-d5 (40-105%) – (DoD QSM = 35-100%)
2-Fluorobiphenyl (43-107%) – (DoD QSM = 45-105%)
p-Terphenyl-d14 (45-119%) – (DoD QSM = 30-125%)

- Sample 072407R had all three base/neutral surrogates with high recoveries during PAH analysis. No PAHs were detected in 072407R, no data qualification was required.

- All other samples met surrogate recovery criteria. No qualifiers were applied.

VII-Internal Standards

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD solid matrix LCS recovery limits are specified in Table D-7 of the DoD QSM (DoD, 2006), while aqueous recovery limits are specified in Table D-6 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21675-BS was used as the aqueous LCS during SVOC analysis on 8/2/07. All compounds met recovery criteria. No qualifiers were applied. Sample 072407R was analyzed in conjunction with this LCS.

- Sample OP21718-BS was used as the solid LCS during SVOC analysis on 8/3/07. All compounds met recovery criteria. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

- Sample OP21676-BS was used as the aqueous LCS for the PAH-SIM analysis on 8/2/07. All compounds met recovery criteria. No qualifiers were applied. Sample 072407R was analyzed in conjunction with this LCS.

- Sample OP21719-BS was used as the solid LCS for the PAH-SIM analysis on 8/6/07. All compounds met recovery criteria. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid matrix MS/MSD recovery limits follow the LCS criteria specified in Table D-7 of the DoD QSM (DoD, 2006), while aqueous recovery limits follow the LCS criteria in Table D-6 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51272-6 was used as the aqueous MS/MSD during SVOC analysis on 8/1/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample 072407R was analyzed in conjunction with this MS/MSD.

- Sample F51300-5 (an RFAAP sample in data package F51300) was used as the solid MS/MSD during SVOC analysis on 8/3/07. All target compounds met recovery criteria. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

- Sample F53100-31 (an RFAAP sample in data package F51300) was used as the aqueous MS/MSD during PAH SIM analysis on 8/2/07. All compounds met recovery criteria. No qualifiers were applied. Sample 072407R was analyzed in conjunction with this MS/MSD.

- Sample F53100-7 (an RFAAP sample in data package F51300) was used as the solid MS/MSD during PAH SIM analysis on 8/7/07. Chrysene (52%, 53%) and 1-methylnaphthalene (56%, 57%) had low recoveries in the MS & MSD; all chrysene and 1-methylnaphthalene results in associated samples have been qualified "J/UJ". All other target compounds met recovery criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: F51300-7 MSD, pyrene

Conc. (µg/kg) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_i)*(Ws)*(Ps)}

where:	Conc	=	Sample concentration in µg/kg
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	DF	=	Dilution Factor
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_i	=	Volume of extract injected (µL).
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (213250 * 4 * 1000 * 4) / (115975 * 2.134 * 1 * 30.1 * 0.866) = 529 ug/kg

Reported Value = 529 µg/kg
% Difference = 0.0%
Values were within 10% difference.

Sample: F51300-5 MSD, 1,2-dichlorobenzene

Conc. (µg/kg) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_i)*(Ws)*(Ps)}

where:	Conc	=	Sample concentration in µg/kg
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	DF	=	Dilution Factor
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_i	=	Volume of extract injected (µL).
	Ws	=	weight of sample (g)
	Ps	=	percent solids/100

Conc. µg/L = (192226 * 40 * 1000 * 1) / (220274 * 1.477 * 1 * 30.5 * 0.842) = 920 ug/kg

Reported Value = 921 µg/kg
% Difference = 0.1%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L037577.D	1	08/02/07	RB	07/31/07	OP21675	SL1922
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%		14-62%
4165-62-2	Phenol-d5	26%		10-40%
118-79-6	2,4,6-Tribromophenol	86%		33-118%
4165-60-0	Nitrobenzene-d5	80%		42-108%
321-60-8	2-Fluorobiphenyl	78%		40-106%
1718-51-0	Terphenyl-d14	80%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@72036 11:14 19-Dec-2007

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	Date Sampled:	07/24/07
Matrix:	AQ - Water	Date Received:	07/25/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09530.D	1	08/02/07	NJ	07/31/07	OP21676	SR451
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003739.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	900	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	900	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	72	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	900	360	ug/kg	
87-86-5	Pentachlorophenol	ND	900	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	90	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	180	72	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	36	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	36	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	36	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	72	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	360	90	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	360	90	ug/kg	
84-66-2	Diethyl phthalate	ND	360	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	90	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	36	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	36	ug/kg	
67-72-1	Hexachloroethane	ND	180	36	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	72	ug/kg	
99-09-2	3-Nitroaniline	ND	360	72	ug/kg	
100-01-6	4-Nitroaniline	ND	360	72	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	36	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	72%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	61%		40-105%
321-60-8	2-Fluorobiphenyl	64%		43-107%
1718-51-0	Terphenyl-d14	77%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09623.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09623.D	4	08/06/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	290	72	ug/kg	
208-96-8	Acenaphthylene	ND	290	72	ug/kg	
120-12-7	Anthracene	ND	290	43	ug/kg	
56-55-3	Benzo(a)anthracene	25.5	57	14	ug/kg	J
50-32-8	Benzo(a)pyrene	23.9	57	14	ug/kg	J
205-99-2	Benzo(b)fluoranthene	30.9	57	14	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	15.1	57	14	ug/kg	J
207-08-9	Benzo(k)fluoranthene	21.8	57	14	ug/kg	J
218-01-9	Chrysene	37.0	57	14	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	57	14	ug/kg	
206-44-0	Fluoranthene	51.1	290	50	ug/kg	J
86-73-7	Fluorene	ND	290	43	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	15.9	57	14	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	290	43	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	290	43	ug/kg	
91-20-3	Naphthalene	ND	290	43	ug/kg	
85-01-8	Phenanthrene	53.0	290	43	ug/kg	J
129-00-0	Pyrene	ND	290	50	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003742.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1000	410	ug/kg	
95-57-8	2-Chlorophenol	ND	210	41	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	210	41	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	210	41	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	210	41	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	410	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	410	82	ug/kg	
95-48-7	2-Methylphenol	ND	210	41	ug/kg	
	3&4-Methylphenol	ND	210	41	ug/kg	
88-75-5	2-Nitrophenol	ND	210	41	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	410	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	410	ug/kg	
108-95-2	Phenol	ND	210	41	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	210	41	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	210	41	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	210	41	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	410	100	ug/kg	
100-51-6	Benzyl Alcohol	ND	210	41	ug/kg	
91-58-7	2-Chloronaphthalene	ND	210	41	ug/kg	
106-47-8	4-Chloroaniline	ND	210	82	ug/kg	
86-74-8	Carbazole	ND	210	41	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	210	41	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	210	41	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	210	41	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	210	41	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	210	41	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	210	41	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	210	41	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	41	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	410	82	ug/kg	
132-64-9	Dibenzofuran	ND	210	41	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	410	100	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	410	100	ug/kg	
84-66-2	Diethyl phthalate	ND	410	210	ug/kg	
131-11-3	Dimethyl phthalate	ND	410	100	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	410	210	ug/kg	
118-74-1	Hexachlorobenzene	ND	210	41	ug/kg	
87-68-3	Hexachlorobutadiene	ND	210	41	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	210	41	ug/kg	
67-72-1	Hexachloroethane	ND	210	41	ug/kg	
78-59-1	Isophorone	ND	210	41	ug/kg	
88-74-4	2-Nitroaniline	ND	410	82	ug/kg	
99-09-2	3-Nitroaniline	ND	410	82	ug/kg	
100-01-6	4-Nitroaniline	ND	410	82	ug/kg	
98-95-3	Nitrobenzene	ND	210	41	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	210	41	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	210	41	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	210	41	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	72%		40-102%
4165-62-2	Phenol-d5	76%		41-100%
118-79-6	2,4,6-Tribromophenol	80%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	81%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09624.D	4	08/06/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	330	82	ug/kg	
208-96-8	Acenaphthylene	ND	330	82	ug/kg	
120-12-7	Anthracene	ND	330	49	ug/kg	
56-55-3	Benzo(a)anthracene	ND	66	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	66	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	66	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	66	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	66	16	ug/kg	
218-01-9	Chrysene	ND	66	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	66	16	ug/kg	
206-44-0	Fluoranthene	ND	330	58	ug/kg	
86-73-7	Fluorene	ND	330	49	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	66	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	330	49	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	330	49	ug/kg	
91-20-3	Naphthalene	ND	330	49	ug/kg	
85-01-8	Phenanthrene	ND	330	49	ug/kg	
129-00-0	Pyrene	ND	330	58	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003743.D	1	08/03/07	NJ	08/02/07	OP21718	SU183
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	990	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	990	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	79	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	990	390	ug/kg	
87-86-5	Pentachlorophenol	ND	990	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	99	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	79	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	79	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	99	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	99	ug/kg	
84-66-2	Diethyl phthalate	ND	390	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	99	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg	
67-72-1	Hexachloroethane	ND	200	39	ug/kg	
78-59-1	Isophorone	ND	200	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	79	ug/kg	
99-09-2	3-Nitroaniline	ND	390	79	ug/kg	
100-01-6	4-Nitroaniline	ND	390	79	ug/kg	
98-95-3	Nitrobenzene	ND	200	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	58%		40-102%
4165-62-2	Phenol-d5	64%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	51%		40-105%
321-60-8	2-Fluorobiphenyl	55%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09625.D	4	08/06/07	NJ	08/02/07	OP21719	SR455
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	79	ug/kg	
208-96-8	Acenaphthylene	ND	320	79	ug/kg	
120-12-7	Anthracene	ND	320	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	UJ
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	320	55	ug/kg	
86-73-7	Fluorene	ND	320	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	47	ug/kg	UJ
91-57-6	2-Methylnaphthalene	ND	320	47	ug/kg	
91-20-3	Naphthalene	ND	320	47	ug/kg	
85-01-8	Phenanthrene	ND	320	47	ug/kg	
129-00-0	Pyrene	ND	320	55	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F51275

DATE: December 11, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. Samples were analyzed for pesticides using USEPA Methods 3550B/8081A (soils) and 3510C/8081A (waters); and for PCBs using USEPA Methods 3550B/8082 (soils) and 3510C/8082 (waters), respectively. A total of one aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
072407R	F51275-1	59SB03B	F51275-3
59SB03A	F51275-2	59SB03C	F51275-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/11/07
Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F51275

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: Solid samples must be stored @4°C ± 2°C with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/24/07. The aqueous sample was extracted for pesticides and PCBs on 7/30/07, analyzed for pesticides on 8/10/07, and analyzed for PCBs on 8/1/07. The solid samples were extracted for pesticides and PCBs on 8/2/07, analyzed for pesticides on 8/8/07 & 8/11/07, and analyzed for PCBs on 8/6/07 and 8/13/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- During the analysis beginning 8/6/07 @0925, endrin and 4,4'-DDT percent breakdowns were 11.2% and 7.1% on signal #1, and 10.7% and 5.6% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/8/07 @1046, endrin and 4,4'-DDT percent breakdowns were 4.6% and 4.2% on signal #1, and 4.6% and 3.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/10/07 @1538, endrin and 4,4'-DDT percent breakdowns were 3.7% and 2.5% on signal #1, and 3.9% and 2.0% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/11/07 @1054, endrin and 4,4'-DDT percent breakdowns were 3.4% and 2.3% on signal #1, and 3.5% and 2.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- During the analysis beginning 8/13/07 @1116, endrin and 4,4'-DDT percent breakdowns were 2.7% and 1.4% on signal #1, and 2.6% and 1.1% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- During the pesticide initial calibration performed on 8/6/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed following this initial calibration.

- During the pesticide initial calibration performed on 8/10/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample 072407R plus the 1:5 dilutions of 59SB03A, 59SB03B, and 59SB03C were analyzed following this initial calibration.

- During the PCB initial calibration performed on 7/28/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 072407R was analyzed following this initial calibration.

- During the PCB initial calibration performed on 8/6/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 59SB03B and 59SB03C were analyzed following this initial calibration.

- During the PCB initial calibration performed on 8/13/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 59SB03A was analyzed following this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the calibration should be no greater than ±20%.

- During the pesticide initial calibration verification performed on 8/6/07 @1229 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples were analyzed in conjunction with this ICV.

- During the pesticide continuing calibration performed on 8/8/07 @1131 on instrument ECD6, all criteria were met. No qualifiers were applied. A method blank and LCS were analyzed in conjunction with this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1153 on instrument ECD6, the 4th chlordane peak (20.4%) from signal #2 had a %D outside criteria, but the average %D of all six chlordane peaks was 7.9% which met criteria. No qualifiers were applied. A method blank and LCS were analyzed in conjunction with this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1209 on instrument ECD6, all criteria were met. No qualifiers were applied. A method blank and LCS were analyzed in conjunction with this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @1528 on instrument ECD6, all criteria were met. No qualifiers were applied. The only sample associated with this continuing calibration was the unspiked MS/MSD (an RFAAP sample but not from this data package).

- During the pesticide continuing calibration performed on 8/8/07 @1838 on instrument ECD6, endrin aldehyde (21.3%) had a high %D on signal #1, while 4,4'-DDT(28.3%, 25.2%) and methoxychlor (25.6%, 24.4%) had a high %D on both signals. All other compounds met criteria. The only sample associated with this continuing calibration was the unspiked MS/MSD (an RFAAP sample but not from this data package). No qualifiers were applied.

- During the pesticide continuing calibration performed on 8/8/07 @1926 on instrument ECD6, heptachlor (24.0%, 23.1%), endrin aldehyde (21.9%, 22.4%), 4,4'-DDT(31.8%, 31.8%), and methoxychlor (31.3%, 32.5%) had a high %D on both signals. The results for these compounds have been qualified "J/UJ" in associated samples. All other compounds met criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed following this continuing calibration.

- During the pesticide continuing calibration performed on 8/8/07 @2116 on instrument ECD6, endrin (20.4%) had a high %D on signal #1, while endrin aldehyde (22.1%, 21.3%), 4,4'-DDT(46.6%, 42.1%), and methoxychlor (40.3%, 35.3%) had a high %D on both signals. The results for these compounds have been qualified "J/UJ" in associated samples. All other compounds met criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed before this continuing calibration.

- During the pesticide initial calibration verification performed on 8/10/07 @1840 on instrument ECD6, all criteria were met. No qualifiers were applied. A method blank and LCS were analyzed following this ICV.

- During the pesticide continuing calibration performed on 8/10/07 @2015 on instrument ECD6, all criteria were met. No qualifiers were applied. A method blank and LCS were analyzed before this continuing calibration, while sample 072407R plus the aqueous MS & MSD were analyzed following with this continuing calibration.

- During the pesticide continuing calibration performed on 8/10/07 @2205 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample 072407R plus the aqueous MS & MSD were analyzed before with this continuing calibration.

- During the pesticide continuing calibration performed on 8/10/07 @2309 on instrument ECD6, all criteria were met. No qualifiers were applied. The solid MS & MSD were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1110 on instrument ECD6, all criteria were met. No qualifiers were applied. The 1:5 dilution of samples 59SB03A, 59SB03B, and 59SB03C were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1132 on instrument ECD6, all criteria were met. No qualifiers were applied. The 1:5 dilution of samples 59SB03A, 59SB03B, and 59SB03C were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1148 on instrument ECD6, all criteria were met. No qualifiers were applied. The 1:5 dilution of samples 59SB03A, 59SB03B, and 59SB03C were analyzed after this continuing calibration.

- During the pesticide continuing calibration performed on 8/11/07 @1400 on instrument ECD6, all criteria were met. No qualifiers were applied. The 1:5 dilution of samples 59SB03A, 59SB03B, and 59SB03C were analyzed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 7/28/07 @1459 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/1/07 @1521 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 072407R, the aqueous method blank, the aqueous LCS, and the aqueous MS/MSD were analyzed following this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/1/07 @1833 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 072407R, the aqueous method blank, the aqueous LCS, and the aqueous MS/MSD were analyzed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 8/6/07 @1556 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples were analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/6/07 @1906 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 59SB03B and 59SB03C plus the solid method blank, the solid LCS, and the solid MS/MSD were analyzed after this continuing calibration.

- During the PCB 1016/1260 continuing calibration performed on 8/6/07 @2214 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 59SB03B and 59SB03C plus the solid method blank, the solid LCS, and the solid MS/MSD were analyzed before this continuing calibration.

- During the PCB 1016/1260 initial calibration verification performed on 8/13/07 @1416 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 59SB03A was analyzed following this initial calibration verification.

- During the PCB 1016/1260 continuing calibration performed on 8/13/07 @1719 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 59SB03A was analyzed before this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	8/10/07	OP21657-MB	All target <½MRL	NA	NA	None
Pesticides	8/8/07	OP21716-MB	All target <½MRL	NA	NA	None
Pesticides	8/11/07	OP21716-MB	All target <½MRL	NA	NA	None
Pesticides	8/10/07	072407R	All target <½MRL	NA	NA	None
PCBs	8/1/07	OP21658-MB	All target <½MRL	NA	NA	None
PCBs	8/6/07	OP21715-MB	All target <½MRL	NA	NA	None
PCBs	8/1/07	072407R	All target <½MRL	NA	NA	None

072407R is a rinsate blank.
NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Pesticides:	Tetrachloro-m-xylene: 42-127% (DoD QSM 25-140%) Decachlorobiphenyl: 27-127% (DoD QSM 30-135%)
	PCBs:	Tetrachloro-m-xylene: 38-127% (DoD QSM Not Listed) Decachlorobiphenyl: 25-137% (DoD QSM 40-135%)
Solid Criteria:	Pesticides:	Tetrachloro-m-xylene: 46-122% (DoD QSM 70-125%) Decachlorobiphenyl: 50-133% (DoD QSM 55-130%)
	PCBs:	Tetrachloro-m-xylene: 44-126% (DoD QSM Not Listed) Decachlorobiphenyl: 39-157% (DoD QSM 60-125%)

- Sample 59SB03A had a low tetrachloro-m-xylene recovery (61.3%) from signal #1 during pesticide analysis. No data qualification is required unless two surrogates are outside criteria.

- All other samples met surrogate recovery criteria during pesticide analysis.

- All samples met surrogate recovery criteria during PCB analysis.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM solid matrix LCS recovery limits are specified in Tables D-15 and D-17 of the DoD QSM (DoD, 2006), while aqueous LCS recovery limits are specified in Tables D-14 and D-16 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21657-BS was used as the aqueous LCS during the 8/10/07 pesticide analysis. Endrin aldehyde (15%) had a low recovery, and was not detected in any field samples – the results have been qualified "UL" as estimated in associated samples. All other pesticides met recovery criteria. Sample 072407R was analyzed in conjunction with this LCS.

- Sample OP21716-BS was used as the solid LCS during the 8/8/07 pesticide analysis. Delta-BHC (53%) and endrin aldehyde (12%) had low recoveries, and were not detected in any field samples. The results for both compounds have been qualified "UL" as estimated in associated samples. All other pesticides met recovery criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

- Sample OP21658-BS was used as the aqueous LCS during the 8/1/07 PCB analysis. All criteria were met. No qualifiers were applied.

- Sample OP21715-BS was used as the solid LCS during the 8/6/07 PCB analysis. All criteria were met. No qualifiers were applied.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid matrix MS/MSD recovery limits follow the LCS criteria specified in Tables D-15 and D-17 of the DoD QSM (DoD, 2006), while aqueous MS/MSD recovery limits follow the LCS criteria specified in Tables D-14 and D-16 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51353-8 was used for the aqueous pesticide MS/MSD analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample 072407R was analyzed in conjunction with this MS/MSD.

- Sample F51300-11 was used for the solid matrix pesticide MS/MSD analysis. Delta-BHC (51%) and endrin aldehyde (0%, 0%) had low recoveries in the MS and MSD, as well as having low recoveries in the associated LCS. All sample results have already been qualified "UL", no further qualification is required. All other pesticides met criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

- Sample F51314-1 was used for the aqueous PCB MS/MSD analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample 072407R was analyzed in conjunction with this MS/MSD.

- Sample F51300-1 was used for the solid matrix PCB MS/MSD analysis. All PCBs met criteria. No data qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

Sample: OP21716-BS, beta-BHC

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (705390 * 10000 * 1) / (19750 * 1 * 30 * 1 * 1000)
= 11.9 ug/kg

Reported Conc. = 11.9 µg/kg
%D = 0.0%
Values were within 10% difference

Sample: OP21715-BS, Aroclor 1260

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Signal #1
Conc1 µg/L = (3211932 * 10000* 1) / (8380 * 1 * 30 * 1000) = 127.76 µg/kg
Conc2 µg/L = (4273339 * 10000* 1) / (10410 * 1 * 30 * 1000) = 136.83 µg/kg
Conc3 µg/L = (4293784 * 10000* 1) / (10450 * 1 * 30 * 1000) = 136.96 µg/kg
Conc4 µg/L = (2923739 * 10000* 1) / (7516 * 1 * 30 * 1000) = 129.67 µg/kg
Conc5 µg/L = (6792273 * 10000* 1) / (17360 * 1 * 30 * 1000) = 130.42 µg/kg
Conc6 µg/L = (3912029 * 10000* 1) / (9980 * 1 * 30 * 1000) = 130.66 µg/kg
Average concentration = 132 µg/kg

Reported Value = 132 µg/kg (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: TT08307.D

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8081A SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08307.D	1	08/10/07	FS	07/30/07	OP21657	GTT281
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.010	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.010	ug/l	
319-85-7	beta-BHC	ND	0.050	0.011	ug/l	
319-86-8	delta-BHC	ND	0.050	0.010	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.010	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.010	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.010	ug/l	
60-57-1	Dieldrin	ND	0.050	0.010	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.020	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	0.030	ug/l	UL
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.010	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.010	ug/l	
76-44-8	Heptachlor	ND	0.050	0.010	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.010	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.020	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	82%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8082 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64312.D	1	08/01/07	JB	07/30/07	OP21658	GST1698
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		38-127%
2051-24-3	Decachlorobiphenyl	95%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08240.D TT08335.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08240.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08335.D	5	08/11/07	FS	08/02/07	OP21716	GTT282

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2	30.6 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.42	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.49	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.77	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.60	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.35	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.39	ug/kg	
72-54-8	4,4'-DDD	ND	3.5	0.70	ug/kg	
72-55-9	4,4'-DDE	ND	3.5	0.70	ug/kg	
50-29-3	4,4'-DDT	ND [a]	18	4.0	ug/kg	UJ
72-20-8	Endrin	ND	3.5	0.70	ug/kg	UJ
1031-07-8	Endosulfan sulfate	ND	3.5	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.5	1.1	ug/kg	UJ
53494-70-5	Endrin ketone	ND	3.5	0.70	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.5	0.53	ug/kg	
76-44-8	Heptachlor	ND [a]	8.8	2.5	ug/kg	UJ
1024-57-3	Heptachlor epoxide	ND	1.8	0.35	ug/kg	
72-43-5	Methoxychlor	ND [a]	18	3.5	ug/kg	UJ
8001-35-2	Toxaphene	ND	88	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	61%	77%	46-122%
2051-24-3	Decachlorobiphenyl	68%	88%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64788.D	1	08/13/07	JB	08/02/07	OP21715	GST1707
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	8.8	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	8.8	ug/kg	
12672-29-6	Aroclor 1248	ND	18	8.8	ug/kg	
11097-69-1	Aroclor 1254	16.1	18	8.8	ug/kg	J
11096-82-5	Aroclor 1260	ND	18	8.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	88%		44-126%
2051-24-3	Decachlorobiphenyl	79%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08241.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08336.D	5	08/11/07	FS	08/02/07	OP21716	GTT282

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2	30.2 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.1	0.50	ug/kg	
319-84-6	alpha-BHC	ND	2.1	0.58	ug/kg	
319-85-7	beta-BHC	ND	2.1	0.54	ug/kg	
319-86-8	delta-BHC	ND	2.1	0.92	ug/kg	UL
58-89-9	gamma-BHC (Lindane)	ND	2.1	0.71	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.1	0.42	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.1	0.46	ug/kg	
60-57-1	Dieldrin	ND	2.1	0.46	ug/kg	
72-54-8	4,4'-DDD	ND	4.2	0.83	ug/kg	
72-55-9	4,4'-DDE	ND	4.2	0.83	ug/kg	
50-29-3	4,4'-DDT	ND [a]	21	4.8	ug/kg	UJ
72-20-8	Endrin	ND	4.2	0.83	ug/kg	UJ
1031-07-8	Endosulfan sulfate	ND	4.2	1.4	ug/kg	
7421-93-4	Endrin aldehyde	ND	4.2	1.2	ug/kg	UJ
53494-70-5	Endrin ketone	ND	4.2	0.83	ug/kg	
959-98-8	Endosulfan-I	ND	2.1	0.46	ug/kg	
33213-65-9	Endosulfan-II	ND	4.2	0.62	ug/kg	
76-44-8	Heptachlor	ND [a]	10	2.9	ug/kg	UJ
1024-57-3	Heptachlor epoxide	ND	2.1	0.42	ug/kg	
72-43-5	Methoxychlor	ND [a]	21	4.2	ug/kg	UJ
8001-35-2	Toxaphene	ND	100	52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%	91%	46-122%
2051-24-3	Decachlorobiphenyl	73%	94%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64546.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	21	10	ug/kg	
11104-28-2	Aroclor 1221	ND	21	17	ug/kg	
11141-16-5	Aroclor 1232	ND	21	17	ug/kg	
53469-21-9	Aroclor 1242	ND	21	10	ug/kg	
12672-29-6	Aroclor 1248	ND	21	10	ug/kg	
11097-69-1	Aroclor 1254	ND	21	10	ug/kg	
11096-82-5	Aroclor 1260	ND	21	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		44-126%
2051-24-3	Decachlorobiphenyl	90%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08242.D	1	08/08/07	FS	08/02/07	OP21716	GTT279
Run #2	TT08337.D	5	08/11/07	FS	08/02/07	OP21716	GTT282

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2	30.4 g	10.0 ml

Pesticide TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	VL
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
50-29-3	4,4'-DDT	ND [a]	20	4.6	ug/kg	UJ
72-20-8	Endrin	ND	4.0	0.80	ug/kg	UJ
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND	4.0	1.2	ug/kg	UJ
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
76-44-8	Heptachlor	ND [a]	10	2.8	ug/kg	UJ
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND [a]	20	4.0	ug/kg	UJ
8001-35-2	Toxaphene	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%	81%	46-122%
2051-24-3	Decachlorobiphenyl	71%	89%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64547.D	1	08/06/07	JB	08/02/07	OP21715	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254	ND	20	10	ug/kg	
11096-82-5	Aroclor 1260	ND	20	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		44-126%
2051-24-3	Decachlorobiphenyl	86%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F51275

DATE: December 17, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. The samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3010A/6010B (aqueous) and 3050B/6010B (solid matrix) for ICP metals; and SW-846 7470A (aqueous) and 7471A (solid matrix) for mercury. A total of one aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
072407R	F51275-1	59SB03B	F51275-3
59SB03A	F51275-2	59SB03C	F51275-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
	X	Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
X		Laboratory Sample Duplicate
X		Matrix Spike and Spike Duplicate
X		ICP Serial Dilution
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/17/07
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F51275

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Solid samples must be cooled @4°C±2°C with a maximum holding time of 180 days for ICP metals and 28 days for mercury. Aqueous samples must be preserved to pH<2 with HNO_3 and cooled @4°C±2°C, with a maximum holding time of 180 days for ICP metals and 28 days for mercury.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected 7/24/07 for metals analysis, digested for mercury on 7/26/07 and 7/28/07, analyzed for mercury on 7/26/07 and 7/28/07, digested for ICP metals on 7/30/07, and analyzed for ICP metals on 7/30/07 & 7/31/07. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (DoD QSM <½ MRL)	Hg:	1 – blank (DoD QSM <½ MRL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (DoD QSM 90-110%)		ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%)
	MRL (70-130%) (DoD QSM 80-120%)		MRL (80-120%) (DoD QSM 80-120%)
	High Std. (95-105%)		High Std. (95-105%)

- Mercury analysis was performed on 7/26/07, with a correlation coefficient of 0.999.

- Mercury analysis was performed on 7/28/07, with a correlation coefficient of 0.999.

- The mercury ICVs and CCVs met recovery criteria.

- The four samples in this data package were analyzed between CCV16 and CCV22 during the 7/30/07 metals run. All CCVs in this interval met recovery criteria.

- Samples 59SB03B and 59SB03C were analyzed for iron only between CCV8 and CCV10 during the 7/31/07 metals run. All CCVs in this interval met recovery criteria.

- All metals met recovery criteria during the High Standard analysis.

- **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
7/26/07	Hg	0.2 ug/l	Met criteria	None	None
7/28/07	Hg	0.2 ug/l	Met criteria	None	None
7/31/07	ICP-Sb	5 ug/l	34.0	072407R	UL
7/31/07	ICP-Pb	5 ug/l	138.0	072407R	K
7/30/07	ICP-Se	10 ug/l	130.0	None	None
7/30/07	ICP-Zn	20 ug/l	121.5	None	None

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
7/30/07	Copper	ICB/CCBs	0.12	0.60	None
7/30/07	Lead	ICB/CCBs	0.315	1.575	None
7/30/07	Magnesium	ICB/CCBs	0.52	2.6	None
7/30/07	Potassium	ICB/CCBs	87	435	None
7/30/07	Selenium	ICB/CCBs	0.25	1.25	None
7/30/07	Sodium	ICB/CCBs	97	485	None
7/30/07	Thallium	ICB/CCBs	0.28	1.4	None
7/26/07	Mercury	ICB/CCBs	<2*MDL	NA	None
7/28/07	Mercury	ICB/CCBs	<2*MDL	NA	None
7/30/07	ICP Metals	MP12607-MB	<½MRL	NA	None
7/30/07	ICP Metals	MP12611-MB*	<½MRL	NA	None
7/26/07	Mercury	MP12575-MB	<½MRL	NA	None
7/28/07	Mercury	MP12598-MB	<½MRL	NA	None
7/31/07	Lead	072407R	0.105 J	0.525	None
7/31/07	Magnesium	072407R	0.265 J	1.325	None
7/31/07	Potassium	072407R	88 J	440	None
7/31/07	Sodium	072407R	96 J	480	None
7/28/07	Mercury	072407R	<½MRL	NA	None

*: MP12611-MB is an aqueous blank.
072407R is a rinsate blank.
J = Estimated value <MRL and >MDL.

IV-ICP Interference Check Sample (ICS)

The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. The DoD LCS recovery limits are specified in Tables D-18 (aqueous) and D-19 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12607-BS was used as the LCS during solid matrix ICP metals analysis. All criteria were met. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

- Sample MP12611-BS was used as the LCS during aqueous ICP metals analysis. All criteria were met. No qualifiers were applied. Sample 072407R was analyzed in conjunction with this LCS.

- Sample MP12575-BS was used as the LCS during solid matrix mercury analysis. All criteria were met. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

- Sample MP12598-BS was used as the LCS during aqueous mercury analysis. All criteria were met. No qualifiers were applied. Sample 072407R was analyzed in conjunction with this LCS.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample 59SB03A was analyzed in duplicate during solid matrix ICP metals analysis. Arsenic (22.3%) and calcium (21.0%) had RPDs above criteria – all results for these two metals have been qualified "J". The other metals met RPD criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this laboratory duplicate.

- Sample 072407R was analyzed in duplicate during aqueous ICP metals analysis. Copper (53.7%), iron (200%), magnesium (24.8%), and zinc (200%) had RPDs above criteria; the high RPDs were due to low sample concentrations (<RL) Therefore, no qualifiers were applied. All other metals met RPD criteria. Sample 072407R was analyzed in conjunction with this laboratory duplicate.

- Sample F51247-17 was analyzed in duplicate during solid matrix mercury analysis. The sample was not a RFAAP site sample; therefore, it was not evaluated. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this laboratory duplicate.

- Sample F51314-1 was analyzed in duplicate during aqueous mercury analysis. The sample was not a RFAAP site sample; therefore, it was not evaluated. Sample 072407R was analyzed in conjunction with this laboratory duplicate.

VII-Matrix Spike/Spike Duplicate
MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD MS/MSD recovery limits follow the LCS criteria specified in Tables D-18 (aqueous) and D-19 (sold matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample 59SB03A was used as the MS/MSD during solid matrix ICP metals analysis. Aluminum (28.1%, 36.2%), antimony (10.5%, 9.2%), calcium (65.3%, 62.6%), chromium (74.1%, 73.3%), iron (14.6%, 37.6%), magnesium (69.9%, 69.6%), magnesium (0%, 19.6%), selenium (78.6%, 76.2%), vanadium (79.0%, 77.8%), and zinc (62,7%, 69.6%) had low recoveries in the MS & MSD, while cobalt (79.4%), copper (79.8%), nickel (76.6%), and thallium (78.8%) had low recoveries in the MSD. The results for these metals have been qualified "L/UL". The other metals met recovery criteria, and all metals met RPD criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

- Sample 072407R was used as the MS/MSD during aqueous ICP metals analysis. All metals met recovery and RPD criteria. Sample 072407R was analyzed in conjunction with this MS/MSD.

- Sample F51247-17 was used as the MS/MSD during solid matrix mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

- Sample F51314-1 was used as the MS/MSD during aqueous mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample 072407R was analyzed in conjunction with this MS/MSD.

VIII-ICP Serial Dilution

An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- Sample 59SB03A was used as the serial dilution during solid matrix ICP metals analysis. Aluminum (13.4%), arsenic (18.3%), barium (13.2%), calcium (18.1%), chromium (17.4%), cobalt (20.4%), copper (11.5%), iron (18.1%), lead (18.9%), magnesium (18.6%), manganese (19.0%), nickel (19.6%), potassium (52.0%), selenium (16.5%), vanadium (16.3%), and zinc (21.0%) had %D > 10%. All detections for these metals have been qualified "J/UJ". The other metals met criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this serial dilution.

- Sample 072407R was used as the serial dilution during aqueous ICP metals analysis. Potassium (389.3%) had a %D > 10%. The potassium detections have been qualified "J". All other metals met criteria. Sample 072407R was analyzed in conjunction with this serial dilution.

- Sample F51247-17 was used as the serial dilution during solid matrix mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this serial dilution.

- Sample F51314-1 was used as the serial dilution during aqueous mercury analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Sample 072407R was analyzed in conjunction with this serial dilution.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

X-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 59SB03A, Chromium

Conc. (mg/kg) = (conc. μg/L) *(Final Volume L) * (DF) / (Sample weight g) * (Percent solids/100)

Conc. (mg/kg) = (296.2 μg/L)*(0.05 L)*(1) / (1.02)*(0.931) = 15.6 mg/kg

Reported concentration = 15.6 mg/kg
%D = 0.0%
Values were within 10% difference.

CVAA Sample: 59SB03A, Mercury

Conc. (mg/kg) = (conc. μg/L) *(Final Volume L) * (DF) / (Sample weight g) * (Percent solids/100)

Conc. (mg/kg) = (2.70 μg/L)*(0.05 L)*(1) / (0.66)*(0.931) = 0.22 mg/kg

Reported concentration = 0.22 mg/kg
%D = 0.0%.
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result		RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18 U		200	18	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	UL	6.0	3.4	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U		10	2.8	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	5.0 U		200	5.0	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U		4.0	1.0	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U		5.0	1.0	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	42 U		1000	42	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.60 U		10	0.60	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U		50	1.0	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.0 U		25	1.0	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U		300	15	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	2.1 J	K	5.0	1.7	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	5.3 J	J	5000	4.3	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.5 U		15	1.5	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U		1.0	0.10	ug/l	1	07/28/07	07/28/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.0 U		40	1.0	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1760 J	J	10000	100	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U		10	2.8	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U		10	0.90	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	1920 J	J	10000	500	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U		10	2.9	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U		50	1.1	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	1.6 U		20	1.6	ug/l	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5882
(2) Instrument QC Batch: MA5885
(3) Prep QC Batch: MP12598
(4) Prep QC Batch: MP12611

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	Date Sampled:	07/24/07
Matrix:	SO - Soil	Date Received:	07/25/07
		Percent Solids:	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	10400 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Antimony	0.74 J L	3.2	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	30.3 J	0.42	0.21	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	181 J	11	0.26	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.59	0.26	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium	0.053 U	0.21	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Calcium	1420 J	260	3.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	15.6	0.53	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	5.4	2.6	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Copper	13.2	1.3	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	15600	5.3	0.63	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	20.3	5.3	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	1520	260	0.39	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	175	0.79	0.032	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.22	0.081	0.0065	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	8.9 J	2.1	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Potassium	757 J	530	5.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Selenium	6.4 J	5.3	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.047 U	0.53	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Sodium	43 U	530	43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Thallium [a]	4.8 U	11	4.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	25.0 J	2.6	0.032	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Zinc	45.7 J	1.1	0.068	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Prep QC Batch: MP12575
(4) Prep QC Batch: MP12607

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
		Percent Solids:	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	27300 J	12	1.4	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.5 J L	3.7	0.33	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	4.3 J	0.49	0.24	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	39.7 J	12	0.31	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.54	0.31	0.062	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.062 U	0.25	0.062	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	138 J J	310	3.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	17.3	0.62	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	3.2	3.1	0.062	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	19.1	1.5	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	36400	62	8.6	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Lead	9.7	6.2	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	972	310	0.46	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	82.2	0.92	0.037	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.093 J	0.10	0.0080	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	10.6	2.5	0.062	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1130	620	6.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	10.7	6.2	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.055 U	0.62	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	51 U	620	51	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	7.0 U	12	7.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	56.9 J	3.1	0.037	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	31.9 J	1.2	0.080	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12575
(5) Prep QC Batch: MP12607

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
		Percent Solids:	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis DATA VAL QUALIFIER

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	24200 J	12	1.3	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.8 J L	3.6	0.32	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	11.0 J	0.49	0.24	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	41.6 J	12	0.30	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.48	0.30	0.061	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.61 U	1.2	0.61	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	152 J J	300	3.5	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	19.6	0.61	0.055	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	2.9 J	3.0	0.061	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	17.3	1.5	0.055	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	36500	61	8.5	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Lead	9.3	6.1	0.12	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	949	300	0.45	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	76.6	0.91	0.036	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.029 J	0.098	0.0078	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.6	2.4	0.061	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1020	610	6.1	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	11.7	6.1	0.12	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.055 U	0.61	0.055	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	50 U	610	50	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	7.0 U	12	7.0	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	49.5 J	3.0	0.036	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	29.5 J	1.2	0.079	mg/kg	1	07/30/07	07/31/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12575
(5) Prep QC Batch: MP12607

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Richard McCracken, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F51275

DATE: December 17, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. The samples were analyzed for chlorinated herbicides using USEPA SW846 Method 8151A. A total of one aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
072407R	F51275-1	59SB03B	F51275-3
59SB03A	F51275-2	59SB03C	F51275-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

12/17/07
Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F51275

I-Holding Times

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Solid samples must be cooled @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/24/07, extracted on 7/31/07, and analyzed on 8/2/07 & 8/3/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration data was provided for MCPP or MCPA. During discussions with the laboratory, they indicated that they perform a one-point calibration each day that analysis for MCPP or MCPA is conducted. A five-point initial calibration was not performed, therefore all data for these two compounds has been qualified "J/UJ".

- During the initial calibration performed on 8/1/07 on instrument GC-GG, pentachlorophenol (20.65%) and 2,4,5-TP (Silvex) (20.32%) had %RSD > 20% on signal #1 - the results for these two compounds have been qualified "J/UJ". The other target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. All samples were analyzed following this initial calibration.

III-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A one-point daily calibration from 8/2/07 @1149 and 8/3/07 @1729 was provided for MCPP and MCPA, indicating that the lab is able to detect and quantitate both compounds. %D data was not supplied since a five-point initial calibration was not performed. All MCPP and MCPA data has already been qualified (see initial calibration), no additional qualification is required.

- During continuing calibration performed on 8/2/07 @1244 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed after this continuing calibration.

- During continuing calibration performed on 8/2/07 @2009 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed before this continuing calibration.

- During continuing calibration performed on 8/3/07 @0134 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. The MS & MSD were analyzed after this continuing calibration.

- During continuing calibration performed on 8/3/07 @0350 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. The MS & MSD were analyzed before this continuing calibration.

- During continuing calibration performed on 8/3/07 @1756 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample 072407R plus the aqueous MS & MSD were analyzed after this continuing calibration.

- During continuing calibration performed on 8/3/07 @2322 on instrument GC-GG, all target compounds (except MCPP and MCPA – see above) met criteria for signal #1 and signal #2. No qualifiers were applied. Sample 072407R plus the aqueous MS & MSD were analyzed before this continuing calibration.

IV-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L or ug/kg	Action Level µg/L	B qualified samples
8/2/07	OP7785-MB	All target compounds <½MRL	NA	NA	None
8/3/07	OP7790-MB	All target compounds <½MRL	NA	NA	None
8/3/07	072407R	All target compounds <½MRL	NA	NA	None

072407R is a rinsate blank.
NA = Not applicable. MRL = Method reporting limit.

V-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Control Limit: 2,4-DCAA (34-179%)

- All samples met recovery criteria.

VI-Laboratory Control Samples
Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD LCS recovery limits are specified in Tables D-8 (aqueous) and D-9 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP7785-BS was used as the solid matrix LCS during the 8/2/07 run. All herbicides were within criteria, no data qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

- Sample OP7790-BS was used as the aqueous LCS during the 8/3/07 run. All herbicides were within criteria, no data qualifiers were applied. Sample 072407R was analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD MS/MSD recovery limits follow the LCS criteria specified in Tables D-8 (aqueous) and D-9 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Solid matrix MS/MSD analysis was performed on F51300-25 (an RFAAP sample analyzed as part of Accutest job number 51300) . Dichloroprop (65%) had a low recovery in the MS – the dichloroprop results in associated samples have been qualified "J/UJ". 2,4,5-TP (Silvex), 2,4,5-T, and dalapon had high RPDs – no data qualification is performed on RPD data alone. All other herbicides met recovery and RPD criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

- Aqueous MS/MSD analysis was performed on 072407R. Dinoseb (13%, 14%) had a low recovery in the MS & MSD, the dinoseb results in associated samples have been qualified "J/UJ". All other herbicides met recovery and RPD criteria. Sample 072407R was analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

IX-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL is qualified as estimated, "J." All criteria were met. No qualifiers were applied.

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: OP7785-BS, 2,4,5-TP (Silvex)

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where:
- Ax = Area response for the compound being measured
- Vt = Total volume of extract, taking into account dilutions (uL)
- DF = Dilution factor
- CF = Calibration Factor from initial calibration (area/pg)
- Vi = Volume of extract injected (uL)
- Ws = weight of sample (g)
- Ps = percent solids/100

Conc. µg/kg = (1639054 * 10000 * 1) / (48130 * 1 * 30.11 * 1 * 1000)
= 11.3 ug/kg

Reported Conc. = 11.3 µg/kg
%D = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8151 SW846 3510C	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36536.D	1	08/03/07	ATX	07/31/07	T:OP7790	T:GGG1141
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	UJ
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	UJ
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND	50		ug/l	UJ
94-74-6	MCPA	ND	50		ug/l	UJ
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	85%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36492.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	13	ug/kg	UJ
93-76-5	2,4,5-T	ND	7.2	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.2	5.4	ug/kg	
88-85-7	Dinoseb	ND	7.2	4.7	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.7	ug/kg	UJ
94-82-6	2,4-DB	ND	72	58	ug/kg	
93-65-2	MCPP	ND	180		ug/kg	UJ
94-74-6	MCPA	ND	180		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	67%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36493.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
94-75-7	2,4-D	ND	42	17	ug/kg		
93-72-1	2,4,5-TP (Silvex)	ND	17	15	ug/kg	UJ	
93-76-5	2,4,5-T	ND	8.3	4.2	ug/kg		
1918-00-9	Dicamba	ND	8.3	6.3	ug/kg		
88-85-7	Dinoseb	ND	8.3	5.4	ug/kg		
75-99-0	Dalapon	ND	42	29	ug/kg		
120-36-5	Dichloroprop	ND	42	11	ug/kg	UJ	
94-82-6	2,4-DB	ND	83	68	ug/kg		
93-65-2	MCPP	ND	210		ug/kg	UJ	
94-74-6	MCPA	ND	210		ug/kg	UJ	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	86%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36494.D	1	08/02/07	ATX	07/31/07	T:OP7785	T:GGG1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	41	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	UJ
93-76-5	2,4,5-T	ND	8.1	4.1	ug/kg	
1918-00-9	Dicamba	ND	8.1	6.1	ug/kg	
88-85-7	Dinoseb	ND	8.1	5.3	ug/kg	
75-99-0	Dalapon	ND	41	28	ug/kg	
120-36-5	Dichloroprop	ND	41	11	ug/kg	UJ
94-82-6	2,4-DB	ND	81	66	ug/kg	
93-65-2	MCPP	ND	200		ug/kg	UJ
94-74-6	MCPA	ND	200		ug/kg	UJ

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	84%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. Project G383-587
(Accutest SDG F51275)

DATE: December 18, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. The samples were analyzed for Dioxin and Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of one aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	**Field Sample ID**	Lab Sample ID
072407R	F51275-1	59SB03B	F51275-3
59SB03A	F51275-2	59SB03C	F51275-4

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
X		Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard M. Cracken

Richard McCracken, Chemist

12/18/07

Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDG G383-587
(Accutest SDG F51275)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Dioxin and furan samples must be shipped @4°C ± 2°C, with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied. Accutest shipped the dioxin aliquots to SGS Paradigm Analytical Laboratories on 7/27/07, and they were received by SGS Paradigm on 7/31/07 at 4.6°C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/24/07, extracted on 8/1/07 & 8/7/07, and analyzed on 8/3/07 & 8/9/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. pg/g	Action Level pg/g	B qualified samples
8/2/07	LMB14393	All	ND	NA	None
8/9/07	LMB14402	1,2,3,4,6,7,8-HpCDD	0.446	2.23	None
8/9/07	LMB14402	OCDD	2.84	28.4	None
8/9/07	LMB14402	1,2,3,4,7,8-HxCDF	0.258	1.29	F51275-2, -4
8/9/07	LMB14402	1,2,3,6,7,8-HxCDF	0.126	0.63	None
8/9/07	LMB14402	1,2,3,4,6,7,8-HpCDF	1.23	6.15	F51275-4
8/9/07	LMB14402	OCDF	1.95	19.5	F51275-4
8/3/07	072407R	All	ND	NA	None

LMB14393 is an aqueous method blank, for sample F51275-1.
LMB14402 is a solid matrix method blank, for samples F51275-2, -3, & -4.
072407R is a rinsate blank.
J = Estimated value <MRL and >EDL.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

  - The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
  - The signal to noise ratio ≥10% for all target ions;
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During initial calibration performed on 07/10/07 using instrument HRMS1, all compounds met criteria. No qualifiers were applied. Sample F51275-1 was analyzed in conjunction with this initial calibration.

- During initial calibration performed on 11/2/06 using instrument HRMS3, all compounds met criteria. No qualifiers were applied. Samples F51275-2, F51275-3, and F51275-4 were analyzed in conjunction with this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

  - The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
  - The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- During the continuing calibration performed on 8/2/07 @1603 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample F51275-1 was analyzed following this continuing calibration.

- During the continuing calibration performed on 8/3/07 @0324 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample F51275-1 was analyzed before this continuing calibration.

- During the continuing calibration performed on 8/9/07 @1323 on instrument HRMS3, all criteria were met. No qualifiers were applied. Samples F51275-2, F51275-3, and F51275-4 were analyzed after this continuing calibration.

- During the continuing calibration performed on 8/9/07 @2234 on instrument HRMS3, 13C-1,2,3,4-TCDD (37.2%) and 13C-1,2,3,7,8,9-HxCDD (36.4%) had high %D. These labeled standards are injection standards only, the standards used for quantitation met criteria, so no data qualifiers were applied. All other standards met criteria. Samples F51275-2, F51275-3, and F51275-4 were analyzed after this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All field samples met criteria. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All field samples met criteria. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within $\pm$35% when spiked at the method quantitation limit and within $\pm$30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within $\pm$20% when spiked above 20 times the method quantitation limit.

- Sample OPR14402 was used as the solid LCS/LCSD during the 8/9/07 analytical run. All criteria were met. No qualifiers were applied. Samples F51275-2, F51275-3, and F51275-4 were analyzed in conjunction with this LCS.

- Sample OPR14393 was used as the aqueous LCS/LCSD during the 8/2/07 analytical run. All criteria were met. No qualifiers were applied. Sample F51275-1 was were analyzed in conjunction with this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD $\leq$20%.

- MS/MSD analysis was not performed on an RFAAP sample. No data qualification was required.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". When the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". If of quantitation interference was present (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- The 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, and 1,2,3,4,7,8,9-HpCDF results in F51275-2 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,7,8-PeCDF and 1,2,3,6,7,8-HxCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

- The 2,3,7,8-TCDF and 1,2,3,4,6,7,8-HpCDF results in F51275-3 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratio for 1,2,3,4,6,7,8-HpCDF did not meet criteria and has been reported as an Estimated Maximum Possible Concentration (EPMC). Since the result has already been qualified "J", no further qualification is required.

- The 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF results in F51275-4 have been qualified "J" as estimated since the amount detected was less than the Lower Method Calibration Limit. The ion abundance ratios for 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDF, and 2,3,4,6,7,8-HxCDF did not meet criteria and have been reported as an Estimated Maximum Possible Concentration (EPMC). Since the results have already been qualified "J", no further qualification is required.

Sample: 49MW01 (F51275-1), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
Avg. RRF = calculated mean relative response factor for the unlabeled analyte.
Ws = weight of sample (g)
Ps = percent solids/100

$$\text{Conc. (ng/L)} = \frac{(A(x)) * Q(is) * 1000}{A(is) * \text{Avg. RRF} * Ws * Ps} = \frac{(2910000) * 4.0 * 1000}{(704000) * 1.12564 * 10.56 * 0.797} = 1750 \text{ pg/g}$$

Reported Value = 1750 pg/g
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Method 8290
F51275-1
Accutest

Analytical Data Summary Sheet

Analyte	Amount ng/L	EDL ng/L	EMPC ng/L	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00436				
1,2,3,7,8-PeCDD	ND	0.00533				
1,2,3,4,7,8-HxCDD	ND	0.00697				
1,2,3,6,7,8-HxCDD	ND	0.00709				
1,2,3,7,8,9-HxCDD	ND	0.00720				
1,2,3,4,6,7,8-HpCDD	ND	0.0112				
OCDD	ND	0.0173				
2,3,7,8-TCDF	ND	0.00345				
1,2,3,7,8-PeCDF	ND	0.00533				
2,3,4,7,8-PeCDF	ND	0.00533				
1,2,3,4,7,8-HxCDF	ND	0.00533				
1,2,3,6,7,8-HxCDF	ND	0.00533				
2,3,4,6,7,8-HxCDF	ND	0.00533				
1,2,3,7,8,9-HxCDF	ND	0.00545				
1,2,3,4,6,7,8-HpCDF	ND	0.00533				
1,2,3,4,7,8,9-HpCDF	ND	0.00619				
OCDF	ND	0.0141				
Total TCDDs	ND	0.00436				
Total PeCDDs	ND	0.00533				
Total HxCDDs	ND	0.00720				
Total HpCDDs	ND	0.0112				
Total TCDFs	ND	0.00345				
Total PeCDFs	ND	0.00533				
Total HxCDFs	ND	0.00545				
Total HpCDFs	ND	0.00619				
WHO-2005 TEQ (ND=0)	ND		ND			
WHO-2005 TEQ (ND=½)	0.00815		0.00815			

Client Information			**Sample Information**	
Project Name:	F51275		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51275-1		Weight / Volume:	938 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14393
Project ID:	G383-587		Instrument:	HRMS1
Sample ID:	G383-587-1C		Filename:	a30jul07a_9-12
Collection Date/Time:	07/24/07	8:00	Retchk:	a30jul07a_8-4
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	a30jul07a_8-4
Extraction Date:	08/01/07		End ConCal:	a30jul07a_9-14
Analysis Date/Time:	08/03/07	1:48	Initial Cal:	m8290-071007a

Method 8290
F51275-2
Accutest

Analytical Data Summary Sheet

DATA VAL QUALIFIER

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.217						
1,2,3,7,8-PeCDD	0.675			34.01	1.54		A	J
1,2,3,4,7,8-HxCDD	1.07			36.57	1.35		A	J
1,2,3,6,7,8-HxCDD	3.07			36.66	1.35		A	J
1,2,3,7,8,9-HxCDD	2.89			36.90	1.20		A	J
1,2,3,4,6,7,8-HpCDD	91.9			39.90	1.05			
OCDD	1750			44.03	0.90			
2,3,7,8-TCDF	0.502			30.18	0.73		A	J
1,2,3,7,8-PeCDF	EMPC	0.594	0.152	33.18	0.81	*	A	J
2,3,4,7,8-PeCDF	0.376			33.81	1.57		A	J
1,2,3,4,7,8-HxCDF	1.11			35.88	1.23		A	BJ
1,2,3,6,7,8-HxCDF	EMPC	0.594	0.616	35.96	1.46	*	A	J
2,3,4,6,7,8-HxCDF	0.899			36.46	1.16		A	J
1,2,3,7,8,9-HxCDF	ND	0.594						
1,2,3,4,6,7,8-HpCDF	18.9			38.67	1.03			
1,2,3,4,7,8,9-HpCDF	0.982			40.55	1.17		A	J
OCDF	50.7			44.31	0.88			
Total TCDDs	0.418		0.535					
Total PeCDDs	2.19		4.50				Q	
Total HxCDDs	19.4							
Total HpCDDs	194							
Total TCDFs	1.50		2.47					
Total PeCDFs	1.67		3.69					
Total HxCDFs	16.3		17.1					
Total HpCDFs	62.0							
WHO-2005 TEQ (ND=0)	3.40		3.47					
WHO-2005 TEQ (ND=½)	3.58		3.60					

Client Information			**Sample Information**	
Project Name:	F51275		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51275-2		Weight / Volume:	10.56 g
			Solids / Lipids:	79.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-587		Instrument:	HRMS3
Sample ID:	G383-587-2B		Filename:	c08aug07a_4-7
Collection Date/Time:	07/24/07	10:45	Retchk:	c08aug07a_3-14
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_3-14
Extraction Date:	08/07/07		End ConCal:	c08aug07a_4-10
Analysis Date/Time:	08/09/07	20:08	Initial Cal:	m8290-c110206a

Method 8290
F51275-3
Accutest

DATA VAL QUALIFIER

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.261						
1,2,3,7,8-PeCDD	ND	0.615						
1,2,3,4,7,8-HxCDD	ND	0.615						
1,2,3,6,7,8-HxCDD	ND	0.615						
1,2,3,7,8,9-HxCDD	ND	0.615						
1,2,3,4,6,7,8-HpCDD	20.7			39.91	1.10			
OCDD	3260			44.03	0.90			
2,3,7,8-TCDF	0.290			30.21	0.72		A	J
1,2,3,7,8-PeCDF	ND	0.615						
2,3,4,7,8-PeCDF	ND	0.615						
1,2,3,4,7,8-HxCDF	ND	0.615						
1,2,3,6,7,8-HxCDF	ND	0.615						
2,3,4,6,7,8-HxCDF	ND	0.615						
1,2,3,7,8,9-HxCDF	ND	0.615						
1,2,3,4,6,7,8-HpCDF	EMPC	0.615	0.963	38.65	1.24	*	A	J
1,2,3,4,7,8,9-HpCDF	ND	0.615						
OCDF	ND	1.23						
Total TCDDs	ND	0.261						
Total PeCDDs	ND	0.615	0.214					
Total HxCDDs	0.394		0.977					
Total HpCDDs	52.9							
Total TCDFs	0.290							
Total PeCDFs	ND	0.615						
Total HxCDFs	ND	0.615	0.460					
Total HpCDFs	0.896		1.86					
WHO-2005 TEQ (ND=0)	1.21		1.22					
WHO-2005 TEQ (ND=½)	1.98		1.98					

Client Information			**Sample Information**	
Project Name:	F51275		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51275-3		Weight / Volume:	10.54 g
			Solids / Lipids:	77.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14402
Project ID:	G383-587		Instrument:	HRMS3
Sample ID:	G383-587-3B		Filename:	c08aug07a_4-8
Collection Date/Time:	07/24/07	10:55	Retchk:	c08aug07a_3-14
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_3-14
Extraction Date:	08/07/07		End ConCal:	c08aug07a_4-10
Analysis Date/Time:	08/09/07	20:57	Initial Cal:	m8290-c110206a

Method 8290
F51275-4
Accutest

DATA VAL
QUALIFIER

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier	
2,3,7,8-TCDD	ND	0.191						
1,2,3,7,8-PeCDD	EMPC	0.617	0.234	34.02	1.19	*	A	J
1,2,3,4,7,8-HxCDD	EMPC	0.617	0.269	36.60	2.07	*	A	J
1,2,3,6,7,8-HxCDD	0.383			36.67	1.28		A	J
1,2,3,7,8,9-HxCDD	0.496			36.91	1.24		A	J
1,2,3,4,6,7,8-HpCDD	14.7			39.90	1.09			
OCDD	1170			44.03	0.90			
2,3,7,8-TCDF	ND	0.188						
1,2,3,7,8-PeCDF	ND	0.617						
2,3,4,7,8-PeCDF	EMPC	0.617	0.101	33.81	1.30	*	A	J
1,2,3,4,7,8-HxCDF	0.239			35.90	1.20		A	BJ
1,2,3,6,7,8-HxCDF	EMPC	0.617	0.153	35.98	1.96	*	A	J
2,3,4,6,7,8-HxCDF	EMPC	0.617	0.0913	36.46	3.17	*	A	J
1,2,3,7,8,9-HxCDF	ND	0.617						
1,2,3,4,6,7,8-HpCDF	2.75			38.68	1.01		A	BJ
1,2,3,4,7,8,9-HpCDF	ND	0.617						
OCDF	5.74			44.33	0.94		A	BJ
Total TCDDs	0.0740		0.195					
Total PeCDDs	ND	0.617	0.550					
Total HxCDDs	1.34		2.60					
Total HpCDDs	32.3							
Total TCDFs	0.170		0.271					
Total PeCDFs	0.104		0.205					
Total HxCDFs	1.51		1.75					
Total HpCDFs	6.06							
WHO-2005 TEQ (ND=0)	0.639		0.955					
WHO-2005 TEQ (ND=½)	1.28		1.10					

Client Information			**Sample Information**		
Project Name:	F51275		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51275-4		Weight / Volume:	10.22 g	
			Solids / Lipids:	79.3	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14402	
Project ID:	G383-587		Instrument:	HRMS3	
Sample ID:	G383-587-4B		Filename:	c08aug07a_4-9	
Collection Date/Time:	07/24/07	11:05	Retchk:	c08aug07a_3-14	
Receipt Date/Time:	07/31/07	10:20	Begin ConCal:	c08aug07a_3-14	
Extraction Date:	08/07/07		End ConCal:	c08aug07a_4-10	
Analysis Date/Time:	08/09/07	21:45	Initial Cal:	m8290-c110206a	

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F51275

DATE: December 12, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on July 24, 2007. The samples were analyzed for explosives using USEPA SW846 Method 8330A, and nitroglycerin & PETN using USEPA SW-846 Method 8332A. A total of one aqueous and three soil samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
072407R	F51275-1	59SB03B	F51275-3
59SB03A	F51275-2	59SB03C	F51275-4

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Richard M. Cracken

Richard McCracken, Chemist

12/12/07

Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F51275

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Solid samples must be cooled @4°C ± 2°C, with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. Aqueous samples must be cooled @4°C ± 2°C, with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 7/24/07 were sent in two coolers, and were received by the laboratory on 7/25/07 at 2.6 °C & 3.4 °C. No qualifiers were applied.

- Holding Time Review: The samples were collected on 7/24/07, extracted on 7/31/07 & 8/1/07, analyzed for PETN and nitroglycerine on 8/1/07 & 8/3/07, and analyzed for all other explosives on 8/1/07 & 8/3/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
8/1/07	OP21682-MB	All target explosives <½MRL	NA	NA	None
8/1/07	OP21682-MB	PETN & NG <½MRL	NA	NA	None
8/3/07	OP21693-MB	All target explosives <½MRL	NA	NA	None
8/3/07	OP21693-MB	PETN & NG <½MRL	NA	NA	None
8/1/07	072407R	All target explosives <½MRL	NA	NA	None
8/1/07	072407R	PETN & NG <½MRL	NA	NA	None

072407R is a rinsate blank
MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient (r^2) must be ≥0.990 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration performed on 10/18/06 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

- During the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- During the explosives initial calibration verification performed on 10/18/06 @1739 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed after this initial calibration verification.

- During the explosives initial calibration verification performed on 10/19/06 @1344 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed after this initial calibration verification.

- During the explosives continuing calibration verification performed on 8/1/07 @1220 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 072407R was analyzed following this continuing calibration.

- During the explosives continuing calibration verification performed on 8/1/07 @1705 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 072407R was analyzed before this continuing calibration.

- During the explosives continuing calibration verification performed on 8/2/07 @2239 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. The solid matrix method blank, LCS, MS, & MSD were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/3/07 @0411 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. The solid matrix method blank, LCS, MS, & MSD were analyzed before this continuing calibration.

- During the explosives continuing calibration verification performed on 8/3/07 @0941 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed after this continuing calibration.

- During the explosives continuing calibration verification performed on 8/3/07 @1537 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed before this continuing calibration.

- During the PETN and nitroglycerin initial calibration verification performed on 3/15/07 @1235 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples were analyzed in conjunction with this initial calibration verification.

- During the PETN and nitroglycerin continuing calibration performed on 8/1/07 @1027 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 072407R was analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/1/07 @1136 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample 072407R was analyzed before this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/3/07 @0924 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. The solid matrix method blank and LCS were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/3/07 @1059 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. The solid matrix method blank and LCS were analyzed before this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/3/07 @1241 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed after this continuing calibration.

- During the PETN and nitroglycerin continuing calibration performed on 8/3/07 @1333 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed before this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria: 3,4-dinitrotoluene (72-145%)

Aqueous Criteria: 3,4-dinitrotoluene (70-136%)

- All criteria were met for explosives, PETN, and nitroglycerin. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM solid matrix LCS recovery limits are specified in Table D-13 of the DoD QSM (DoD, 2006), while the aqueous LCS recovery limits are specified in Table D-12 of the DoD QSM. If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21682-BS was used as the aqueous LCS for explosives, PETN, and nitroglycerin analysis. All compounds met recovery criteria. Sample 072407R was analyzed in conjunction with this LCS.

- Sample OP21693-BS was used as the solid LCS for explosives, PETN, and nitroglycerin analysis. All compounds met recovery criteria. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD MS/MSD recovery limits follow the LCS criteria specified in Table D-12 (aqueous) and D-13 (solid matrix) of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 072407R was used for the aqueous MS/MSD analysis. All compounds met criteria. Sample 072407R was analyzed in conjunction with this MS/MSD.

- Sample F51154-18 was used for the solid MS/MSD analysis. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Samples 59SB03A, 59SB03B, and 59SB03C were analyzed in conjunction with this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this data package.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all detected compounds.

Sample: OP21693-BS, HMX

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where: Ax = Area response for the compound being measured
Vt = Total volume of extract, taking into account dilutions (uL)
DF = Dilution factor
CF = Calibration Factor from initial calibration (area/pg)
Vi = Volume of extract injected (uL)
Ws = weight of sample (g)
Ps = percent solids/100

Conc. µg/kg = (1654265 * 20000 * 1) / (2764 * 1 * 2 * 1 * 1000)
= 5980 ug/kg

Reported Value = 5980 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: OP21693-BS2, nitroglycerin

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * Ps * 1000)

where:
- Ax = Area response for the compound being measured
- Vt = Total volume of extract, taking into account dilutions (uL)
- DF = Dilution factor
- CF = Calibration Factor from initial calibration (area/pg)
- Vi = Volume of extract injected (uL)
- Ws = weight of sample (g)
- Ps = percent solids/100

Conc. µg/kg = (3475817 * 20000 * 1) / (1228 * 1 * 2.0 * 1 * 1000)
= 28300 ug/kg

Reported Value = 28300 µg/kg
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest Laboratories

Report of Analysis

Client Sample ID:	072407R		
Lab Sample ID:	F51275-1	**Date Sampled:**	07/24/07
Matrix:	AQ - Water	**Date Received:**	07/25/07
Method:	SW846 8330A SW846 3535A	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023032.D	1	08/01/07	NAF	07/31/07	OP21682	GGG990
Run #2	PP021890.D	1	08/01/07	NAF	07/31/07	OP21682	GPP756

	Initial Volume	Final Volume
Run #1	950 ml	10.0 ml
Run #2	950 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.21	0.054	ug/l	
121-82-4	RDX	ND	0.21	0.063	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.21	0.059	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.21	0.075	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.21	0.10	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.21	0.068	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.21	0.059	ug/l	
98-95-3	Nitrobenzene	ND	0.21	0.077	ug/l	
88-72-2	o-Nitrotoluene	ND	0.21	0.12	ug/l	
99-08-1	m-Nitrotoluene	ND	0.21	0.082	ug/l	
99-99-0	p-Nitrotoluene	ND	0.21	0.11	ug/l	
479-45-8	Tetryl	ND	0.21	0.072	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.21	0.068	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.21	0.053	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.1	0.53	ug/l	
78-11-5	PETN	ND [a]	2.1	0.53	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	97%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03A		
Lab Sample ID:	F51275-2	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8330A SW846 8330B	**Percent Solids:**	93.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023102.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021983.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.42 g	20.0 ml
Run #2	2.42 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	43	ug/kg	
121-82-4	RDX	ND	210	41	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	74	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	41	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	41	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	45	ug/kg	
98-95-3	Nitrobenzene	ND	210	59	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	64	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	85	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	57	ug/kg	
479-45-8	Tetryl	ND	410	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	49	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	41	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	620	ug/kg	
78-11-5	PETN	ND [a]	1700	620	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	103%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03B		
Lab Sample ID:	F51275-3	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8330A SW846 8330B	**Percent Solids:**	79.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023103.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021984.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.37 g	20.0 ml
Run #2	2.37 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	44	ug/kg	
121-82-4	RDX	ND	210	42	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	42	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	75	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	42	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	42	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	46	ug/kg	
98-95-3	Nitrobenzene	ND	210	60	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	65	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	87	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	58	ug/kg	
479-45-8	Tetryl	ND	420	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	50	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	42	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	630	ug/kg	
78-11-5	PETN	ND [a]	1700	630	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	107%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SB03C		
Lab Sample ID:	F51275-4	**Date Sampled:**	07/24/07
Matrix:	SO - Soil	**Date Received:**	07/25/07
Method:	SW846 8330A SW846 8330B	**Percent Solids:**	82.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023104.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021985.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.39 g	20.0 ml
Run #2	2.39 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	44	ug/kg	
121-82-4	RDX	ND	210	42	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	42	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	74	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	42	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	42	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	45	ug/kg	
98-95-3	Nitrobenzene	ND	210	59	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	64	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	86	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	58	ug/kg	
479-45-8	Tetryl	ND	420	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	49	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	42	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	630	ug/kg	
78-11-5	PETN	ND [a]	1700	630	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	112%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F51247

DATE: November 30, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5035/8260B for solid matrices. A total of twenty solid samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
X		Matrix Spike / Spike Duplicate Sample
X		System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

11/30/07
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F51247

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For soil samples cooled @ 4°C±2°C; the maximum holding time is 14 days from sample collection to analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: For the solid samples collected 07/23/07, the VOCs were prepped and analyzed on 07/27/07, 07/30/07, and 07/31/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For initial calibration performed on 07/16/07 on instrument MSVOA3, target compounds acetone (18.5%), methylene chloride (32.0%; grossly exceeding), ethylbenzene (15.1%), m,p-xylene (16.6%), and o-xylene (15.4%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds acetone (r=0.9962), methylene chloride (r=1.0000), ethylbenzene (r=0.9985), m,p-xylene (r=0.9988), and o-xylene (r=0.9990) were quantified using linear or second order regression with correlation coefficients >0.995; therefore, no qualifiers were applied based upon these outliers. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this initial calibration. Confirmations for samples 50SB012B (F51247-14), 50SB013B (F51247-16), and 50SB015B (F51247-20) also apply to this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For initial calibration verification performed on 07/16/07 @18:20 on instrument MSVOA3, bromomethane (36.1%) was outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Bromomethane was non-detect for all samples; therefore, no qualifiers were applied based upon the high %D. No samples reported apply to this initial calibration verification. No qualifiers were applied based upon this outlier.

- For continuing calibration performed on 07/27/07 @11:02 on instrument MSVOA3, target compounds acetone (55.4%; grossly exceeding), 1,1,1-trichloroethane (25.9%) and carbon tetrachloride (30.4%) were outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Acetone was qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Drift. 1,1,1-Trichloroethane and carbon tetrachloride were non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), and 50SB09B (F51247-8) apply to this continuing calibration.

- For continuing calibration performed on 07/30/07 @12:07 on instrument MSVOA3, target compounds acetone (43.7%; grossly exceeding), 2-butanone (35.6%), trichloroethene (21.1%), and 2-hexanone (27.0%) were outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Acetone was qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Drift. 2-Butanone, trichloroethene, and 2-hexanone were non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. Samples 50SB07A (F51247-3), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this continuing calibration.

- For continuing calibration performed on 07/31/07 @11:12 on instrument MSVOA3, target compounds bromomethane (27.9%), chloroethane (25.4%), acetone (75.0%; grossly exceeding), and 2-butanone (22.9%) were outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Acetone was qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Drift. Bromomethane, chloroethane, and 2-butanone were non-detect for all associated samples; therefore no qualifiers were applied based upon this outlier. Confirmations for samples 50SB012B (F51247-14), 50SB013B (F51247-16), and 50SB015B (F51247-20) apply to this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 1) as needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. The trip blank TB072307 (F51247-21) applies to the solid samples collected 07/23/07.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
07/27/07	VH1663-MB	All target <½MRL	NA	NA	None
07/30/07	VH1664-MB	All target <½MRL	NA	NA	None
07/31/07	VH1665-MB	All target <½MRL	NA	NA	None
07/31/07	072407R	All target <½MRL	NA	NA	None
08/02/07	072507R	All target <½MRL	NA	NA	None
07/30/07	TB072307	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample
Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. DoD LCS soil recovery limits are specified in Table D-5 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample VH1663-BS was used as the solid LCS for the VOC analysis on 07/27/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), and 50SB09B (F51247-8) apply to this LCS.

- Sample VH1664-BS was used as the solid LCS for the VOC analysis on 07/30/07. All criteria were met. No qualifiers were applied. Samples 50SB07A (F51247-3), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample VH1665-BS was used as the solid LCS for the VOC analysis on 07/31/07. All criteria were met. No qualifiers were applied. Confirmations for samples 50SB012B (F51247-14), 50SB013B (F51247-16), and 50SB015B (F51247-20) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD solid recovery limits follow the LCS criteria and are specified in Table D-5 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample F51244-2 was used for the solid MS/MSD analysis for analysis on 07/27/07. Since this sample is not a RFAAP site sample, it was not evaluated. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), and 50SB09B (F51247-8) apply to this MS/MSD.

- Sample 50SB012A (F51247-13) was used for the solid MS/MSD analysis on 07/30/07. Acetone (48%, 47%), cis-1,3-dichloropropene (74%, 73%), trans-1,3-dichloropropene (83%), 2-hexanone (50%, 53%), 4-methyl-2-pentanone (54%, 56%), methyl ethyl ketone (47%, 48%), 1,1,2,2-tetrachloroethane (67%) were outside lab criteria and/or DoD QSM criteria for the MS/MSD sample. The associated LCS was within criteria for these compounds (See Section VI). The spiked sample was qualified bias low "UL" for non-detects for acetone, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 2-hexanone, 4-methyl-2-pentanone, methyl ethyl ketone, and 1,1,2,2-tetrachloroethane based upon these outliers. All other percent recoveries were within criteria for all target compounds. Samples 50SB07A (F51247-3), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

- Sample 43SB10C (F51300-29) was used for the solid MS/MSD analysis on 07/31/07. Acetone (53%, 55%), carbon tetrachloride (139%, 141%), 2-hexanone (62%), 4-methyl-2-pentanone (61%), methyl bromide (156%, 155%), methyl ethyl ketone (54%, 57%), 1,1,1-trichloroethane (135%), and toluene (133%) were outside lab criteria and/or DoD QSM criteria for the MS/MSD sample. The associated LCS was within criteria for these compounds (See Section VI). The spiked sample was qualified bias low "UL" for non-detects for acetone, 2-hexanone, 4-methyl-2-pentanone, and methyl ethyl ketone based upon these outliers. No qualifiers were applied for carbon tetrachloride, methyl bromide, 1,1,1-trichloroethane, and toluene based upon the high recoveries (spiked sample was non-detect for these compounds). All other percent recoveries were within criteria for all target compounds. Confirmations for samples 50SB012B (F51247-14), 50SB013B (F51247-16), and 50SB015B (F51247-20) apply to this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria:
Dibromofluoromethane (80-121%) (DoD QSM = None Listed)
Toluene-d8 (71-130%) (DoD QSM = 85-115%)
4-Bromofluorobenzene (59-148%) (DoD QSM = 85-120%)
1,2-Dichloroethane-d4 (77-123%) (DoD QSM = None Listed)

- For sample 50SB06A (F51247-1), 4-bromofluorobenzene (122%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 50SB07A (F51247-3), 4-bromofluorobenzene (123%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 50SB010A (F51247-9), 4-bromofluorobenzene (121%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 50SB012B (F51247-14), dibromofluoromethane (124%) and 4-bromofluorobenzene (144%) were outside DoD QSM criteria and within lab criteria. All detects were qualified estimated high "K" and non-detects no qualifier based upon these outliers. The sample was rerun for confirmation with 107% (within criteria) recovery.

- For sample 50SB013B (F51247-16), 4-bromofluorobenzene (146%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 130% recovery.

- For sample 50SB015B (F51247-20), dibromofluoromethane (130%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 123% recovery.

- For all other samples, all criteria were met. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- For sample 50SB08A (F51247-5), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 50SB08B (F51247-6), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 50SB09B (F51247-8), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 50SB010A (F51247-9), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 50SB012B (F51247-14), internal standard 3 1,4-dichlorobenzene-d4 was below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For confirmation run of sample 50SB012B (F51247-14), internal standard 3 1,4-dichlorobenzene-d4 and internal standard 4 tert-butyl-alcohol-d10 were below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4 or tert-butyl-alcohol-d10; therefore, no qualifiers were applied based upon these outliers. All other internal standards were within criteria. The sample was rerun for confirmation.

- For sample 50SB013B (F51247-16), internal standard 3 1,4-dichlorobenzene-d4 was below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For confirmation run of sample 50SB013B (F51247-16), internal standard 3 1,4-dichlorobenzene-d4 was below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For all other samples, all criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 50SB012AMS (F51247-13MS), methyl ethyl ketone

Conc. (µg/kg) = {(Ax)*(Is)*(DF)*(Vp)} / {(Ais)*(RRF)*(Ws)*Fs)}
where:
Ax is the compound area
Is is the corresponding internal standard concentration (ng/mL)
DF is the dilution factor
Vp is the volume purged (mL)
Ais is the corresponding internal standard area
RRF is the relative response factor
Ws is the weight of the sample (g)
Fs is the fraction solids for the sample

Conc. µg/kg = (583457 * 50 ng/mL * 1 * 5mL) / (880802 * 0.284 * 5.06g * 0.854) =
= 135 µg/kg

Reported Conc. = 135 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: H044704.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044704.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	5.73 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	49	25	ug/kg	
71-43-2	Benzene	ND	4.9	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	4.9	2.0	ug/kg	
75-25-2	Bromoform	ND	4.9	2.0	ug/kg	
108-90-7	Chlorobenzene	ND	4.9	2.0	ug/kg	
75-00-3	Chloroethane	ND	4.9	2.9	ug/kg	
67-66-3	Chloroform	ND	4.9	2.0	ug/kg	
75-15-0	Carbon disulfide	ND	4.9	2.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.9	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.9	2.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.9	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.9	2.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.9	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	4.9	2.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.9	2.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.9	2.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.9	2.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.9	2.0	ug/kg	
100-41-4	Ethylbenzene	ND	4.9	2.0	ug/kg	
591-78-6	2-Hexanone	ND	25	9.8	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	9.8	ug/kg	
74-83-9	Methyl bromide	ND	4.9	2.0	ug/kg	
74-87-3	Methyl chloride	ND	4.9	2.0	ug/kg	
75-09-2	Methylene chloride	ND	9.8	4.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	9.8	ug/kg	
100-42-5	Styrene	ND	4.9	2.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.9	2.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.9	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.9	2.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.9	2.0	ug/kg	
108-88-3	Toluene	ND	4.9	2.0	ug/kg	
79-01-6	Trichloroethylene	ND	4.9	2.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.9	2.0	ug/kg	
	m,p-Xylene	ND	9.8	2.9	ug/kg	
95-47-6	o-Xylene	ND	4.9	2.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	122%		59-148%
17060-07-0	1,2-Dichloroethane-D4	105%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044705.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044705.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	3.79 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	110	55	ug/kg	
71-43-2	Benzene	ND	11	4.4	ug/kg	
75-27-4	Bromodichloromethane	ND	11	4.4	ug/kg	
75-25-2	Bromoform	ND	11	4.4	ug/kg	
108-90-7	Chlorobenzene	ND	11	4.4	ug/kg	
75-00-3	Chloroethane	ND	11	6.6	ug/kg	
67-66-3	Chloroform	ND	11	4.4	ug/kg	
75-15-0	Carbon disulfide	ND	11	4.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	11	4.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	11	4.4	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	11	4.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	11	4.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	11	4.4	ug/kg	
124-48-1	Dibromochloromethane	ND	11	4.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	11	4.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	11	4.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	11	4.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	11	4.4	ug/kg	
100-41-4	Ethylbenzene	ND	11	4.4	ug/kg	
591-78-6	2-Hexanone	ND	55	22	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	55	22	ug/kg	
74-83-9	Methyl bromide	ND	11	4.4	ug/kg	
74-87-3	Methyl chloride	ND	11	4.4	ug/kg	
75-09-2	Methylene chloride	ND	22	11	ug/kg	
78-93-3	Methyl ethyl ketone	ND	55	22	ug/kg	
100-42-5	Styrene	ND	11	4.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	11	4.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	11	4.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	11	4.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	11	4.4	ug/kg	
108-88-3	Toluene	ND	11	4.4	ug/kg	
79-01-6	Trichloroethylene	ND	11	4.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	11	4.4	ug/kg	
	m,p-Xylene	ND	22	6.6	ug/kg	
95-47-6	o-Xylene	ND	11	4.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	112%		59-148%
17060-07-0	1,2-Dichloroethane-D4	101%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044741.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	3.13 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VT	90	45	ug/kg	
71-43-2	Benzene	ND	9.0	3.6	ug/kg	
75-27-4	Bromodichloromethane	ND	9.0	3.6	ug/kg	
75-25-2	Bromoform	ND	9.0	3.6	ug/kg	
108-90-7	Chlorobenzene	ND	9.0	3.6	ug/kg	
75-00-3	Chloroethane	ND	9.0	5.4	ug/kg	
67-66-3	Chloroform	ND	9.0	3.6	ug/kg	
75-15-0	Carbon disulfide	ND	9.0	3.6	ug/kg	
56-23-5	Carbon tetrachloride	ND	9.0	3.6	ug/kg	
75-34-3	1,1-Dichloroethane	ND	9.0	3.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	9.0	3.6	ug/kg	
107-06-2	1,2-Dichloroethane	ND	9.0	3.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	9.0	3.6	ug/kg	
124-48-1	Dibromochloromethane	ND	9.0	3.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	9.0	3.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	9.0	3.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	9.0	3.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	9.0	3.6	ug/kg	
100-41-4	Ethylbenzene	ND	9.0	3.6	ug/kg	
591-78-6	2-Hexanone	ND	45	18	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	45	18	ug/kg	
74-83-9	Methyl bromide	ND	9.0	3.6	ug/kg	
74-87-3	Methyl chloride	ND	9.0	3.6	ug/kg	
75-09-2	Methylene chloride	ND	18	9.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	45	18	ug/kg	
100-42-5	Styrene	ND	9.0	3.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	9.0	3.6	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.0	3.6	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	9.0	3.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	9.0	3.6	ug/kg	
108-88-3	Toluene	ND	9.0	3.6	ug/kg	
79-01-6	Trichloroethylene	ND	9.0	3.6	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	9.0	3.6	ug/kg	
	m,p-Xylene	ND	18	5.4	ug/kg	
95-47-6	o-Xylene	ND	9.0	3.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	101%		71-130%
460-00-4	4-Bromofluorobenzene	123%		59-148%
17060-07-0	1,2-Dichloroethane-D4	118%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044707.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	4.36 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	97	48	ug/kg	
71-43-2	Benzene	ND	9.7	3.9	ug/kg	
75-27-4	Bromodichloromethane	ND	9.7	3.9	ug/kg	
75-25-2	Bromoform	ND	9.7	3.9	ug/kg	
108-90-7	Chlorobenzene	ND	9.7	3.9	ug/kg	
75-00-3	Chloroethane	ND	9.7	5.8	ug/kg	
67-66-3	Chloroform	ND	9.7	3.9	ug/kg	
75-15-0	Carbon disulfide	ND	9.7	3.9	ug/kg	
56-23-5	Carbon tetrachloride	ND	9.7	3.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	9.7	3.9	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	9.7	3.9	ug/kg	
107-06-2	1,2-Dichloroethane	ND	9.7	3.9	ug/kg	
78-87-5	1,2-Dichloropropane	ND	9.7	3.9	ug/kg	
124-48-1	Dibromochloromethane	ND	9.7	3.9	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	9.7	3.9	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	9.7	3.9	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	9.7	3.9	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	9.7	3.9	ug/kg	
100-41-4	Ethylbenzene	ND	9.7	3.9	ug/kg	
591-78-6	2-Hexanone	ND	48	19	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	48	19	ug/kg	
74-83-9	Methyl bromide	ND	9.7	3.9	ug/kg	
74-87-3	Methyl chloride	ND	9.7	3.9	ug/kg	
75-09-2	Methylene chloride	ND	19	9.7	ug/kg	
78-93-3	Methyl ethyl ketone	ND	48	19	ug/kg	
100-42-5	Styrene	ND	9.7	3.9	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	9.7	3.9	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.7	3.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	9.7	3.9	ug/kg	
127-18-4	Tetrachloroethylene	ND	9.7	3.9	ug/kg	
108-88-3	Toluene	ND	9.7	3.9	ug/kg	
79-01-6	Trichloroethylene	ND	9.7	3.9	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	9.7	3.9	ug/kg	
	m,p-Xylene	ND	19	5.8	ug/kg	
95-47-6	o-Xylene	ND	9.7	3.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-121%
2037-26-5	Toluene-D8	100%		71-130%
460-00-4	4-Bromofluorobenzene	118%		59-148%
17060-07-0	1,2-Dichloroethane-D4	105%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044708.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044708.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	4.70 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone [a]	74.5 J	61	31	ug/kg	
71-43-2	Benzene	ND	6.1	2.5	ug/kg	
75-27-4	Bromodichloromethane	ND	6.1	2.5	ug/kg	
75-25-2	Bromoform	ND	6.1	2.5	ug/kg	
108-90-7	Chlorobenzene	ND	6.1	2.5	ug/kg	
75-00-3	Chloroethane	ND	6.1	3.7	ug/kg	
67-66-3	Chloroform	ND	6.1	2.5	ug/kg	
75-15-0	Carbon disulfide	ND	6.1	2.5	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.1	2.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.1	2.5	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.1	2.5	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.1	2.5	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.1	2.5	ug/kg	
124-48-1	Dibromochloromethane	ND	6.1	2.5	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.1	2.5	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.1	2.5	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.1	2.5	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.1	2.5	ug/kg	
100-41-4	Ethylbenzene	ND	6.1	2.5	ug/kg	
591-78-6	2-Hexanone	ND	31	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	31	12	ug/kg	
74-83-9	Methyl bromide	ND	6.1	2.5	ug/kg	
74-87-3	Methyl chloride	ND	6.1	2.5	ug/kg	
75-09-2	Methylene chloride	ND	12	6.1	ug/kg	
78-93-3	Methyl ethyl ketone	ND	31	12	ug/kg	
100-42-5	Styrene	ND	6.1	2.5	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.1	2.5	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.1	2.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.1	2.5	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.1	2.5	ug/kg	
108-88-3	Toluene	ND	6.1	2.5	ug/kg	
79-01-6	Trichloroethylene	ND	6.1	2.5	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.1	2.5	ug/kg	
	m,p-Xylene	ND	12	3.7	ug/kg	
95-47-6	o-Xylene	ND	6.1	2.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	115%		59-148%
17060-07-0	1,2-Dichloroethane-D4	105%		77-123%

(a) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044709.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044709.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	4.12 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	95	48	ug/kg	
71-43-2	Benzene	ND	9.5	3.8	ug/kg	
75-27-4	Bromodichloromethane	ND	9.5	3.8	ug/kg	
75-25-2	Bromoform	ND	9.5	3.8	ug/kg	
108-90-7	Chlorobenzene	ND	9.5	3.8	ug/kg	
75-00-3	Chloroethane	ND	9.5	5.7	ug/kg	
67-66-3	Chloroform	ND	9.5	3.8	ug/kg	
75-15-0	Carbon disulfide	ND	9.5	3.8	ug/kg	
56-23-5	Carbon tetrachloride	ND	9.5	3.8	ug/kg	
75-34-3	1,1-Dichloroethane	ND	9.5	3.8	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	9.5	3.8	ug/kg	
107-06-2	1,2-Dichloroethane	ND	9.5	3.8	ug/kg	
78-87-5	1,2-Dichloropropane	ND	9.5	3.8	ug/kg	
124-48-1	Dibromochloromethane	ND	9.5	3.8	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	9.5	3.8	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	9.5	3.8	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	9.5	3.8	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	9.5	3.8	ug/kg	
100-41-4	Ethylbenzene	ND	9.5	3.8	ug/kg	
591-78-6	2-Hexanone	ND	48	19	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	48	19	ug/kg	
74-83-9	Methyl bromide	ND	9.5	3.8	ug/kg	
74-87-3	Methyl chloride	ND	9.5	3.8	ug/kg	
75-09-2	Methylene chloride	ND	19	9.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	48	19	ug/kg	
100-42-5	Styrene	ND	9.5	3.8	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	9.5	3.8	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.5	3.8	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	9.5	3.8	ug/kg	
127-18-4	Tetrachloroethylene	ND	9.5	3.8	ug/kg	
108-88-3	Toluene	ND	9.5	3.8	ug/kg	
79-01-6	Trichloroethylene	ND	9.5	3.8	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	9.5	3.8	ug/kg	
	m,p-Xylene	ND	19	5.7	ug/kg	
95-47-6	o-Xylene	ND	9.5	3.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	116%		59-148%
17060-07-0	1,2-Dichloroethane-D4	107%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044710.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044710.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	4.08 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	73	37	ug/kg	
71-43-2	Benzene	ND	7.3	2.9	ug/kg	
75-27-4	Bromodichloromethane	ND	7.3	2.9	ug/kg	
75-25-2	Bromoform	ND	7.3	2.9	ug/kg	
108-90-7	Chlorobenzene	ND	7.3	2.9	ug/kg	
75-00-3	Chloroethane	ND	7.3	4.4	ug/kg	
67-66-3	Chloroform	ND	7.3	2.9	ug/kg	
75-15-0	Carbon disulfide	ND	7.3	2.9	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.3	2.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.3	2.9	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.3	2.9	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.3	2.9	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.3	2.9	ug/kg	
124-48-1	Dibromochloromethane	ND	7.3	2.9	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.3	2.9	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.3	2.9	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.3	2.9	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.3	2.9	ug/kg	
100-41-4	Ethylbenzene	ND	7.3	2.9	ug/kg	
591-78-6	2-Hexanone	ND	37	15	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	37	15	ug/kg	
74-83-9	Methyl bromide	ND	7.3	2.9	ug/kg	
74-87-3	Methyl chloride	ND	7.3	2.9	ug/kg	
75-09-2	Methylene chloride	ND	15	7.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND	37	15	ug/kg	
100-42-5	Styrene	ND	7.3	2.9	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.3	2.9	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.3	2.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.3	2.9	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.3	2.9	ug/kg	
108-88-3	Toluene	ND	7.3	2.9	ug/kg	
79-01-6	Trichloroethylene	ND	7.3	2.9	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.3	2.9	ug/kg	
	m,p-Xylene	ND	15	4.4	ug/kg	
95-47-6	o-Xylene	ND	7.3	2.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	114%		59-148%
17060-07-0	1,2-Dichloroethane-D4	108%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044711.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044711.D	1	07/27/07	SH	n/a	n/a	VH1663
Run #2							

	Initial Weight
Run #1	4.07 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	99	50	ug/kg	
71-43-2	Benzene	ND	9.9	4.0	ug/kg	
75-27-4	Bromodichloromethane	ND	9.9	4.0	ug/kg	
75-25-2	Bromoform	ND	9.9	4.0	ug/kg	
108-90-7	Chlorobenzene	ND	9.9	4.0	ug/kg	
75-00-3	Chloroethane	ND	9.9	5.9	ug/kg	
67-66-3	Chloroform	ND	9.9	4.0	ug/kg	
75-15-0	Carbon disulfide	ND	9.9	4.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	9.9	4.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	9.9	4.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	9.9	4.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	9.9	4.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	9.9	4.0	ug/kg	
124-48-1	Dibromochloromethane	ND	9.9	4.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	9.9	4.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	9.9	4.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	9.9	4.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	9.9	4.0	ug/kg	
100-41-4	Ethylbenzene	ND	9.9	4.0	ug/kg	
591-78-6	2-Hexanone	ND	50	20	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	50	20	ug/kg	
74-83-9	Methyl bromide	ND	9.9	4.0	ug/kg	
74-87-3	Methyl chloride	ND	9.9	4.0	ug/kg	
75-09-2	Methylene chloride	ND	20	9.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	50	20	ug/kg	
100-42-5	Styrene	ND	9.9	4.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	9.9	4.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.9	4.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	9.9	4.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	9.9	4.0	ug/kg	
108-88-3	Toluene	ND	9.9	4.0	ug/kg	
79-01-6	Trichloroethylene	ND	9.9	4.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	9.9	4.0	ug/kg	
	m,p-Xylene	ND	20	5.9	ug/kg	
95-47-6	o-Xylene	ND	9.9	4.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	110%		59-148%
17060-07-0	1,2-Dichloroethane-D4	121%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044725.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.94 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	55	27	ug/kg	
71-43-2	Benzene	ND	5.5	2.2	ug/kg	
75-27-4	Bromodichloromethane	ND	5.5	2.2	ug/kg	
75-25-2	Bromoform	ND	5.5	2.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.5	2.2	ug/kg	
75-00-3	Chloroethane	ND	5.5	3.3	ug/kg	
67-66-3	Chloroform	ND	5.5	2.2	ug/kg	
75-15-0	Carbon disulfide	ND	5.5	2.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.5	2.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.5	2.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.5	2.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.5	2.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.5	2.2	ug/kg	
124-48-1	Dibromochloromethane	ND	5.5	2.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.5	2.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.5	2.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.5	2.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.5	2.2	ug/kg	
100-41-4	Ethylbenzene	ND	5.5	2.2	ug/kg	
591-78-6	2-Hexanone	ND	27	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	27	11	ug/kg	
74-83-9	Methyl bromide	ND	5.5	2.2	ug/kg	
74-87-3	Methyl chloride	ND	5.5	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	27	11	ug/kg	
100-42-5	Styrene	ND	5.5	2.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.5	2.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.5	2.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.5	2.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.5	2.2	ug/kg	
108-88-3	Toluene	ND	5.5	2.2	ug/kg	
79-01-6	Trichloroethylene	ND	5.5	2.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.5	2.2	ug/kg	
	m,p-Xylene	ND	11	3.3	ug/kg	
95-47-6	o-Xylene	ND	5.5	2.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	121%		59-148%
17060-07-0	1,2-Dichloroethane-D4	107%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8260B	Percent Solids:	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044726.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.40 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	60	30	ug/kg	
71-43-2	Benzene	ND	6.0	2.4	ug/kg	
75-27-4	Bromodichloromethane	ND	6.0	2.4	ug/kg	
75-25-2	Bromoform	ND	6.0	2.4	ug/kg	
108-90-7	Chlorobenzene	ND	6.0	2.4	ug/kg	
75-00-3	Chloroethane	ND	6.0	3.6	ug/kg	
67-66-3	Chloroform	ND	6.0	2.4	ug/kg	
75-15-0	Carbon disulfide	ND	6.0	2.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.0	2.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.0	2.4	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.0	2.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.0	2.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.0	2.4	ug/kg	
124-48-1	Dibromochloromethane	ND	6.0	2.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.0	2.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.0	2.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.0	2.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.0	2.4	ug/kg	
100-41-4	Ethylbenzene	ND	6.0	2.4	ug/kg	
591-78-6	2-Hexanone	ND	30	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	30	12	ug/kg	
74-83-9	Methyl bromide	ND	6.0	2.4	ug/kg	
74-87-3	Methyl chloride	ND	6.0	2.4	ug/kg	
75-09-2	Methylene chloride	ND	12	6.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	30	12	ug/kg	
100-42-5	Styrene	ND	6.0	2.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.0	2.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.0	2.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.0	2.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.0	2.4	ug/kg	
108-88-3	Toluene	ND	6.0	2.4	ug/kg	
79-01-6	Trichloroethylene	ND	6.0	2.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.0	2.4	ug/kg	
	m,p-Xylene	ND	12	3.6	ug/kg	
95-47-6	o-Xylene	ND	6.0	2.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	110%		59-148%
17060-07-0	1,2-Dichloroethane-D4	106%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044727.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.90 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	55	28	ug/kg	
71-43-2	Benzene	ND	5.5	2.2	ug/kg	
75-27-4	Bromodichloromethane	ND	5.5	2.2	ug/kg	
75-25-2	Bromoform	ND	5.5	2.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.5	2.2	ug/kg	
75-00-3	Chloroethane	ND	5.5	3.3	ug/kg	
67-66-3	Chloroform	ND	5.5	2.2	ug/kg	
75-15-0	Carbon disulfide	ND	5.5	2.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.5	2.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.5	2.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.5	2.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.5	2.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.5	2.2	ug/kg	
124-48-1	Dibromochloromethane	ND	5.5	2.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.5	2.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.5	2.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.5	2.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.5	2.2	ug/kg	
100-41-4	Ethylbenzene	ND	5.5	2.2	ug/kg	
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.5	2.2	ug/kg	
74-87-3	Methyl chloride	ND	5.5	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.5	2.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.5	2.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.5	2.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.5	2.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.5	2.2	ug/kg	
108-88-3	Toluene	ND	5.5	2.2	ug/kg	
79-01-6	Trichloroethylene	ND	5.5	2.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.5	2.2	ug/kg	
	m,p-Xylene	ND	11	3.3	ug/kg	
95-47-6	o-Xylene	ND	5.5	2.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-121%
2037-26-5	Toluene-D8	98%		71-130%
460-00-4	4-Bromofluorobenzene	109%		59-148%
17060-07-0	1,2-Dichloroethane-D4	113%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044728.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.92 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	49	25	ug/kg	
71-43-2	Benzene	ND	4.9	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	4.9	2.0	ug/kg	
75-25-2	Bromoform	ND	4.9	2.0	ug/kg	
108-90-7	Chlorobenzene	ND	4.9	2.0	ug/kg	
75-00-3	Chloroethane	ND	4.9	3.0	ug/kg	
67-66-3	Chloroform	ND	4.9	2.0	ug/kg	
75-15-0	Carbon disulfide	ND	4.9	2.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	4.9	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	4.9	2.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	4.9	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	4.9	2.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	4.9	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	4.9	2.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	4.9	2.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	4.9	2.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	4.9	2.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	4.9	2.0	ug/kg	
100-41-4	Ethylbenzene	ND	4.9	2.0	ug/kg	
591-78-6	2-Hexanone	ND	25	9.9	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	9.9	ug/kg	
74-83-9	Methyl bromide	ND	4.9	2.0	ug/kg	
74-87-3	Methyl chloride	ND	4.9	2.0	ug/kg	
75-09-2	Methylene chloride	ND	9.9	4.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	9.9	ug/kg	
100-42-5	Styrene	ND	4.9	2.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	4.9	2.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	4.9	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	4.9	2.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	4.9	2.0	ug/kg	
108-88-3	Toluene	ND	4.9	2.0	ug/kg	
79-01-6	Trichloroethylene	ND	4.9	2.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	4.9	2.0	ug/kg	
	m,p-Xylene	ND	9.9	3.0	ug/kg	
95-47-6	o-Xylene	ND	4.9	2.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-121%
2037-26-5	Toluene-D8	95%		71-130%
460-00-4	4-Bromofluorobenzene	107%		59-148%
17060-07-0	1,2-Dichloroethane-D4	111%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044729.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.65 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	63	31	ug/kg	
71-43-2	Benzene	ND	6.3	2.5	ug/kg	
75-27-4	Bromodichloromethane	ND	6.3	2.5	ug/kg	
75-25-2	Bromoform	ND	6.3	2.5	ug/kg	
108-90-7	Chlorobenzene	ND	6.3	2.5	ug/kg	
75-00-3	Chloroethane	ND	6.3	3.8	ug/kg	
67-66-3	Chloroform	ND	6.3	2.5	ug/kg	
75-15-0	Carbon disulfide	ND	6.3	2.5	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.3	2.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.3	2.5	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.3	2.5	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.3	2.5	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.3	2.5	ug/kg	
124-48-1	Dibromochloromethane	ND	6.3	2.5	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.3	2.5	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND UL	6.3	2.5	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.3	2.5	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND UL	6.3	2.5	ug/kg	
100-41-4	Ethylbenzene	ND	6.3	2.5	ug/kg	
591-78-6	2-Hexanone	ND UL	31	13	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND UL	31	13	ug/kg	
74-83-9	Methyl bromide	ND	6.3	2.5	ug/kg	
74-87-3	Methyl chloride	ND	6.3	2.5	ug/kg	
75-09-2	Methylene chloride	ND	13	6.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND UL	31	13	ug/kg	
100-42-5	Styrene	ND	6.3	2.5	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.3	2.5	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND UL	6.3	2.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.3	2.5	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.3	2.5	ug/kg	
108-88-3	Toluene	ND	6.3	2.5	ug/kg	
79-01-6	Trichloroethylene	ND	6.3	2.5	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.3	2.5	ug/kg	
	m,p-Xylene	ND	13	3.8	ug/kg	
95-47-6	o-Xylene	ND	6.3	2.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	109%		59-148%
17060-07-0	1,2-Dichloroethane-D4	110%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044758.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2 [a]	H044730.D	1	07/30/07	SH	n/a	n/a	VH1664

	Initial Weight
Run #1	4.85 g
Run #2	3.89 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone [b]	101 J	76	38	ug/kg	
71-43-2	Benzene	ND	7.6	1.5	ug/kg	
75-27-4	Bromodichloromethane	ND	7.6	1.5	ug/kg	
75-25-2	Bromoform	ND	7.6	1.5	ug/kg	
108-90-7	Chlorobenzene	ND	7.6	1.5	ug/kg	
75-00-3	Chloroethane	ND	7.6	4.0	ug/kg	
67-66-3	Chloroform	ND	7.6	1.5	ug/kg	
75-15-0	Carbon disulfide	ND	7.6	1.5	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.6	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.6	1.7	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.6	1.5	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.6	1.5	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.6	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	7.6	1.5	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.6	1.5	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.6	1.5	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.6	1.5	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.6	1.5	ug/kg	
100-41-4	Ethylbenzene	ND	7.6	1.5	ug/kg	
591-78-6	2-Hexanone	ND	38	15	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	38	15	ug/kg	
74-83-9	Methyl bromide	ND	7.6	2.7	ug/kg	
74-87-3	Methyl chloride	ND	7.6	3.0	ug/kg	
75-09-2	Methylene chloride	ND	15	7.6	ug/kg	
78-93-3	Methyl ethyl ketone	ND	38	15	ug/kg	
100-42-5	Styrene	ND	7.6	1.5	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.6	1.5	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.6	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.6	1.5	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.6	1.5	ug/kg	
108-88-3	Toluene	ND	7.6	1.5	ug/kg	
79-01-6	Trichloroethylene	ND	7.6	1.5	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.6	2.1	ug/kg	
	m,p-Xylene	5.8	15	1.7	ug/kg	J
95-47-6	o-Xylene	ND	7.6	1.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	124%	80-121%
2037-26-5	Toluene-D8	105%	113%	71-130%
460-00-4	4-Bromofluorobenzene	120%	144%	59-148%
17060-07-0	1,2-Dichloroethane-D4	108%	122%	77-123%

(a) Confirmation run.
(b) CCV outside of control limits; results may be biased high.
(c) Outside control limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044731.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.93 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	58	29	ug/kg	
71-43-2	Benzene	ND	5.8	2.3	ug/kg	
75-27-4	Bromodichloromethane	ND	5.8	2.3	ug/kg	
75-25-2	Bromoform	ND	5.8	2.3	ug/kg	
108-90-7	Chlorobenzene	ND	5.8	2.3	ug/kg	
75-00-3	Chloroethane	ND	5.8	3.5	ug/kg	
67-66-3	Chloroform	ND	5.8	2.3	ug/kg	
75-15-0	Carbon disulfide	ND	5.8	2.3	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.8	2.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.8	2.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.8	2.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.8	2.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.8	2.3	ug/kg	
124-48-1	Dibromochloromethane	ND	5.8	2.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.8	2.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.8	2.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.8	2.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.8	2.3	ug/kg	
100-41-4	Ethylbenzene	ND	5.8	2.3	ug/kg	
591-78-6	2-Hexanone	ND	29	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	29	12	ug/kg	
74-83-9	Methyl bromide	ND	5.8	2.3	ug/kg	
74-87-3	Methyl chloride	ND	5.8	2.3	ug/kg	
75-09-2	Methylene chloride	ND	12	5.8	ug/kg	
78-93-3	Methyl ethyl ketone	ND	29	12	ug/kg	
100-42-5	Styrene	ND	5.8	2.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.8	2.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.8	2.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.8	2.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.8	2.3	ug/kg	
108-88-3	Toluene	ND	5.8	2.3	ug/kg	
79-01-6	Trichloroethylene	ND	5.8	2.3	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.8	2.3	ug/kg	
	m,p-Xylene	ND	12	3.5	ug/kg	
95-47-6	o-Xylene	ND	5.8	2.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	113%		59-148%
17060-07-0	1,2-Dichloroethane-D4	116%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044759.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2 [a]	H044732.D	1	07/30/07	SH	n/a	n/a	VH1664

	Initial Weight
Run #1	4.86 g
Run #2	3.32 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	80	40	ug/kg	
71-43-2	Benzene	ND	8.0	1.6	ug/kg	
75-27-4	Bromodichloromethane	ND	8.0	1.6	ug/kg	
75-25-2	Bromoform	ND	8.0	1.6	ug/kg	
108-90-7	Chlorobenzene	ND	8.0	1.6	ug/kg	
75-00-3	Chloroethane	ND	8.0	4.1	ug/kg	
67-66-3	Chloroform	ND	8.0	1.6	ug/kg	
75-15-0	Carbon disulfide	ND	8.0	1.6	ug/kg	
56-23-5	Carbon tetrachloride	ND	8.0	2.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	8.0	1.7	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	8.0	1.6	ug/kg	
107-06-2	1,2-Dichloroethane	ND	8.0	1.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	8.0	2.1	ug/kg	
124-48-1	Dibromochloromethane	ND	8.0	1.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	8.0	1.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	8.0	1.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	8.0	1.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	8.0	1.6	ug/kg	
100-41-4	Ethylbenzene	ND	8.0	1.6	ug/kg	
591-78-6	2-Hexanone	ND	40	16	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	40	16	ug/kg	
74-83-9	Methyl bromide	ND	8.0	2.9	ug/kg	
74-87-3	Methyl chloride	ND	8.0	3.2	ug/kg	
75-09-2	Methylene chloride	ND	16	8.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	40	16	ug/kg	
100-42-5	Styrene	ND	8.0	1.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	8.0	1.6	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	8.0	2.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	8.0	1.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	8.0	1.6	ug/kg	
108-88-3	Toluene	ND	8.0	1.6	ug/kg	
79-01-6	Trichloroethylene	ND	8.0	1.6	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	8.0	2.2	ug/kg	
	m,p-Xylene	ND	16	1.7	ug/kg	
95-47-6	o-Xylene	ND	8.0	1.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%	115%	80-121%
2037-26-5	Toluene-D8	107%	115%	71-130%
460-00-4	4-Bromofluorobenzene	130%	146%	59-148%
17060-07-0	1,2-Dichloroethane-D4	116%	121%	77-123%

(a) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044733.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044733.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.10 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	68	34	ug/kg	
71-43-2	Benzene	ND	6.8	2.7	ug/kg	
75-27-4	Bromodichloromethane	ND	6.8	2.7	ug/kg	
75-25-2	Bromoform	ND	6.8	2.7	ug/kg	
108-90-7	Chlorobenzene	ND	6.8	2.7	ug/kg	
75-00-3	Chloroethane	ND	6.8	4.1	ug/kg	
67-66-3	Chloroform	ND	6.8	2.7	ug/kg	
75-15-0	Carbon disulfide	ND	6.8	2.7	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.8	2.7	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.8	2.7	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.8	2.7	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.8	2.7	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.8	2.7	ug/kg	
124-48-1	Dibromochloromethane	ND	6.8	2.7	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.8	2.7	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.8	2.7	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.8	2.7	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.8	2.7	ug/kg	
100-41-4	Ethylbenzene	ND	6.8	2.7	ug/kg	
591-78-6	2-Hexanone	ND	34	14	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	34	14	ug/kg	
74-83-9	Methyl bromide	ND	6.8	2.7	ug/kg	
74-87-3	Methyl chloride	ND	6.8	2.7	ug/kg	
75-09-2	Methylene chloride	ND	14	6.8	ug/kg	
78-93-3	Methyl ethyl ketone	ND	34	14	ug/kg	
100-42-5	Styrene	ND	6.8	2.7	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.8	2.7	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.8	2.7	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.8	2.7	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.8	2.7	ug/kg	
108-88-3	Toluene	ND	6.8	2.7	ug/kg	
79-01-6	Trichloroethylene	ND	6.8	2.7	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.8	2.7	ug/kg	
	m,p-Xylene	ND	14	4.1	ug/kg	
95-47-6	o-Xylene	ND	6.8	2.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	109%		59-148%
17060-07-0	1,2-Dichloroethane-D4	117%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044734.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	4.79 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	63	32	ug/kg	
71-43-2	Benzene	ND	6.3	2.5	ug/kg	
75-27-4	Bromodichloromethane	ND	6.3	2.5	ug/kg	
75-25-2	Bromoform	ND	6.3	2.5	ug/kg	
108-90-7	Chlorobenzene	ND	6.3	2.5	ug/kg	
75-00-3	Chloroethane	ND	6.3	3.8	ug/kg	
67-66-3	Chloroform	ND	6.3	2.5	ug/kg	
75-15-0	Carbon disulfide	ND	6.3	2.5	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.3	2.5	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.3	2.5	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.3	2.5	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.3	2.5	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.3	2.5	ug/kg	
124-48-1	Dibromochloromethane	ND	6.3	2.5	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.3	2.5	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.3	2.5	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.3	2.5	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.3	2.5	ug/kg	
100-41-4	Ethylbenzene	ND	6.3	2.5	ug/kg	
591-78-6	2-Hexanone	ND	32	13	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	32	13	ug/kg	
74-83-9	Methyl bromide	ND	6.3	2.5	ug/kg	
74-87-3	Methyl chloride	ND	6.3	2.5	ug/kg	
75-09-2	Methylene chloride	ND	13	6.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND	32	13	ug/kg	
100-42-5	Styrene	ND	6.3	2.5	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.3	2.5	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.3	2.5	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.3	2.5	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.3	2.5	ug/kg	
108-88-3	Toluene	ND	6.3	2.5	ug/kg	
79-01-6	Trichloroethylene	ND	6.3	2.5	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.3	2.5	ug/kg	
	m,p-Xylene	ND	13	3.8	ug/kg	
95-47-6	o-Xylene	ND	6.3	2.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	106%		59-148%
17060-07-0	1,2-Dichloroethane-D4	112%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044735.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.51 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	52	26	ug/kg	
71-43-2	Benzene	ND	5.2	2.1	ug/kg	
75-27-4	Bromodichloromethane	ND	5.2	2.1	ug/kg	
75-25-2	Bromoform	ND	5.2	2.1	ug/kg	
108-90-7	Chlorobenzene	ND	5.2	2.1	ug/kg	
75-00-3	Chloroethane	ND	5.2	3.1	ug/kg	
67-66-3	Chloroform	ND	5.2	2.1	ug/kg	
75-15-0	Carbon disulfide	ND	5.2	2.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.2	2.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.2	2.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.2	2.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.2	2.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.2	2.1	ug/kg	
124-48-1	Dibromochloromethane	ND	5.2	2.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.2	2.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.2	2.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.2	2.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.2	2.1	ug/kg	
100-41-4	Ethylbenzene	ND	5.2	2.1	ug/kg	
591-78-6	2-Hexanone	ND	26	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	26	10	ug/kg	
74-83-9	Methyl bromide	ND	5.2	2.1	ug/kg	
74-87-3	Methyl chloride	ND	5.2	2.1	ug/kg	
75-09-2	Methylene chloride	ND	10	5.2	ug/kg	
78-93-3	Methyl ethyl ketone	ND	26	10	ug/kg	
100-42-5	Styrene	ND	5.2	2.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.2	2.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.2	2.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.2	2.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.2	2.1	ug/kg	
108-88-3	Toluene	ND	5.2	2.1	ug/kg	
79-01-6	Trichloroethylene	ND	5.2	2.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.2	2.1	ug/kg	
	m,p-Xylene	ND	10	3.1	ug/kg	
95-47-6	o-Xylene	ND	5.2	2.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		80-121%
2037-26-5	Toluene-D8	95%		71-130%
460-00-4	4-Bromofluorobenzene	108%		59-148%
17060-07-0	1,2-Dichloroethane-D4	117%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044760.D	1	07/31/07	SH	n/a	n/a	VH1665
Run #2 [a]	H044736.D	1	07/30/07	SH	n/a	n/a	VH1664

	Initial Weight
Run #1	3.73 g
Run #2	4.93 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	79	39	ug/kg	
71-43-2	Benzene	ND	7.9	1.6	ug/kg	
75-27-4	Bromodichloromethane	ND	7.9	1.6	ug/kg	
75-25-2	Bromoform	ND	7.9	1.6	ug/kg	
108-90-7	Chlorobenzene	ND	7.9	1.6	ug/kg	
75-00-3	Chloroethane	ND	7.9	4.1	ug/kg	
67-66-3	Chloroform	ND	7.9	1.6	ug/kg	
75-15-0	Carbon disulfide	ND	7.9	1.6	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.9	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.9	1.7	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.9	1.6	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.9	1.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.9	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	7.9	1.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.9	1.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.9	1.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.9	1.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.9	1.6	ug/kg	
100-41-4	Ethylbenzene	ND	7.9	1.6	ug/kg	
591-78-6	2-Hexanone	ND	39	16	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	39	16	ug/kg	
74-83-9	Methyl bromide	ND	7.9	2.8	ug/kg	
74-87-3	Methyl chloride	ND	7.9	3.1	ug/kg	
75-09-2	Methylene chloride	ND	16	7.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	39	16	ug/kg	
100-42-5	Styrene	ND	7.9	1.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.9	1.6	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.9	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.9	1.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.9	1.6	ug/kg	
108-88-3	Toluene	ND	7.9	1.6	ug/kg	
79-01-6	Trichloroethylene	ND	7.9	1.6	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	7.9	2.2	ug/kg	
	m,p-Xylene	ND	16	1.7	ug/kg	
95-47-6	o-Xylene	ND	7.9	1.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	123% [b]	130% [b]	80-121%
2037-26-5	Toluene-D8	98%	97%	71-130%
460-00-4	4-Bromofluorobenzene	110%	106%	59-148%
17060-07-0	1,2-Dichloroethane-D4	114%	120%	77-123%

(a) Confirmation run.
(b) Outside control limits due to matrix interference. Confirmed by reanalysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB072307		
Lab Sample ID:	F51247-21	**Date Sampled:**	07/23/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044724.D	1	07/30/07	SH	n/a	n/a	VH1664
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	25	ug/kg	
71-43-2	Benzene	ND	5.0	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	2.0	ug/kg	
75-25-2	Bromoform	ND	5.0	2.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	2.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	3.0	ug/kg	
67-66-3	Chloroform	ND	5.0	2.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	2.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	2.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	2.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	2.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	2.0	ug/kg	
591-78-6	2-Hexanone	ND	25	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	10	ug/kg	
74-83-9	Methyl bromide	ND	5.0	2.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
75-09-2	Methylene chloride	ND	10	5.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	10	ug/kg	
100-42-5	Styrene	ND	5.0	2.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	2.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	2.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	2.0	ug/kg	
108-88-3	Toluene	ND	5.0	2.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	2.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB072307		
Lab Sample ID:	F51247-21	**Date Sampled:**	07/23/07
Matrix:	SO - Trip Blank Soil	**Date Received:**	07/24/07
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.0	2.0	ug/kg	
	m,p-Xylene	ND	10	3.0	ug/kg	
95-47-6	o-Xylene	ND	5.0	2.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	105%		59-148%
17060-07-0	1,2-Dichloroethane-D4	106%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F51247

DATE: December 3, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3550B/8270C for solid matrices. The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of twenty solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
X		Surrogate Spikes
	X	Internal Standards
X		Laboratory Control Sample
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

12/3/07
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F51247

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For semivolatile (SVOC) and polynuclear aromatic hydrocarbons (PAH) compounds in solid matrices, the samples are cooled @4°C ± 2°C with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: The soil samples were collected 07/23/07. For samples 50SB07A (F51247-3) and 50SB08B (F51247-6), the SVOCs were extracted on 08/07/07 and analyzed on 08/08/07 and 08/10/07. Samples 50SB07A (F51247-3) and 50SB08B (F51247-6) were extracted one day out of holding time for SVOCs. No qualifiers were applied based upon these outliers. For the remaining samples, the SVOCs were extracted on 07/31/07 and analyzed on 08/01/07 and 08/02/07. For samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08B (F51247-6), 50SB010B (F51247-10), 50SB012B (F51247-14), the PAHs by SIM were extracted on 08/07/07 and analyzed on 08/11/07, 08/15/07, and 08/17/07. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08B (F51247-6), 50SB010B (F51247-10), 50SB012B (F51247-14) were extracted one day out of holding time for PAHs by SIM. No qualifiers were applied based upon these outliers. For the remaining samples, the PAHs by SIM were extracted on 07/31/07 and analyzed on 08/03/07 and 08/04/07. No qualifiers were applied based upon this outlier. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 07/05/07 on instrument MSBNA02. Target compounds 2,4-dinitrophenol (19.7%) and 4,6-dinitro-2-methylphenol (25.9%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9950) and 4,6-dinitro-2-methylphenol (r=0.9975) were quantified using linear or second order regression with correlation coefficients >0.995, therefore, no qualifiers were applied based upon the high %RSDs. Samples 50SB012A (F51247-13 confirmation), 50SB012B (F51247-14 confirmation), 50SB010B (F51247-10 confirmation), 50SB012B (F51247-14 confirmation), and 50SB06B (F51247-2 confirmation) were analyzed using this initial calibration.

- Initial calibration for the SVOCs was performed on 07/13/07 on instrument MSBNA04. Target compounds 2,4-dinitrophenol (42.0%; grossly exceeding) and 4,6-dinitro-2-methylphenol (24.0%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9988) and 4,6-dinitro-2-methylphenol (r=0.9995) were quantified using linear or second order regression with correlation coefficients >0.995, therefore, no qualifiers were applied based upon the high %RSDs. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this initial calibration.

- Initial calibration for the PAHs by SIM was performed on 07/18/07 on instrument MSBNA03, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this initial calibration.

- Initial calibration for the PAHs by SIM was performed on 08/07/07 on instrument MSBNA01, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Samples 50SB010B (F51247-10) and 50SB012B (F51247-14) were analyzed using this initial calibration.

- Initial calibration for the PAHs by SIM was performed on 08/15/07 on instrument MSBNA01, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), and 50SB08B (F51247-6) were analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For SVOC initial calibration verification performed on 07/05/07 @15:27 on instrument MSBNA02, 3-nitroaniline (26.0%) was outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 3-nitroaniline. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC initial calibration verification performed on 07/05/07 @15:55 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC continuing calibration performed on 08/02/07 @13:24 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. Samples 50SB012A (F51247-13 confirmation) and 50SB012B (F51247-14 confirmation) apply to this continuing calibration.

- For SVOC continuing calibration performed on 08/08/07 @10:46 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. Samples 50SB08B (F51247-6), 50SB010B (F51247-10 confirmation), and 50SB012B (F51247-14 confirmation) apply to this continuing calibration.

- For SVOC continuing calibration performed on 08/13/07 @12:13 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For SVOC continuing calibration performed on 08/13/07 @19:50 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. Sample 50SB06B (F51247-2 confirmation) applies to this continuing calibration.

- For SVOC initial calibration verification performed on 07/13/07 @13:48 on instrument MSBNA04, 4-chloroaniline (38.2%) and 3-nitroaniline (39.0%) were outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 4-chloroaniline and 3-nitroaniline. No samples reported apply to this initial calibration verification. No qualifiers were applied.

- For SVOC initial calibration verification performed on 07/13/07 @14:19 on instrument MSBNA04, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC continuing calibration performed on 08/01/07 @13:41 on instrument MSBNA04, all criteria were met for all target compounds. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this continuing calibration.

- For SVOC continuing calibration performed on 08/10/07 @10:24 on instrument MSBNA04, 2,4-dinitrophenol (20.8%) was outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 2,4-dinitrophenol. Sample 50SB07A (F51247-3) applies to this continuing calibration.

- For PAH by SIM initial calibration verification performed on 07/18/07 @06:34 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For PAH by SIM continuing calibration performed on 08/03/07 @20:42 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this continuing calibration.

- For PAH by SIM initial calibration verification performed on 08/07/07 @18:49 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For PAH by SIM initial calibration verification performed on 08/07/07 @19:17 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For PAH by SIM continuing calibration performed on 07/30/07 @11:52 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PAH by SIM continuing calibration performed on 08/10/07 @15:52 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples 50SB010B (F51247-10) and 50SB012B (F51247-14) apply to this continuing calibration.

- For PAH by SIM continuing calibration performed on 08/13/07 @10:12 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PAH by SIM initial calibration verification performed on 08/15/07 @13:54 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For PAH by SIM initial calibration verification performed on 08/15/07 @14:21 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For PAH by SIM continuing calibration performed on 08/15/07 @16:26 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Sample 50SB06B (F51247-2) applies to this continuing calibration.

- For PAH by SIM continuing calibration performed on 08/17/07 @00:39 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples 50SB07A (F51247-3) and 50SB08B (F51247-6) apply to this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
08/01/07	OP21689-MB	All SVOC target <½MRL	NA	NA	None
08/02/07	OP21689-MB	All SVOC target <½MRL	NA	NA	None
08/08/07	OP21773-MB	All SVOC target <½MRL	NA	NA	None
08/10/07	OP21773-MB	All SVOC target <½MRL	NA	NA	None
08/13/07	OP21773-MB	All SVOC target <½MRL	NA	NA	None
08/13/07	OP21773-MB	All SVOC target <½MRL	NA	NA	None
08/03/07	OP21688-MB	All PAH SIM target <½MRL	NA	NA	None
08/10/07	OP21772-MB	All PAH SIM target <½MRL	NA	NA	None
08/13/07	OP21772-MB	All PAH SIM target <½MRL	NA	NA	None
08/15/07	OP21772-MB	All PAH SIM target <½MRL	NA	NA	None
08/17/07	OP21772-MB	All PAH SIM target <½MRL	NA	NA	None
08/02/07	072407R	All SVOC target <½MRL	NA	NA	None
08/02/07	072407R	All PAH SIM target <½MRL	NA	NA	None
08/02/07	072507R	All SVOC target <½MRL	NA	NA	None
08/02/07	072507R	All PAH SIM target <½MRL	NA	NA	None

NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-2 and Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria:
2-Fluorophenol (40-102%) – (DoD QSM = 35-105%)
Phenol – d5 (41-100%) – (DoD QSM = 40-100%)
2,4,6-Tribromophenol (42-108%) – (DoD QSM = 35-125%)
Nitrobenzene-d5 (40-105%) – (DoD QSM = 35-100%)
2-Fluorobiphenyl (43-107%) – (DoD QSM = 45-105%)
p-Terphenyl – d14 (45-119%) – (DoD QSM = 30-125%)

- For soil sample 50SB06B (F51247-2), 2-fluorophenol (36.0%), phenol – d5 (37.0%), 2,4,6-tribromophenol (34.0%), nitrobenzene-d5 (35.0%), 2-fluorobiphenyl (37.0%), and p-terphenyl – d14 (37.0%) were outside lab criteria and/or DoD QSM criteria. The sample was diluted due to matrix effects. The sample was re-extracted and rerun beyond holding times at a further dilution for confirmation with the following recoveries: 2-fluorophenol (9.0%), phenol – d5 (11.0%), 2,4,6-tribromophenol (0.0%), nitrobenzene-d5 (10.0%), 2-fluorobiphenyl (11.0%), and p-terphenyl – d14 (9.0%). Sample 50SB06B (F51247-2) was qualified bias low "UL" based upon the noted matrix effects and the low surrogate recoveries.

- For soil sample 50SB07A (F51247-3), 2-fluorophenol (28.0%), phenol – d5 (34.0%), 2,4,6-tribromophenol (24.0%), nitrobenzene-d5 (28.0%), 2-fluorobiphenyl (32.0%), and p-terphenyl – d14 (29.0%) were outside lab criteria and/or DoD QSM criteria. The sample was diluted due to matrix effects. Sample 50SB07A (F51247-3) was qualified bias low "L" for detects and "UL" for non-detects based upon the noted matrix effects and the low surrogate recoveries.

- For soil sample 50SB010B (F51247-10), 2-fluorophenol (11.0%), phenol – d5 (16.0%), nitrobenzene-d5 (9.0%), and 2-fluorobiphenyl (14.0%) were outside lab criteria and/or DoD QSM criteria. The sample was re-extracted and rerun beyond holding times for confirmation with all recoveries within criteria. Sample 50SB010B (F51247-10) was qualified bias low "UL" based upon the low surrogate recoveries.

- For soil sample 50SB012B (F51247-14), 2-fluorophenol (19.0%), phenol – d5 (20.0%), 2,4,6-tribromophenol (22.0%), nitrobenzene-d5 (20.0%), 2-fluorobiphenyl (24.0%), and p-terphenyl – d14 (25.0%) were outside lab criteria and/or DoD QSM criteria. The sample was diluted due to matrix effects. The sample was re-extracted and rerun beyond holding times for confirmation with the following recoveries: 2-fluorophenol (16.0%), phenol – d5 (16.0%), 2,4,6-tribromophenol (0.0%), nitrobenzene-d5 (23.0%), 2-fluorobiphenyl (29.0%), and p-terphenyl – d14 (27.0%). Sample 50SB012B (F51247-14) was qualified bias low "L" for detects and "UL" for non-detects based upon the noted matrix effects and the low surrogate recoveries.

- For all other field samples, all surrogates were within criteria limits.

VII-Internal Standards
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD LCS solid recovery limits are specified in Table D-2 and Table D-7 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21689-BS was used as the solid LCS for the SVOC analysis on 08/01/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample OP21773-BS was used as the solid LCS for the SVOC analysis on 08/08/07. All criteria were met. No qualifiers were applied. Samples 50SB07A (F51247-3) and 50SB08B (F51247-6) apply to this LCS.

- Sample OP21773-BS was used as the solid LCS for the SVOC analysis on 08/10/07. All criteria were met. No qualifiers were applied. Samples 50SB07A (F51247-3) and 50SB08B (F51247-6) apply to this LCS.

- Sample OP21773-BS was used as the solid LCS for the SVOC analysis on 08/13/07. 2,4-Dinitrophenol (35%) and 4,6-dinitro-2-methylphenol (52%) were below laboratory criteria. The associated samples were non-detect for these compounds and was qualified bias low "UL" based upon the low recoveries. Samples 50SB07A (F51247-3) and 50SB08B (F51247-6) apply to this LCS.

- Sample OP21688-BS was used as the solid LCS for the PAH SIM analysis on 08/03/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample OP21772-BS was used as the solid LCS for the PAH SIM analysis on 08/10/07. All criteria were met. No qualifiers were applied. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08B (F51247-6), 50SB010B (F51247-10), and 50SB012B (F51247-14) apply to this LCS.

- Sample OP21772-BS was used as the solid LCS for the PAH SIM analysis on 08/13/07. All criteria were met. No qualifiers were applied. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08B (F51247-6), 50SB010B (F51247-10), and 50SB012B (F51247-14) apply to this LCS.

IX-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-7 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 50SB010A (F51247-9) was used for the solid MS/MSD for SVOC analysis on 08/01/07. 2,4-Dimethylphenol (46%, 42%) and 3,3'-dichlorobenzidine (16%, 12%) were below laboratory and/or DoD QSM accuracy criteria. All other target compounds were within criteria. The associated solid LCS was within criteria and all solid samples were non-detect for these compounds. 2,4-Dimethylphenol and 3,3'-dichlorobenzidine were non-detect for the spiked sample and qualified "UL" based upon the low recoveries. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

- Sample APSB08B (F51353-27) was used for the solid MS/MSD for SVOC analysis on 07/30/07. 2,4-Dimethylphenol (36%, 30%), 4,6-dinitro-2-methylphenol (52%, 49%), 1,2-dichlorobenzene (44%), 1,3-dichlorobenzene (39%), 1,4-dichlorobenzene (40%), and hexachloroethane (39%) were below laboratory and/or DoD QSM accuracy criteria. All other target compounds were within criteria. The associated solid LCS was within criteria and all solid samples were non-detect for these compounds. 2,4-Dimethylphenol, 4,6-dinitro-2-methylphenol, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, and hexachloroethane were non-detect for the spiked sample and qualified "UL" based upon the low recoveries. Samples 50SB07A (F51247-3) and 50SB08B (F51247-6) apply to this MS/MSD.

- Sample 50SB014A (F51247-17) was used for the solid MS/MSD for PAH SIM analysis on 08/04/07. Acenaphthene (43%; RPD=37%), acenaphthylene (43%; RPD=40%), anthracene (62%), chrysene (63%), fluorene (51%; RPD=29%), 1-methylnaphthalene (38%; RPD=50%), 2-methylnaphthalene (36%; RPD=51%), naphthalene (34%; RPD=59%), and phenanthrene (61%) were below laboratory and/or DoD QSM accuracy criteria. All other target compounds were within criteria. The associated solid LCS was within criteria. Acenaphthene, acenaphthylene, anthracene, chrysene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and phenanthrene were non-detect for the spiked sample and qualified "UL" based upon the low recoveries. Samples 50SB06A (F51247-1), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

- Sample APSB08B (F51353-27) was used for the aqueous MS/MSD for PAH SIM analysis on 08/13/07. All criteria were met. No qualifiers were applied. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08B (F51247-6), 50SB010B (F51247-10), and 50SB012B (F51247-14) apply to this MS/MSD.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 50SB06A (F51247-1), di-n-butyl phthalate

Conc. µg/kg = (Ax * Is * Vt * DF) / (Ais * RRF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area of characteristic ion for compound being measured.
Is = Amount of internal standard injected (ng).
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 uL.
Ais = Area of characteristic ion for the internal standard.
RRF = Average relative response factor for compound being measured (from ICAL)
Vi = Volume of extract injected (uL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100
DF = Dilution factor

Conc. µg/kg = (101016 * 40 * 1000 * 1) / (799753 * 1.457 * 1 * 30.3 * 0.8880) = 130 µg/kg
Reported Value = 129 µg/kg
% Difference = 0.8%
Values were within 10% difference

Sample: 50SB07A (F51247-3), chrysene

Conc. µg/kg = (Ax * Is * Vt * DF) / (Ais * RRF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area of characteristic ion for compound being measured.
Is = Amount of internal standard injected (ng).
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 uL.
Ais = Area of characteristic ion for the internal standard.
RRF = Average relative response factor for compound being measured (from ICAL)
Vi = Volume of extract injected (uL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100
DF = Dilution factor

Conc. µg/kg = (7702 * 4.0 * 1000 * 20) / (124514 * 1.560 * 1 * 30.2 * 0.8840) = 119 µg/kg
Reported Value = 119 µg/kg
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003688.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	74	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	74	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	129 J	370	93	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	370	93	ug/kg	
84-66-2	Diethyl phthalate	ND	370	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg	
67-72-1	Hexachloroethane	ND	190	37	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	74	ug/kg	
99-09-2	3-Nitroaniline	ND	370	74	ug/kg	
100-01-6	4-Nitroaniline	ND	370	74	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		40-102%
4165-62-2	Phenol-d5	76%		41-100%
118-79-6	2,4,6-Tribromophenol	74%		42-108%
4165-60-0	Nitrobenzene-d5	65%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	77%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09577.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09577.D	4	08/03/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	74	ug/kg	
208-96-8	Acenaphthylene	ND	300	74	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	59	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	59	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	59	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	59	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	59	15	ug/kg	
218-01-9	Chrysene	ND	59	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	59	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U003708.D	5	08/02/07	NJ	07/31/07	OP21689	SU181
Run #2 [b]	L037790.D	8	08/13/07	RB	08/07/07	OP21773	SL1931

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2	30.1 g	1.0 ml

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND UL	7000	2800	ug/kg	
95-57-8	2-Chlorophenol	ND UL	1400	280	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND UL	1400	280	ug/kg	
120-83-2	2,4-Dichlorophenol	ND UL	1400	280	ug/kg	
105-67-9	2,4-Dimethylphenol	ND UL	1400	280	ug/kg	
51-28-5	2,4-Dinitrophenol	ND UL	7000	2800	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND UL	2800	560	ug/kg	
95-48-7	2-Methylphenol	ND UL	1400	280	ug/kg	
	3&4-Methylphenol	ND UL	1400	280	ug/kg	
88-75-5	2-Nitrophenol	ND UL	1400	280	ug/kg	
100-02-7	4-Nitrophenol	ND UL	7000	2800	ug/kg	
87-86-5	Pentachlorophenol	ND UL	7000	2800	ug/kg	
108-95-2	Phenol	ND UL	1400	280	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND UL	1400	280	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND UL	1400	280	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND UL	1400	280	ug/kg	
85-68-7	Butyl benzyl phthalate	ND UL	2800	700	ug/kg	
100-51-6	Benzyl Alcohol	ND UL	1400	280	ug/kg	
91-58-7	2-Chloronaphthalene	ND UL	1400	280	ug/kg	
106-47-8	4-Chloroaniline	ND UL	1400	560	ug/kg	
86-74-8	Carbazole	ND UL	1400	280	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND UL	1400	280	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND UL	1400	280	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND UL	1400	280	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND UL	1400	280	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND UL	1400	280	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND UL	1400	280	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND UL	1400	280	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND UL	1400	280	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND UL	1400	280	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND UL	2800	560	ug/kg	
132-64-9	Dibenzofuran	ND UL	1400	280	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND UL	2800	700	ug/kg	
117-84-0	Di-n-octyl phthalate	ND UL	2800	700	ug/kg	
84-66-2	Diethyl phthalate	ND UL	2800	1400	ug/kg	
131-11-3	Dimethyl phthalate	ND UL	2800	700	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND UL	2800	1400	ug/kg	
118-74-1	Hexachlorobenzene	ND UL	1400	280	ug/kg	
87-68-3	Hexachlorobutadiene	ND UL	1400	280	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND UL	1400	280	ug/kg	
67-72-1	Hexachloroethane	ND UL	1400	280	ug/kg	
78-59-1	Isophorone	ND UL	1400	280	ug/kg	
88-74-4	2-Nitroaniline	ND UL	2800	560	ug/kg	
99-09-2	3-Nitroaniline	ND UL	2800	560	ug/kg	
100-01-6	4-Nitroaniline	ND UL	2800	560	ug/kg	
98-95-3	Nitrobenzene	ND UL	1400	280	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND UL	1400	280	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND UL	1400	280	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND UL	1400	280	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	36%	9%	40-102%
4165-62-2	Phenol-d5	37%	11%	41-100%
118-79-6	2,4,6-Tribromophenol	34%	0%	42-108%
4165-60-0	Nitrobenzene-d5	35%	10%	40-105%
321-60-8	2-Fluorobiphenyl	37%	11%	43-107%
1718-51-0	Terphenyl-d14	37%	9%	45-119%

(a) Confirmed ND by re-extraction and reanalysis beyond holdtime. Dilution due to matrix interference.
(b) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W036270.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W036270.D	8	08/15/07	RB	08/07/07	OP21772	SW1875
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND VL	890	220	ug/kg	
208-96-8	Acenaphthylene	ND VL	890	220	ug/kg	
120-12-7	Anthracene	ND VL	890	130	ug/kg	
56-55-3	Benzo(a)anthracene	ND VL	180	45	ug/kg	
50-32-8	Benzo(a)pyrene	ND VL	180	45	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND VL	180	45	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND VL	180	45	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND VL	180	45	ug/kg	
218-01-9	Chrysene	ND VL	180	45	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND VL	180	45	ug/kg	
206-44-0	Fluoranthene	ND VL	890	160	ug/kg	
86-73-7	Fluorene	ND VL	890	130	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND VL	180	45	ug/kg	
90-12-0	1-Methylnaphthalene	ND VL	890	130	ug/kg	
91-57-6	2-Methylnaphthalene	ND VL	890	130	ug/kg	
91-20-3	Naphthalene	ND VL	890	130	ug/kg	
85-01-8	Phenanthrene	ND VL	890	130	ug/kg	
129-00-0	Pyrene	ND VL	890	160	ug/kg	

(a) Sample reextracted beyond hold time. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U003878.D	4	08/10/07	RB	08/07/07	OP21773	SU187
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND VL	3700	1500	ug/kg	
95-57-8	2-Chlorophenol	ND VL	750	150	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND VL	750	150	ug/kg	
120-83-2	2,4-Dichlorophenol	ND VL	750	150	ug/kg	
105-67-9	2,4-Dimethylphenol	ND VL	750	150	ug/kg	
51-28-5	2,4-Dinitrophenol	ND VL	3700	1500	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND VL	1500	300	ug/kg	
95-48-7	2-Methylphenol	ND VL	750	150	ug/kg	
	3&4-Methylphenol	ND VL	750	150	ug/kg	
88-75-5	2-Nitrophenol	ND VL	750	150	ug/kg	
100-02-7	4-Nitrophenol	ND VL	3700	1500	ug/kg	
87-86-5	Pentachlorophenol	ND VL	3700	1500	ug/kg	
108-95-2	Phenol	ND VL	750	150	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND VL	750	150	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND VL	750	150	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND VL	750	150	ug/kg	
85-68-7	Butyl benzyl phthalate	ND VL	1500	370	ug/kg	
100-51-6	Benzyl Alcohol	ND VL	750	150	ug/kg	
91-58-7	2-Chloronaphthalene	ND VL	750	150	ug/kg	
106-47-8	4-Chloroaniline	ND VL	750	300	ug/kg	
86-74-8	Carbazole	ND VL	750	150	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND VL	750	150	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND VL	750	150	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND VL	750	150	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND VL	750	150	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND VL	750	150	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND VL	750	150	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND VL	750	150	ug/kg	
121-14-2	2,4-Dinitrotoluene	331 L	750	150	ug/kg	J
606-20-2	2,6-Dinitrotoluene	ND VL	750	150	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND VL	1500	300	ug/kg	
132-64-9	Dibenzofuran	ND VL	750	150	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND VL	1500	370	ug/kg	
117-84-0	Di-n-octyl phthalate	ND VL	1500	370	ug/kg	
84-66-2	Diethyl phthalate	ND VL	1500	750	ug/kg	
131-11-3	Dimethyl phthalate	ND VL	1500	370	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND VL	1500	750	ug/kg	
118-74-1	Hexachlorobenzene	ND VL	750	150	ug/kg	
87-68-3	Hexachlorobutadiene	ND VL	750	150	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND VL	750	150	ug/kg	
67-72-1	Hexachloroethane	ND VL	750	150	ug/kg	
78-59-1	Isophorone	ND VL	750	150	ug/kg	
88-74-4	2-Nitroaniline	ND VL	1500	300	ug/kg	
99-09-2	3-Nitroaniline	ND VL	1500	300	ug/kg	
100-01-6	4-Nitroaniline	ND VL	1500	300	ug/kg	
98-95-3	Nitrobenzene	ND VL	750	150	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND VL	750	150	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND VL	750	150	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND VL	750	150	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	28%		40-102%
4165-62-2	Phenol-d5	34%		41-100%
118-79-6	2,4,6-Tribromophenol	24%		42-108%
4165-60-0	Nitrobenzene-d5	28%		40-105%
321-60-8	2-Fluorobiphenyl	32%		43-107%
1718-51-0	Terphenyl-d14	29%		45-119%

(a) Dilution required due to matrix interference. Sample reextracted beyond hold time.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W036285.D	20	08/17/07	RB	08/07/07	OP21772	SW1876
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND VL	1500	370	ug/kg	
208-96-8	Acenaphthylene	ND VL	1500	370	ug/kg	
120-12-7	Anthracene	ND VL	1500	220	ug/kg	
56-55-3	Benzo(a)anthracene	137 L	300	75	ug/kg	J
50-32-8	Benzo(a)pyrene	150 L	300	75	ug/kg	J
205-99-2	Benzo(b)fluoranthene	152 L	300	75	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND VL	300	75	ug/kg	
207-08-9	Benzo(k)fluoranthene	98.9 L	300	75	ug/kg	J
218-01-9	Chrysene	119 L	300	75	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND VL	300	75	ug/kg	
206-44-0	Fluoranthene	ND VL	1500	260	ug/kg	
86-73-7	Fluorene	ND VL	1500	220	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	84.1 L	300	75	ug/kg	J
90-12-0	1-Methylnaphthalene	ND VL	1500	220	ug/kg	
91-57-6	2-Methylnaphthalene	ND VL	1500	220	ug/kg	
91-20-3	Naphthalene	ND VL	1500	220	ug/kg	
85-01-8	Phenanthrene	ND VL	1500	220	ug/kg	
129-00-0	Pyrene	ND VL	1500	260	ug/kg	

(a) Sample reextracted beyond hold time. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003690.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1400	560	ug/kg	
95-57-8	2-Chlorophenol	ND	280	56	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	280	56	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	280	56	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	280	56	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1400	560	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	560	110	ug/kg	
95-48-7	2-Methylphenol	ND	280	56	ug/kg	
	3&4-Methylphenol	ND	280	56	ug/kg	
88-75-5	2-Nitrophenol	ND	280	56	ug/kg	
100-02-7	4-Nitrophenol	ND	1400	560	ug/kg	
87-86-5	Pentachlorophenol	ND	1400	560	ug/kg	
108-95-2	Phenol	ND	280	56	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	280	56	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	280	56	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	280	56	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	560	140	ug/kg	
100-51-6	Benzyl Alcohol	ND	280	56	ug/kg	
91-58-7	2-Chloronaphthalene	ND	280	56	ug/kg	
106-47-8	4-Chloroaniline	ND	280	110	ug/kg	
86-74-8	Carbazole	ND	280	56	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	280	56	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	280	56	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	280	56	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	280	56	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	280	56	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	280	56	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	280	56	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	280	56	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	280	56	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	560	110	ug/kg	
132-64-9	Dibenzofuran	ND	280	56	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	560	140	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	560	140	ug/kg	
84-66-2	Diethyl phthalate	ND	560	280	ug/kg	
131-11-3	Dimethyl phthalate	ND	560	140	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	560	280	ug/kg	
118-74-1	Hexachlorobenzene	ND	280	56	ug/kg	
87-68-3	Hexachlorobutadiene	ND	280	56	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	280	56	ug/kg	
67-72-1	Hexachloroethane	ND	280	56	ug/kg	
78-59-1	Isophorone	ND	280	56	ug/kg	
88-74-4	2-Nitroaniline	ND	560	110	ug/kg	
99-09-2	3-Nitroaniline	ND	560	110	ug/kg	
100-01-6	4-Nitroaniline	ND	560	110	ug/kg	
98-95-3	Nitrobenzene	ND	280	56	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	280	56	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	280	56	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	280	56	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	78%		40-102%
4165-62-2	Phenol-d5	82%		41-100%
118-79-6	2,4,6-Tribromophenol	73%		42-108%
4165-60-0	Nitrobenzene-d5	72%		40-105%
321-60-8	2-Fluorobiphenyl	71%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09578.D	4	08/03/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	450	110	ug/kg	
208-96-8	Acenaphthylene	ND	450	110	ug/kg	
120-12-7	Anthracene	ND	450	67	ug/kg	
56-55-3	Benzo(a)anthracene	ND	90	22	ug/kg	
50-32-8	Benzo(a)pyrene	ND	90	22	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	90	22	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	90	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	90	22	ug/kg	
218-01-9	Chrysene	ND	90	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	90	22	ug/kg	
206-44-0	Fluoranthene	ND	450	79	ug/kg	
86-73-7	Fluorene	ND	450	67	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	90	22	ug/kg	
90-12-0	1-Methylnaphthalene	ND	450	67	ug/kg	
91-57-6	2-Methylnaphthalene	ND	450	67	ug/kg	
91-20-3	Naphthalene	ND	450	67	ug/kg	
85-01-8	Phenanthrene	ND	450	67	ug/kg	
129-00-0	Pyrene	ND	450	79	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003691.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	75	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	75	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	63.0 J	190	37	ug/kg	J
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	75	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	777	370	93	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	93	ug/kg	
84-66-2	Diethyl phthalate	ND	370	190	ug/kg	
131-11-3	Dimethyl phthalate	716	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg	
67-72-1	Hexachloroethane	ND	190	37	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	75	ug/kg	
99-09-2	3-Nitroaniline	ND	370	75	ug/kg	
100-01-6	4-Nitroaniline	ND	370	75	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	65%		40-102%
4165-62-2	Phenol-d5	69%		41-100%
118-79-6	2,4,6-Tribromophenol	64%		42-108%
4165-60-0	Nitrobenzene-d5	59%		40-105%
321-60-8	2-Fluorobiphenyl	62%		43-107%
1718-51-0	Terphenyl-d14	66%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09579.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09579.D	4	08/03/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	75	ug/kg	
208-96-8	Acenaphthylene	ND	300	75	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	60	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	60	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	60	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	60	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	60	15	ug/kg	
218-01-9	Chrysene	ND	60	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	60	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	60	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	L037698.D	4	08/08/07	RB	08/07/07	OP21773	SL1927
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	5200	2100	ug/kg	
95-57-8	2-Chlorophenol	ND	1000	210	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	1000	210	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	1000	210	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	1000	210	ug/kg	
51-28-5	2,4-Dinitrophenol	ND VL	5200	2100	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND VL	2100	410	ug/kg	
95-48-7	2-Methylphenol	ND	1000	210	ug/kg	
	3&4-Methylphenol	ND	1000	210	ug/kg	
88-75-5	2-Nitrophenol	ND	1000	210	ug/kg	
100-02-7	4-Nitrophenol	ND	5200	2100	ug/kg	
87-86-5	Pentachlorophenol	ND	5200	2100	ug/kg	
108-95-2	Phenol	ND	1000	210	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	1000	210	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	1000	210	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	1000	210	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	2100	520	ug/kg	
100-51-6	Benzyl Alcohol	ND	1000	210	ug/kg	
91-58-7	2-Chloronaphthalene	ND	1000	210	ug/kg	
106-47-8	4-Chloroaniline	ND	1000	410	ug/kg	
86-74-8	Carbazole	ND	1000	210	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	1000	210	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	1000	210	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	1000	210	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	1000	210	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	1000	210	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	1000	210	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	1000	210	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	1000	210	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	1000	210	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	2100	410	ug/kg	
132-64-9	Dibenzofuran	ND	1000	210	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	1270 J	2100	520	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	2100	520	ug/kg	
84-66-2	Diethyl phthalate	ND	2100	1000	ug/kg	
131-11-3	Dimethyl phthalate	ND	2100	520	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	2100	1000	ug/kg	
118-74-1	Hexachlorobenzene	ND	1000	210	ug/kg	
87-68-3	Hexachlorobutadiene	ND	1000	210	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	1000	210	ug/kg	
67-72-1	Hexachloroethane	ND	1000	210	ug/kg	
78-59-1	Isophorone	ND	1000	210	ug/kg	
88-74-4	2-Nitroaniline	ND	2100	410	ug/kg	
99-09-2	3-Nitroaniline	ND	2100	410	ug/kg	
100-01-6	4-Nitroaniline	ND	2100	410	ug/kg	
98-95-3	Nitrobenzene	ND	1000	210	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	1000	210	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	1000	210	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	1000	210	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	68%		40-102%
4165-62-2	Phenol-d5	60%		41-100%
118-79-6	2,4,6-Tribromophenol	66%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	66%		45-119%

(a) Sample reextracted beyond hold time. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W036286.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W036286.D	20	08/17/07	RB	08/07/07	OP21772	SW1876
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	2100	520	ug/kg	
208-96-8	Acenaphthylene	ND	2100	520	ug/kg	
120-12-7	Anthracene	ND	2100	310	ug/kg	
56-55-3	Benzo(a)anthracene	ND	410	100	ug/kg	
50-32-8	Benzo(a)pyrene	ND	410	100	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	410	100	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	410	100	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	410	100	ug/kg	
218-01-9	Chrysene	ND	410	100	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	410	100	ug/kg	
206-44-0	Fluoranthene	ND	2100	360	ug/kg	
86-73-7	Fluorene	ND	2100	310	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	410	100	ug/kg	
90-12-0	1-Methylnaphthalene	ND	2100	310	ug/kg	
91-57-6	2-Methylnaphthalene	ND	2100	310	ug/kg	
91-20-3	Naphthalene	ND	2100	310	ug/kg	
85-01-8	Phenanthrene	ND	2100	310	ug/kg	
129-00-0	Pyrene	ND	2100	360	ug/kg	

(a) Sample reextracted beyond hold time. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003692.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	980	390	ug/kg	
95-57-8	2-Chlorophenol	ND	200	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	980	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	79	ug/kg	
95-48-7	2-Methylphenol	ND	200	39	ug/kg	
	3&4-Methylphenol	ND	200	39	ug/kg	
88-75-5	2-Nitrophenol	ND	200	39	ug/kg	
100-02-7	4-Nitrophenol	ND	980	390	ug/kg	
87-86-5	Pentachlorophenol	ND	980	390	ug/kg	
108-95-2	Phenol	ND	200	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	98	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	39	ug/kg	
106-47-8	4-Chloroaniline	ND	200	79	ug/kg	
86-74-8	Carbazole	ND	200	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	79	ug/kg	
132-64-9	Dibenzofuran	ND	200	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	98	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	98	ug/kg	
84-66-2	Diethyl phthalate	ND	390	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	98	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	39	ug/kg	
67-72-1	Hexachloroethane	ND	200	39	ug/kg	
78-59-1	Isophorone	ND	200	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	79	ug/kg	
99-09-2	3-Nitroaniline	ND	390	79	ug/kg	
100-01-6	4-Nitroaniline	ND	390	79	ug/kg	
98-95-3	Nitrobenzene	ND	200	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	70%		40-102%
4165-62-2	Phenol-d5	75%		41-100%
118-79-6	2,4,6-Tribromophenol	71%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	66%		43-107%
1718-51-0	Terphenyl-d14	74%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09580.D	4	08/03/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	79	ug/kg	
208-96-8	Acenaphthylene	ND	310	79	ug/kg	
120-12-7	Anthracene	ND	310	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	63	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	63	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	63	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	63	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	63	16	ug/kg	
218-01-9	Chrysene	ND	63	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	63	16	ug/kg	
206-44-0	Fluoranthene	ND	310	55	ug/kg	
86-73-7	Fluorene	ND	310	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	63	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg	
91-20-3	Naphthalene	ND	310	47	ug/kg	
85-01-8	Phenanthrene	ND	310	47	ug/kg	
129-00-0	Pyrene	ND	310	55	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003693.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003693.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1300	530	ug/kg	
95-57-8	2-Chlorophenol	ND	270	53	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	270	53	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	270	53	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	270	53	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1300	530	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	530	110	ug/kg	
95-48-7	2-Methylphenol	ND	270	53	ug/kg	
	3&4-Methylphenol	ND	270	53	ug/kg	
88-75-5	2-Nitrophenol	ND	270	53	ug/kg	
100-02-7	4-Nitrophenol	ND	1300	530	ug/kg	
87-86-5	Pentachlorophenol	ND	1300	530	ug/kg	
108-95-2	Phenol	ND	270	53	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	270	53	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	270	53	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	270	53	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	530	130	ug/kg	
100-51-6	Benzyl Alcohol	ND	270	53	ug/kg	
91-58-7	2-Chloronaphthalene	ND	270	53	ug/kg	
106-47-8	4-Chloroaniline	ND	270	110	ug/kg	
86-74-8	Carbazole	ND	270	53	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	270	53	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	270	53	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	270	53	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	270	53	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	270	53	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	270	53	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	270	53	ug/kg	
121-14-2	2,4-Dinitrotoluene	54.0 J	270	53	ug/kg	J
606-20-2	2,6-Dinitrotoluene	ND	270	53	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	530	110	ug/kg	
132-64-9	Dibenzofuran	ND	270	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	355 J	530	130	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	530	130	ug/kg	
84-66-2	Diethyl phthalate	ND	530	270	ug/kg	
131-11-3	Dimethyl phthalate	ND	530	130	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	530	270	ug/kg	
118-74-1	Hexachlorobenzene	ND	270	53	ug/kg	
87-68-3	Hexachlorobutadiene	ND	270	53	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	270	53	ug/kg	
67-72-1	Hexachloroethane	ND	270	53	ug/kg	
78-59-1	Isophorone	ND	270	53	ug/kg	
88-74-4	2-Nitroaniline	ND	530	110	ug/kg	
99-09-2	3-Nitroaniline	ND	530	110	ug/kg	
100-01-6	4-Nitroaniline	ND	530	110	ug/kg	
98-95-3	Nitrobenzene	ND	270	53	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	270	53	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	270	53	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	270	53	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	46%		40-102%
4165-62-2	Phenol-d5	54%		41-100%
118-79-6	2,4,6-Tribromophenol	50%		42-108%
4165-60-0	Nitrobenzene-d5	55%		40-105%
321-60-8	2-Fluorobiphenyl	55%		43-107%
1718-51-0	Terphenyl-d14	63%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09581.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09581.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	430	110	ug/kg	
208-96-8	Acenaphthylene	ND	430	110	ug/kg	
120-12-7	Anthracene	ND	430	64	ug/kg	
56-55-3	Benzo(a)anthracene	ND	85	21	ug/kg	
50-32-8	Benzo(a)pyrene	ND	85	21	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	85	21	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	85	21	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	85	21	ug/kg	
218-01-9	Chrysene	ND	85	21	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	85	21	ug/kg	
206-44-0	Fluoranthene	ND	430	75	ug/kg	
86-73-7	Fluorene	ND	430	64	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	85	21	ug/kg	
90-12-0	1-Methylnaphthalene	ND	430	64	ug/kg	
91-57-6	2-Methylnaphthalene	ND	430	64	ug/kg	
91-20-3	Naphthalene	ND	430	64	ug/kg	
85-01-8	Phenanthrene	ND	430	64	ug/kg	
129-00-0	Pyrene	ND	430	75	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003694.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	870	350	ug/kg	
95-57-8	2-Chlorophenol	ND	170	35	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	35	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	35	ug/kg	
105-67-9	2,4-Dimethylphenol	ND VL	170	35	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	870	350	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	350	70	ug/kg	
95-48-7	2-Methylphenol	ND	170	35	ug/kg	
	3&4-Methylphenol	ND	170	35	ug/kg	
88-75-5	2-Nitrophenol	ND	170	35	ug/kg	
100-02-7	4-Nitrophenol	ND	870	350	ug/kg	
87-86-5	Pentachlorophenol	ND	870	350	ug/kg	
108-95-2	Phenol	ND	170	35	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	35	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	35	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	170	35	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	350	87	ug/kg	
100-51-6	Benzyl Alcohol	ND	170	35	ug/kg	
91-58-7	2-Chloronaphthalene	ND	170	35	ug/kg	
106-47-8	4-Chloroaniline	ND	170	70	ug/kg	
86-74-8	Carbazole	ND	170	35	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	170	35	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	170	35	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	170	35	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	170	35	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	170	35	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	170	35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	170	35	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	170	35	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	170	35	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND VL	350	70	ug/kg	
132-64-9	Dibenzofuran	ND	170	35	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	350	87	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	350	87	ug/kg	
84-66-2	Diethyl phthalate	ND	350	170	ug/kg	
131-11-3	Dimethyl phthalate	ND	350	87	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	350	170	ug/kg	
118-74-1	Hexachlorobenzene	ND	170	35	ug/kg	
87-68-3	Hexachlorobutadiene	ND	170	35	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	170	35	ug/kg	
67-72-1	Hexachloroethane	ND	170	35	ug/kg	
78-59-1	Isophorone	ND	170	35	ug/kg	
88-74-4	2-Nitroaniline	ND	350	70	ug/kg	
99-09-2	3-Nitroaniline	ND	350	70	ug/kg	
100-01-6	4-Nitroaniline	ND	350	70	ug/kg	
98-95-3	Nitrobenzene	ND	170	35	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	170	35	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	35	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	170	35	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		40-102%
4165-62-2	Phenol-d5	75%		41-100%
118-79-6	2,4,6-Tribromophenol	72%		42-108%
4165-60-0	Nitrobenzene-d5	67%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09582.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09582.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	280	70	ug/kg	
208-96-8	Acenaphthylene	ND	280	70	ug/kg	
120-12-7	Anthracene	ND	280	42	ug/kg	
56-55-3	Benzo(a)anthracene	ND	56	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND	56	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	56	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	56	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	56	14	ug/kg	
218-01-9	Chrysene	ND	56	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	56	14	ug/kg	
206-44-0	Fluoranthene	ND	280	49	ug/kg	
86-73-7	Fluorene	ND	280	42	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	56	14	ug/kg	
90-12-0	1-Methylnaphthalene	ND	280	42	ug/kg	
91-57-6	2-Methylnaphthalene	ND	280	42	ug/kg	
91-20-3	Naphthalene	ND	280	42	ug/kg	
85-01-8	Phenanthrene	ND	280	42	ug/kg	
129-00-0	Pyrene	ND	280	49	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U003697.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2 [b]	L037699.D	1	08/08/07	RB	08/07/07	OP21773	SL1927

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2	30.6 g	1.0 ml

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND VL	1100	430	ug/kg	
95-57-8	2-Chlorophenol	ND VL	220	43	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND VL	220	43	ug/kg	
120-83-2	2,4-Dichlorophenol	ND VL	220	43	ug/kg	
105-67-9	2,4-Dimethylphenol	ND VL	220	43	ug/kg	
51-28-5	2,4-Dinitrophenol	ND VL	1100	430	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND VL	430	87	ug/kg	
95-48-7	2-Methylphenol	ND VL	220	43	ug/kg	
	3&4-Methylphenol	ND VL	220	43	ug/kg	
88-75-5	2-Nitrophenol	ND VL	220	43	ug/kg	
100-02-7	4-Nitrophenol	ND VL	1100	430	ug/kg	
87-86-5	Pentachlorophenol	ND VL	1100	430	ug/kg	
108-95-2	Phenol	ND VL	220	43	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND VL	220	43	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND VL	220	43	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND VL	220	43	ug/kg	
85-68-7	Butyl benzyl phthalate	ND VL	430	110	ug/kg	
100-51-6	Benzyl Alcohol	ND VL	220	43	ug/kg	
91-58-7	2-Chloronaphthalene	ND VL	220	43	ug/kg	
106-47-8	4-Chloroaniline	ND VL	220	87	ug/kg	
86-74-8	Carbazole	ND VL	220	43	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND VL	220	43	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND VL	220	43	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND VL	220	43	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND VL	220	43	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND VL	220	43	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND VL	220	43	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND VL	220	43	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND VL	220	43	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND VL	220	43	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND VL	430	87	ug/kg	
132-64-9	Dibenzofuran	ND VL	220	43	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND UL	430	110	ug/kg	
117-84-0	Di-n-octyl phthalate	ND UL	430	110	ug/kg	
84-66-2	Diethyl phthalate	ND UL	430	220	ug/kg	
131-11-3	Dimethyl phthalate	ND UL	430	110	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND UL	430	220	ug/kg	
118-74-1	Hexachlorobenzene	ND UL	220	43	ug/kg	
87-68-3	Hexachlorobutadiene	ND UL	220	43	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND UL	220	43	ug/kg	
67-72-1	Hexachloroethane	ND UL	220	43	ug/kg	
78-59-1	Isophorone	ND UL	220	43	ug/kg	
88-74-4	2-Nitroaniline	ND UL	430	87	ug/kg	
99-09-2	3-Nitroaniline	ND UL	430	87	ug/kg	
100-01-6	4-Nitroaniline	ND UL	430	87	ug/kg	
98-95-3	Nitrobenzene	ND UL	220	43	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND UL	220	43	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND UL	220	43	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND UL	220	43	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	11%	66%	40-102%
4165-62-2	Phenol-d5	16%	67%	41-100%
118-79-6	2,4,6-Tribromophenol	52%	74%	42-108%
4165-60-0	Nitrobenzene-d5	9%	59%	40-105%
321-60-8	2-Fluorobiphenyl	14%	63%	43-107%
1718-51-0	Terphenyl-d14	59%	70%	45-119%

(a) Confirmed ND by re-extraction and reanalysis beyond holdtime.
(b) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W036190.D	4	08/11/07	RB	08/07/07	OP21772	SW1872
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND VL	340	85	ug/kg	
208-96-8	Acenaphthylene	ND VL	340	85	ug/kg	
120-12-7	Anthracene	ND VL	340	51	ug/kg	
56-55-3	Benzo(a)anthracene	ND VL	68	17	ug/kg	
50-32-8	Benzo(a)pyrene	ND VL	68	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND VL	68	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND VL	68	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND VL	68	17	ug/kg	
218-01-9	Chrysene	ND VL	68	17	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND VL	68	17	ug/kg	
206-44-0	Fluoranthene	ND VL	340	60	ug/kg	
86-73-7	Fluorene	ND VL	340	51	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND VL	68	17	ug/kg	
90-12-0	1-Methylnaphthalene	ND VL	340	51	ug/kg	
91-57-6	2-Methylnaphthalene	ND VL	340	51	ug/kg	
91-20-3	Naphthalene	ND VL	340	51	ug/kg	
85-01-8	Phenanthrene	ND VL	340	51	ug/kg	
129-00-0	Pyrene	ND VL	340	60	ug/kg	

(a) Sample reextracted beyond hold time. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003698.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	880	350	ug/kg	
95-57-8	2-Chlorophenol	ND	180	35	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	35	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	35	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	35	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	880	350	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	350	71	ug/kg	
95-48-7	2-Methylphenol	ND	180	35	ug/kg	
	3&4-Methylphenol	ND	180	35	ug/kg	
88-75-5	2-Nitrophenol	ND	180	35	ug/kg	
100-02-7	4-Nitrophenol	ND	880	350	ug/kg	
87-86-5	Pentachlorophenol	ND	880	350	ug/kg	
108-95-2	Phenol	ND	180	35	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	35	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	35	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	35	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	350	88	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	35	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	35	ug/kg	
106-47-8	4-Chloroaniline	ND	180	71	ug/kg	
86-74-8	Carbazole	ND	180	35	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	35	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	35	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	35	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	35	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	35	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	35	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	35	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	35	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	350	71	ug/kg	
132-64-9	Dibenzofuran	ND	180	35	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	350	88	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	350	88	ug/kg	
84-66-2	Diethyl phthalate	ND	350	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	350	88	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	350	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	35	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	35	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	35	ug/kg	
67-72-1	Hexachloroethane	ND	180	35	ug/kg	
78-59-1	Isophorone	ND	180	35	ug/kg	
88-74-4	2-Nitroaniline	ND	350	71	ug/kg	
99-09-2	3-Nitroaniline	ND	350	71	ug/kg	
100-01-6	4-Nitroaniline	ND	350	71	ug/kg	
98-95-3	Nitrobenzene	ND	180	35	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	35	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	35	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	35	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	73%		40-102%
4165-62-2	Phenol-d5	75%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	75%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09583.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	280	71	ug/kg	
208-96-8	Acenaphthylene	ND	280	71	ug/kg	
120-12-7	Anthracene	ND	280	42	ug/kg	
56-55-3	Benzo(a)anthracene	ND	57	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND	57	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	57	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	57	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	57	14	ug/kg	
218-01-9	Chrysene	ND	57	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	57	14	ug/kg	
206-44-0	Fluoranthene	ND	280	50	ug/kg	
86-73-7	Fluorene	ND	280	42	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	57	14	ug/kg	
90-12-0	1-Methylnaphthalene	ND	280	42	ug/kg	
91-57-6	2-Methylnaphthalene	ND	280	42	ug/kg	
91-20-3	Naphthalene	ND	280	42	ug/kg	
85-01-8	Phenanthrene	ND	280	42	ug/kg	
129-00-0	Pyrene	ND	280	50	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003699.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	76	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	76	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	95	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	76	ug/kg	
99-09-2	3-Nitroaniline	ND	380	76	ug/kg	
100-01-6	4-Nitroaniline	ND	380	76	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	75%		40-102%
4165-62-2	Phenol-d5	79%		41-100%
118-79-6	2,4,6-Tribromophenol	78%		42-108%
4165-60-0	Nitrobenzene-d5	69%		40-105%
321-60-8	2-Fluorobiphenyl	70%		43-107%
1718-51-0	Terphenyl-d14	82%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09584.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	76	ug/kg	
208-96-8	Acenaphthylene	ND	300	76	ug/kg	
120-12-7	Anthracene	ND	300	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	46	ug/kg	
91-20-3	Naphthalene	ND	300	46	ug/kg	
85-01-8	Phenanthrene	ND	300	46	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	L037581.D	4	08/02/07	RB	07/31/07	OP21689	SL1922
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	3800	1500	ug/kg	
95-57-8	2-Chlorophenol	ND	770	150	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	770	150	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	770	150	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	770	150	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	3800	1500	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	1500	310	ug/kg	
95-48-7	2-Methylphenol	ND	770	150	ug/kg	
	3&4-Methylphenol	ND	770	150	ug/kg	
88-75-5	2-Nitrophenol	ND	770	150	ug/kg	
100-02-7	4-Nitrophenol	ND	3800	1500	ug/kg	
87-86-5	Pentachlorophenol	ND	3800	1500	ug/kg	
108-95-2	Phenol	ND	770	150	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	770	150	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	770	150	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	770	150	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	1500	380	ug/kg	
100-51-6	Benzyl Alcohol	ND	770	150	ug/kg	
91-58-7	2-Chloronaphthalene	ND	770	150	ug/kg	
106-47-8	4-Chloroaniline	ND	770	310	ug/kg	
86-74-8	Carbazole	ND	770	150	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	770	150	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	770	150	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	770	150	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	770	150	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	770	150	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	770	150	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	770	150	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	770	150	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	770	150	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	1500	310	ug/kg	
132-64-9	Dibenzofuran	ND	770	150	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	1500	380	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	1500	380	ug/kg	
84-66-2	Diethyl phthalate	ND	1500	770	ug/kg	
131-11-3	Dimethyl phthalate	ND	1500	380	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	1500	770	ug/kg	
118-74-1	Hexachlorobenzene	ND	770	150	ug/kg	
87-68-3	Hexachlorobutadiene	ND	770	150	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	770	150	ug/kg	
67-72-1	Hexachloroethane	ND	770	150	ug/kg	
78-59-1	Isophorone	ND	770	150	ug/kg	
88-74-4	2-Nitroaniline	ND	1500	310	ug/kg	
99-09-2	3-Nitroaniline	ND	1500	310	ug/kg	
100-01-6	4-Nitroaniline	ND	1500	310	ug/kg	
98-95-3	Nitrobenzene	ND	770	150	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	770	150	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	770	150	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	770	150	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	66%		40-102%
4165-62-2	Phenol-d5	67%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	61%		40-105%
321-60-8	2-Fluorobiphenyl	73%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09585.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	L037582.D	5	08/02/07	RB	07/31/07	OP21689	SL1922
Run #2 [b]	L037700.D	1	08/08/07	RB	08/07/07	OP21773	SL1927

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2	30.2 g	10.0 ml

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND VL	6000	2400	ug/kg	
95-57-8	2-Chlorophenol	ND VL	1200	240	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND VL	1200	240	ug/kg	
120-83-2	2,4-Dichlorophenol	ND VL	1200	240	ug/kg	
105-67-9	2,4-Dimethylphenol	ND VL	1200	240	ug/kg	
51-28-5	2,4-Dinitrophenol	ND VL	6000	2400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND VL	2400	480	ug/kg	
95-48-7	2-Methylphenol	ND VL	1200	240	ug/kg	
	3&4-Methylphenol	ND VL	1200	240	ug/kg	
88-75-5	2-Nitrophenol	ND VL	1200	240	ug/kg	
100-02-7	4-Nitrophenol	ND VL	6000	2400	ug/kg	
87-86-5	Pentachlorophenol	ND VL	6000	2400	ug/kg	
108-95-2	Phenol	ND VL	1200	240	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND VL	1200	240	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND VL	1200	240	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND VL	1200	240	ug/kg	
85-68-7	Butyl benzyl phthalate	ND VL	2400	600	ug/kg	
100-51-6	Benzyl Alcohol	ND VL	1200	240	ug/kg	
91-58-7	2-Chloronaphthalene	ND VL	1200	240	ug/kg	
106-47-8	4-Chloroaniline	ND VL	1200	480	ug/kg	
86-74-8	Carbazole	ND VL	1200	240	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND VL	1200	240	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND VL	1200	240	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND VL	1200	240	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND VL	1200	240	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND VL	1200	240	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND VL	1200	240	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND VL	1200	240	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND VL	1200	240	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND VL	1200	240	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND VL	2400	480	ug/kg	
132-64-9	Dibenzofuran	ND VL	1200	240	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	3540 L	2400	600	ug/kg	
117-84-0	Di-n-octyl phthalate	ND VL	2400	600	ug/kg	
84-66-2	Diethyl phthalate	ND VL	2400	1200	ug/kg	
131-11-3	Dimethyl phthalate	ND VL	2400	600	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND VL	2400	1200	ug/kg	
118-74-1	Hexachlorobenzene	ND VL	1200	240	ug/kg	
87-68-3	Hexachlorobutadiene	ND VL	1200	240	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND VL	1200	240	ug/kg	
67-72-1	Hexachloroethane	ND VL	1200	240	ug/kg	
78-59-1	Isophorone	ND VL	1200	240	ug/kg	
88-74-4	2-Nitroaniline	ND VL	2400	480	ug/kg	
99-09-2	3-Nitroaniline	ND VL	2400	480	ug/kg	
100-01-6	4-Nitroaniline	ND VL	2400	480	ug/kg	
98-95-3	Nitrobenzene	ND VL	1200	240	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND VL	1200	240	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND VL	1200	240	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND VL	1200	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	19%	16%	40-102%
4165-62-2	Phenol-d5	20%	16%	41-100%
118-79-6	2,4,6-Tribromophenol	22%	0%	42-108%
4165-60-0	Nitrobenzene-d5	20%	23%	40-105%
321-60-8	2-Fluorobiphenyl	24%	29%	43-107%
1718-51-0	Terphenyl-d14	25%	27%	45-119%

(a) Confirmed by re-extraction and reanalysis beyond holdtime. Dilution required due to matrix interference.
(b) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W036191.D	4	08/11/07	RB	08/07/07	OP21772	SW1872
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND VL	390	98	ug/kg	
208-96-8	Acenaphthylene	ND VL	390	98	ug/kg	
120-12-7	Anthracene	ND VL	390	59	ug/kg	
56-55-3	Benzo(a)anthracene	ND VL	78	20	ug/kg	
50-32-8	Benzo(a)pyrene	ND VL	78	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND VL	78	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND VL	78	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND VL	78	20	ug/kg	
218-01-9	Chrysene	ND VL	78	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND VL	78	20	ug/kg	
206-44-0	Fluoranthene	ND VL	390	68	ug/kg	
86-73-7	Fluorene	ND VL	390	59	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND VL	78	20	ug/kg	
90-12-0	1-Methylnaphthalene	ND VL	390	59	ug/kg	
91-57-6	2-Methylnaphthalene	ND VL	390	59	ug/kg	
91-20-3	Naphthalene	ND VL	390	59	ug/kg	
85-01-8	Phenanthrene	ND VL	390	59	ug/kg	
129-00-0	Pyrene	ND VL	390	68	ug/kg	

(a) Sample reextracted beyond hold time. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003702.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	940	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	940	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	75	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	940	370	ug/kg	
87-86-5	Pentachlorophenol	ND	940	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	94	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	190	75	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	37	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	37	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	75	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	94	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	94	ug/kg	
84-66-2	Diethyl phthalate	ND	370	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	94	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	37	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	37	ug/kg	
67-72-1	Hexachloroethane	ND	190	37	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	75	ug/kg	
99-09-2	3-Nitroaniline	ND	370	75	ug/kg	
100-01-6	4-Nitroaniline	ND	370	75	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	37	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	71%		41-100%
118-79-6	2,4,6-Tribromophenol	75%		42-108%
4165-60-0	Nitrobenzene-d5	62%		40-105%
321-60-8	2-Fluorobiphenyl	65%		43-107%
1718-51-0	Terphenyl-d14	80%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09586.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	75	ug/kg	
208-96-8	Acenaphthylene	ND	300	75	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	60	15	ug/kg	
50-32-8	Benzo(a)pyrene	18.7 J	60	15	ug/kg	J
205-99-2	Benzo(b)fluoranthene	20.2 J	60	15	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	16.9 J	60	15	ug/kg	J
207-08-9	Benzo(k)fluoranthene	16.0 J	60	15	ug/kg	J
218-01-9	Chrysene	15.8 J	60	15	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	60	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	19.1 J	60	15	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003703.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1300	510	ug/kg	
95-57-8	2-Chlorophenol	ND	250	51	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	250	51	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	250	51	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	250	51	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1300	510	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	510	100	ug/kg	
95-48-7	2-Methylphenol	ND	250	51	ug/kg	
	3&4-Methylphenol	ND	250	51	ug/kg	
88-75-5	2-Nitrophenol	ND	250	51	ug/kg	
100-02-7	4-Nitrophenol	ND	1300	510	ug/kg	
87-86-5	Pentachlorophenol	ND	1300	510	ug/kg	
108-95-2	Phenol	ND	250	51	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	250	51	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	250	51	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	250	51	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	510	130	ug/kg	
100-51-6	Benzyl Alcohol	ND	250	51	ug/kg	
91-58-7	2-Chloronaphthalene	ND	250	51	ug/kg	
106-47-8	4-Chloroaniline	ND	250	100	ug/kg	
86-74-8	Carbazole	ND	250	51	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	250	51	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	250	51	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	250	51	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	250	51	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	250	51	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	250	51	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	250	51	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	51	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	51	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	510	100	ug/kg	
132-64-9	Dibenzofuran	ND	250	51	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	366 J	510	130	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	510	130	ug/kg	
84-66-2	Diethyl phthalate	ND	510	250	ug/kg	
131-11-3	Dimethyl phthalate	ND	510	130	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	510	250	ug/kg	
118-74-1	Hexachlorobenzene	ND	250	51	ug/kg	
87-68-3	Hexachlorobutadiene	ND	250	51	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	250	51	ug/kg	
67-72-1	Hexachloroethane	ND	250	51	ug/kg	
78-59-1	Isophorone	ND	250	51	ug/kg	
88-74-4	2-Nitroaniline	ND	510	100	ug/kg	
99-09-2	3-Nitroaniline	ND	510	100	ug/kg	
100-01-6	4-Nitroaniline	ND	510	100	ug/kg	
98-95-3	Nitrobenzene	ND	250	51	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	250	51	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	250	51	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	250	51	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	73%		40-102%
4165-62-2	Phenol-d5	77%		41-100%
118-79-6	2,4,6-Tribromophenol	73%		42-108%
4165-60-0	Nitrobenzene-d5	68%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	81%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09587.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	400	100	ug/kg	
208-96-8	Acenaphthylene	ND	400	100	ug/kg	
120-12-7	Anthracene	ND	400	61	ug/kg	
56-55-3	Benzo(a)anthracene	ND	81	20	ug/kg	
50-32-8	Benzo(a)pyrene	ND	81	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	81	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	24.5 J	81	20	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	81	20	ug/kg	
218-01-9	Chrysene	ND	81	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	81	20	ug/kg	
206-44-0	Fluoranthene	ND	400	71	ug/kg	
86-73-7	Fluorene	ND	400	61	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	21.0 J	81	20	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	400	61	ug/kg	
91-57-6	2-Methylnaphthalene	ND	400	61	ug/kg	
91-20-3	Naphthalene	ND	400	61	ug/kg	
85-01-8	Phenanthrene	ND	400	61	ug/kg	
129-00-0	Pyrene	ND	400	71	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003704.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	900	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	900	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	72	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	900	360	ug/kg	
87-86-5	Pentachlorophenol	ND	900	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	90	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	180	72	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	36	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	36	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	36	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	72	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	229 J	360	90	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	360	90	ug/kg	
84-66-2	Diethyl phthalate	ND	360	180	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	90	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	36	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	36	ug/kg	
67-72-1	Hexachloroethane	ND	180	36	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	72	ug/kg	
99-09-2	3-Nitroaniline	ND	360	72	ug/kg	
100-01-6	4-Nitroaniline	ND	360	72	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	36	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	72%		40-102%
4165-62-2	Phenol-d5	75%		41-100%
118-79-6	2,4,6-Tribromophenol	72%		42-108%
4165-60-0	Nitrobenzene-d5	68%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09588.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09588.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND VL	290	72	ug/kg	
208-96-8	Acenaphthylene	ND VL	290	72	ug/kg	
120-12-7	Anthracene	ND VL	290	43	ug/kg	
56-55-3	Benzo(a)anthracene	ND	58	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND	58	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	58	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	58	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	58	14	ug/kg	
218-01-9	Chrysene	ND VL	58	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	58	14	ug/kg	
206-44-0	Fluoranthene	ND	290	50	ug/kg	
86-73-7	Fluorene	ND VL	290	43	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	58	14	ug/kg	
90-12-0	1-Methylnaphthalene	ND VL	290	43	ug/kg	
91-57-6	2-Methylnaphthalene	ND VL	290	43	ug/kg	
91-20-3	Naphthalene	ND VL	290	43	ug/kg	
85-01-8	Phenanthrene	ND VL	290	43	ug/kg	
129-00-0	Pyrene	ND	290	50	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003705.D	1	08/01/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1000	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	80	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	400	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	100	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	200	80	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	40	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	40	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	40	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	80	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	100	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	100	ug/kg	
84-66-2	Diethyl phthalate	ND	400	200	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	100	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	40	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	40	ug/kg	
67-72-1	Hexachloroethane	ND	200	40	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	80	ug/kg	
99-09-2	3-Nitroaniline	ND	400	80	ug/kg	
100-01-6	4-Nitroaniline	ND	400	80	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	40	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	74%		40-102%
4165-62-2	Phenol-d5	78%		41-100%
118-79-6	2,4,6-Tribromophenol	75%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	80%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09591.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09591.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	80	ug/kg	
208-96-8	Acenaphthylene	ND	320	80	ug/kg	
120-12-7	Anthracene	ND	320	48	ug/kg	
56-55-3	Benzo(a)anthracene	ND	64	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	64	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	64	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	64	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	64	16	ug/kg	
218-01-9	Chrysene	ND	64	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	64	16	ug/kg	
206-44-0	Fluoranthene	ND	320	56	ug/kg	
86-73-7	Fluorene	ND	320	48	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	64	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	320	48	ug/kg	
91-57-6	2-Methylnaphthalene	ND	320	48	ug/kg	
91-20-3	Naphthalene	ND	320	48	ug/kg	
85-01-8	Phenanthrene	ND	320	48	ug/kg	
129-00-0	Pyrene	ND	320	56	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003706.D	1	08/02/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	960	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	960	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	77	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	960	380	ug/kg	
87-86-5	Pentachlorophenol	ND	960	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	96	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	190	77	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	38	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	38	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	77	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	96	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	96	ug/kg	
84-66-2	Diethyl phthalate	ND	380	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	96	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	38	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	38	ug/kg	
67-72-1	Hexachloroethane	ND	190	38	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	77	ug/kg	
99-09-2	3-Nitroaniline	ND	380	77	ug/kg	
100-01-6	4-Nitroaniline	ND	380	77	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	38	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		40-102%
4165-62-2	Phenol-d5	68%		41-100%
118-79-6	2,4,6-Tribromophenol	63%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	66%		43-107%
1718-51-0	Terphenyl-d14	74%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09592.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	77	ug/kg	
208-96-8	Acenaphthylene	ND	310	77	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003707.D	1	08/02/07	NJ	07/31/07	OP21689	SU181
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	970	390	ug/kg	
95-57-8	2-Chlorophenol	ND	190	39	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	39	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	39	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	39	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	970	390	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	390	78	ug/kg	
95-48-7	2-Methylphenol	ND	190	39	ug/kg	
	3&4-Methylphenol	ND	190	39	ug/kg	
88-75-5	2-Nitrophenol	ND	190	39	ug/kg	
100-02-7	4-Nitrophenol	ND	970	390	ug/kg	
87-86-5	Pentachlorophenol	ND	970	390	ug/kg	
108-95-2	Phenol	ND	190	39	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	39	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	39	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	39	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	390	97	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	39	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	39	ug/kg	
106-47-8	4-Chloroaniline	ND	190	78	ug/kg	
86-74-8	Carbazole	ND	190	39	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	39	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	39	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	39	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	39	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	39	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	39	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	39	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	39	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	39	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	390	78	ug/kg	
132-64-9	Dibenzofuran	ND	190	39	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C SW846 3550B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	390	97	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	390	97	ug/kg	
84-66-2	Diethyl phthalate	ND	390	190	ug/kg	
131-11-3	Dimethyl phthalate	ND	390	97	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	390	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	39	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	39	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	39	ug/kg	
67-72-1	Hexachloroethane	ND	190	39	ug/kg	
78-59-1	Isophorone	ND	190	39	ug/kg	
88-74-4	2-Nitroaniline	ND	390	78	ug/kg	
99-09-2	3-Nitroaniline	ND	390	78	ug/kg	
100-01-6	4-Nitroaniline	ND	390	78	ug/kg	
98-95-3	Nitrobenzene	ND	190	39	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	39	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	39	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	39	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	62%		40-102%
4165-62-2	Phenol-d5	65%		41-100%
118-79-6	2,4,6-Tribromophenol	67%		42-108%
4165-60-0	Nitrobenzene-d5	56%		40-105%
321-60-8	2-Fluorobiphenyl	59%		43-107%
1718-51-0	Terphenyl-d14	72%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8270C BY SIM SW846 3550B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09593.D	4	08/04/07	NJ	07/31/07	OP21688	SR453
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	78	ug/kg	
208-96-8	Acenaphthylene	ND	310	78	ug/kg	
120-12-7	Anthracene	ND	310	47	ug/kg	
56-55-3	Benzo(a)anthracene	ND	62	16	ug/kg	
50-32-8	Benzo(a)pyrene	ND	62	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	62	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	62	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	62	16	ug/kg	
218-01-9	Chrysene	ND	62	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	62	16	ug/kg	
206-44-0	Fluoranthene	ND	310	55	ug/kg	
86-73-7	Fluorene	ND	310	47	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	62	16	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	47	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	47	ug/kg	
91-20-3	Naphthalene	ND	310	47	ug/kg	
85-01-8	Phenanthrene	ND	310	47	ug/kg	
129-00-0	Pyrene	ND	310	55	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F51247

DATE: December 7, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. Solid samples were analyzed for pesticides and PCBs using USEPA Method 3550B/8081A and 3550B/8082, respectively. A total of twenty solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20
50SB06A	F51247-1	50SB011A	F51247-11

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

12/07/07
Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F51247

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For aqueous samples, pesticide and PCB compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. For solid samples, pesticide and PCB compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: The solid samples were collected on 07/23/07. The pesticides were extracted on 07/31/07 and analyzed on 08/07/07, 08/08/07, and 08/10/07. The PCBs were extracted on 07/31/07 and analyzed on 08/02/07, 08/03/07, 08/04/07, and 08/06/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- For analysis performed on 08/04/07 @09:09, endrin and 4,4'-DDT percent breakdowns were 14.1% and 5.0% on signal #1 and 13.8% and 4.5% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/06/07 @14:48, endrin and 4,4'-DDT percent breakdowns were 8.0% and 3.0% on signal #1 and 9.2% and 2.4% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.995. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- For the pesticide initial calibration performed on 08/04/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/10/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample 50SB012A (F51247-13) was analyzed using this initial calibration.

- For the PCB initial calibration performed on 07/28/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples were analyzed using this initial calibration.

- For the PCB initial calibration performed on 08/02/07 on instrument ECD3, PCB1221-A (24.1%) and PCB1221-B (37.3%) were outside criteria for signal #1. For signal #2, PCB1221-A (33.7%) was outside criteria. For signal #1, compounds PCB1221-A (r=0.9974), PCB1221-B (r=0.9938), PCB1221-C (r=0.9992), PCB1221-D (r=0.9995), and PCB1221-E (r=0.9992) were quantified using linear or second order regression with correlation coefficients >0.995. For signal #2, compounds PCB1221-A (r=0.9941), PCB1221-B (r=0.9985), PCB1221-C (r=0.9996), PCB1221-D (r=0.9997), and PCB1221-E (r=0.9996) were quantified using linear or second order regression with correlation coefficients >0.995. Therefore, no qualifiers were applied based upon these outliers. Samples 50SB06A (F51247-1), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 08/06/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), and 50SB012B (F51247-14) were analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the initial calibration should be no greater than ±20%.

- For pesticide initial calibration verification performed on 08/04/07 @12:47 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/06/07 @16:34 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Sample 50SB09A (F51247-7) was analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @19:50 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @22:45 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Sample 50SB08A (F51247-5) was analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/07/07 @12:53 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/07/07 @11:26 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples 50SB08B (F51247-6), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB013A (F51247-15), and 50SB013B (F51247-16) were analyzed using this continuing calibration.

- For pesticide chlordane continuing calibration performed on 08/07/07 @11:57 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide toxaphene continuing calibration performed on 08/07/07 @12:13 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/07/07 @15:32 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/07/07 @18:12 on instrument ECD5, 4,4'-DDD (21.5%), 4,4'-DDT (36.6%), and methoxychlor (31.0%) were outside criteria for the signal #1. 4,4'-DDT (40.6%) and methoxychlor (35.0%) were outside criteria for the signal #2. No samples reported was analyzed using this continuing calibration; therefore, no qualifiers were applied based upon these outliers.

- For pesticide continuing calibration performed on 08/08/07 @11:16 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples 50SB07B (F51247-4), 50SB08A (F51247-5), and 50SB09A (F51247-7) were analyzed using this continuing calibration.

- For pesticide chlordane continuing calibration performed on 08/08/07 @11:32 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide toxaphene continuing calibration performed on 08/08/07 @11:48 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/08/07 @13:34 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples 50SB07A (F51247-3) and 50SB012B (F51247-14) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/10/07 @18:40 on instrument ECD6, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/10/07 @22:05 on instrument ECD6, all criteria were met. No qualifiers were applied. Sample 50SB012A (F51247-13) were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/10/07 @23:09 on instrument ECD6, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 08/02/07 @12:49 on instrument ECD3, PCB1254-F (22.0%) was outside criteria for signal #1; however, the average %D for PCB1254 was 14.2%. PCB1254-E (21.0%) was outside criteria for signal #2. The average %D for PCB1254 was 13.4% for signal #2. PCB1221-E (98.6%) was outside criteria for signal %1. PCB1221-A (95.9%) and PCB-1221-E (98.7%) were outside criteria for signal #2. No samples were analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 08/02/07 @14:54 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB07B (F51247-4), 50SB08A (F51247-5), and 50SB09A (F51247-7) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/02/07 @15:28 on instrument ECD3, PCB1016-C (21.6%) was outside criteria for signal #1; however, the average %D for PCB1016 was 10.2%. No qualifiers were applied based upon this outlier. All criteria were met for signal #2. No samples reported were analyzed using this continuing calibration.

- For PCB 1248 continuing calibration performed on 08/02/07 @15:45 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1242 continuing calibration performed on 08/02/07 @16:02 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1232/1268 continuing calibration performed on 08/02/07 @16:19 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1221/1254 continuing calibration performed on 08/02/07 @16:36 on instrument ECD3, PCB1221-B (24.8%) was outside criteria for signal #1; however, the average %D for PCB1221 was 6.9%. No qualifiers were applied based upon this outlier. All criteria were met for signal #2. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/02/07 @19:43 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB013A (F51247-15), and 50SB013B (F51247-16) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/02/07 @23:08 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/03/07 @00:50 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/04/07 @06:08 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 50SB08B (F51247-6) and 50SB09B (F51247-8) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/04/07 @08:24 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 08/06/07 @15:56 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples 50SB06B (F51247-2), 50SB07A (F51247-3), and 50SB012B (F51247-14) were analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 08/06/07 @19:06 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
Pesticides	08/06/07	OP21686-MB	All target <½MRL	NA	NA	None
Pesticides	08/08/07	OP21686-MB	All target <½MRL	NA	NA	None
Pesticides	08/10/07	OP21686-MB	All target <½MRL	NA	NA	None
Pesticides	07/02/07	072407R	All target <½MRL	NA	NA	None
Pesticides	07/02/07	072507R	All target <½MRL	NA	NA	None
PCBs	08/02/07	OP21687-MB	All target <½MRL	NA	NA	None
PCBs	08/04/07	OP21687-MB	All target <½MRL	NA	NA	None
PCBs	08/06/07	OP21687-MB	All target <½MRL	NA	NA	None
PCBs	06/27/07	072407R	All target <½MRL	NA	NA	None
PCBs	06/27/07	072507R	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Criteria:	Tetrachloro-m-xylene:	Pesticides: 46-122% (DoD QSM 70-125%)
	Decachlorobiphenyl:	Pesticides: 50-133% (DoD QSM 55-130%)
Solid Criteria:	Tetrachloro-m-xylene:	PCBs: 44-126% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 39-157% (DoD QSM 60-125%)

- For pesticides sample 50SB06A (F51247-1), tetrachloro-m-xylene (65.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB06B (F51247-2), tetrachloro-m-xylene (66.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB07A (F51247-3), tetrachloro-m-xylene (64.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. The sample was diluted 10x and since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB07B (F51247-4), tetrachloro-m-xylene (49.0%) and decachlorobiphenyl (50.0%) were below DoD QSM criteria and within laboratory criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries.

- For pesticides sample 50SB08A (F51247-5), tetrachloro-m-xylene (46.0%) and decachlorobiphenyl (44.0%) were below DoD QSM criteria and/or laboratory criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries. Sample was re-analyzed at a 10x dilution for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (60.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since the confirmation run was run at a 10x dilution and only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 50SB08B (F51247-6), tetrachloro-m-xylene (54.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB09A (F51247-7), tetrachloro-m-xylene (52.0%) and decachlorobiphenyl (48.0%) were below DoD QSM criteria and/or laboratory criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries. Sample was re-analyzed at a 10x dilution for confirmation (run #2) and all criteria were met.

- For pesticides sample 50SB09B (F51247-8), tetrachloro-m-xylene (51.0%) and decachlorobiphenyl (52.0%) were below DoD QSM criteria and/or laboratory criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries.

- For pesticides sample 50SB010A (F51247-9), tetrachloro-m-xylene (59.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB010B (F51247-10), tetrachloro-m-xylene (63.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB011A (F51247-11), tetrachloro-m-xylene (55.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB011B (F51247-12), tetrachloro-m-xylene (60.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB012B (F51247-14), tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. The sample was analyzed at a 10x dilution and since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB013A (F51247-15), tetrachloro-m-xylene (57.0%) and decachlorobiphenyl (52.0%) were below DoD QSM criteria and/or laboratory criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries.

- For pesticides sample 50SB013B (F51247-16), tetrachloro-m-xylene (56.0%) and decachlorobiphenyl (53.0%) were below DoD QSM criteria and/or laboratory criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries.

- For pesticides sample 50SB014A (F51247-17), tetrachloro-m-xylene (59.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB014B (F51247-18), tetrachloro-m-xylene (63.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB015A (F51247-19), tetrachloro-m-xylene (56.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For pesticides sample 50SB015B (F51247-20), tetrachloro-m-xylene (68.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 50SB07A (F51247-3), tetrachloro-m-xylene (0.0%) and decachlorobiphenyl (0.0%) surrogates were diluted out. The sample was analyzed at a 20x dilution. No qualifiers were applied based upon these outliers.

- For all other samples, all criteria were met for pesticides and PCBs analysis.

VII-Laboratory Control Samples

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM solid LCS recovery limits are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21686-BS was used as the solid LCS for the pesticide analysis on 08/06/07. Compound endrin aldehyde (12%) was outside DoD QSM criteria, however within laboratory criteria. Compound endrin aldehyde was non-detect for all associated samples and was qualified estimated bias "UL" for non-detects based upon very low recovery. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample OP21687-BS was used as the solid LCS for the PCB analysis on 08/02/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample OP21687-BS was used as the solid LCS for the PCB analysis on 08/06/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 50SB014A (F51247-17) was used as the MS/MSD for the pesticide analysis on 08/07/07. Compounds aldrin (54%; RPD=37%), alpha-BHC (49%; RPD=39%), beta-BHC (65%, 51%; RPD=26%), delta-BHC (35%, 28%), gamma-BHC (52%; RPD=40%), alpha chlordane (58%), gamma chlordane (61%), dieldrin (61%), 4,4'-DDE (66%), 4,4'-DDT (61%), endosulfan sulfate (58%, 50%), endrin aldehyde (7%; RPD=109%), endosulfan I (63%; RPD=26), endosulfan II (69%), heptachlor (57%; RPD=42%), heptachlor epoxide (59%; RPD=26%), and methoxychlor (67%) were outside DoD QSM criteria and/or laboratory criteria. The LCS was also low in recovery (See Section VII), except for endrin aldehyde. Compound endrin aldehyde was qualified "UL" for all samples based upon the low recovery. Compounds aldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, alpha chlordane, gamma chlordane, dieldrin, 4,4'-DDE, 4,4'-DDT, endosulfan sulfate, endosulfan I, endosulfan II, heptachlor, heptachlor epoxide, and methoxychlor were non-detect for the spiked sample and qualified estimated bias low "UL" for non-detects based upon low recoveries. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

- Sample 50SB011B (F51247-12) was used as the MS/MSD for the PCB analysis on 08/02/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

X-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

- All chlorinated pesticides were non-detect. No confirmations were required.

- For all detected PCBs, the %Ds (average %D for multi-peak compounds) between the primary and secondary columns were within criteria. No qualifiers were applied.

Sample: 50SB014AMS (F51247-17MS), alpha-chlordane

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (mL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100 = 1.0 for Wet Weight
DF = Dilution factor

Conc. µg/kg = (7431266Area*10000µL*1) / (200100Area/pg*(1000pg/ng)*1 µL*30.3g*0.9030) = 13.6 µg/kg

Reported Value = 13.6 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: 50SB06B (F51247-2), Aroclor 1254

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (µL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100 = 1.0 for Wet Weight
DF = Dilution factor

Signal #1
Conc1 µg/kg = (727512*10000*5) / (7463*(1000)*1*30.1*0.5960) = 271.70 µg/kg
Conc2 µg/kg = (864110*10000*5) / (8365*(1000)*1*30.1*0.5960) = 287.91 µg/kg
Conc3 µg/kg = (1237642*10000*5) / (10960*(1000)*1*30.1*0.5960) = 314.73 µg/kg
Conc4 µg/kg = (958149*10000*5) / (7838*(1000)*1*30.1*0.5960) = 340.71 µg/kg
Conc5 µg/kg = (781847*10000*5) / (6256*(1000)*1*30.1*0.5960) = 348.32 µg/kg
Conc6 µg/kg = (1366880*10000*5) / (10230*(1000)*1*30.1*0.5960) = 372.40 µg/kg
Average concentration = 323 µg/kg

Signal #2
Conc1 µg/kg = (140364*10000*5) / (1538*(1000)*1*30.1*0.5960) = 254.36 µg/kg
Conc2 µg/kg = (130770*10000*5) / (1319*(1000)*1*30.1*0.5960) = 276.33 µg/kg
Conc3 µg/kg = (174760*10000*5) / (1677*(1000)*1*30.1*0.5960) = 290.45 µg/kg
Conc4 µg/kg = (138739*10000*5) / (1243*(1000)*1*30.1*0.5960) = 311.09 µg/kg
Conc5 µg/kg = (119963*10000*5) / (891.6*(1000)*1*30.1*0.5960) = 375.00 µg/kg
Conc6 µg/kg = (202338*10000*5) / (1579*(1000)*1*30.1*0.5960) = 357.15 µg/kg
Average concentration = 311 µg/kg

Reported Value = 323 µg/kg (signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: KK20742.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20742.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.44	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.48	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.81	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.40	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.40	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.74	ug/kg	
72-55-9	4,4'-DDE	ND	3.7	0.74	ug/kg	
50-29-3	4,4'-DDT	ND	3.7	0.85	ug/kg	
72-20-8	Endrin	ND	3.7	0.74	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.7	0.74	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.40	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.55	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.52	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.8	0.37	ug/kg	
72-43-5	Methoxychlor	ND	3.7	0.74	ug/kg	
8001-35-2	Toxaphene	ND	92	46	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	65%		46-122%
2051-24-3	Decachlorobiphenyl	64%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64379.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64379.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.2	ug/kg	
11104-28-2	Aroclor 1221	ND	18	15	ug/kg	
11141-16-5	Aroclor 1232	ND	18	15	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.2	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.2	ug/kg	
11097-69-1	Aroclor 1254	ND	18	9.2	ug/kg	
11096-82-5	Aroclor 1260	ND	18	9.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%		44-126%
2051-24-3	Decachlorobiphenyl	85%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20743.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20743.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.8	0.67	ug/kg	
319-84-6	alpha-BHC	ND	2.8	0.78	ug/kg	
319-85-7	beta-BHC	ND	2.8	0.72	ug/kg	
319-86-8	delta-BHC	ND	2.8	1.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.8	0.95	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.8	0.56	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.8	0.61	ug/kg	
60-57-1	Dieldrin	ND	2.8	0.61	ug/kg	
72-54-8	4,4'-DDD	ND	5.6	1.1	ug/kg	
72-55-9	4,4'-DDE	ND	5.6	1.1	ug/kg	
50-29-3	4,4'-DDT	ND	5.6	1.3	ug/kg	
72-20-8	Endrin	ND	5.6	1.1	ug/kg	
1031-07-8	Endosulfan sulfate	ND	5.6	1.8	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	5.6	1.7	ug/kg	
53494-70-5	Endrin ketone	ND	5.6	1.1	ug/kg	
959-98-8	Endosulfan-I	ND	2.8	0.61	ug/kg	
33213-65-9	Endosulfan-II	ND	5.6	0.84	ug/kg	
76-44-8	Heptachlor	ND	2.8	0.78	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.8	0.56	ug/kg	
72-43-5	Methoxychlor	ND	5.6	1.1	ug/kg	
8001-35-2	Toxaphene	ND	140	70	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%		46-122%
2051-24-3	Decachlorobiphenyl	60%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64536.D	5	08/06/07	JB	07/31/07	OP21687	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	140	70	ug/kg	
11104-28-2	Aroclor 1221	ND	140	110	ug/kg	
11141-16-5	Aroclor 1232	ND	140	110	ug/kg	
53469-21-9	Aroclor 1242	ND	140	70	ug/kg	
12672-29-6	Aroclor 1248	ND	140	70	ug/kg	
11097-69-1	Aroclor 1254 [b]	323	140	70	ug/kg	
11096-82-5	Aroclor 1260	ND	140	70	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		44-126%
2051-24-3	Decachlorobiphenyl	84%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Aroclor pattern appears to be weathered.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20774.D	10	08/08/07	FS	07/31/07	OP21686	GKK761
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	19	4.5	ug/kg	
319-84-6	alpha-BHC	ND	19	5.3	ug/kg	
319-85-7	beta-BHC	ND	19	4.9	ug/kg	
319-86-8	delta-BHC	ND	19	8.3	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	19	6.4	ug/kg	
5103-71-9	alpha-Chlordane	ND	19	3.8	ug/kg	
5103-74-2	gamma-Chlordane	ND	19	4.1	ug/kg	
60-57-1	Dieldrin	ND	19	4.1	ug/kg	
72-54-8	4,4'-DDD	ND	38	7.5	ug/kg	
72-55-9	4,4'-DDE	ND	38	7.5	ug/kg	
50-29-3	4,4'-DDT	ND	38	8.7	ug/kg	
72-20-8	Endrin	ND	38	7.5	ug/kg	
1031-07-8	Endosulfan sulfate	ND	38	12	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	38	11	ug/kg	
53494-70-5	Endrin ketone	ND	38	7.5	ug/kg	
959-98-8	Endosulfan-I	ND	19	4.1	ug/kg	
33213-65-9	Endosulfan-II	ND	38	5.7	ug/kg	
76-44-8	Heptachlor	ND	19	5.3	ug/kg	
1024-57-3	Heptachlor epoxide	ND	19	3.8	ug/kg	
72-43-5	Methoxychlor	ND	38	7.5	ug/kg	
8001-35-2	Toxaphene	ND	940	470	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	64%		46-122%
2051-24-3	Decachlorobiphenyl	57%		50-133%

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64537.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64537.D	20	08/06/07	JB	07/31/07	OP21687	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	380	190	ug/kg	
11104-28-2	Aroclor 1221	ND	380	300	ug/kg	
11141-16-5	Aroclor 1232	ND	380	300	ug/kg	
53469-21-9	Aroclor 1242	ND	380	190	ug/kg	
12672-29-6	Aroclor 1248	ND	380	190	ug/kg	
11097-69-1	Aroclor 1254	1480	380	190	ug/kg	
11096-82-5	Aroclor 1260	ND	380	190	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	0% [b]		44-126%
2051-24-3	Decachlorobiphenyl	0% [b]		39-157%

(a) All hits confirmed by dual column analysis.
(b) Outside control limits due to dilution.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20767.D	1	08/08/07	FS	07/31/07	OP21686	GKK761
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND UL	2.7	0.65	ug/kg	
319-84-6	alpha-BHC	ND UL	2.7	0.76	ug/kg	
319-85-7	beta-BHC	ND UL	2.7	0.71	ug/kg	
319-86-8	delta-BHC	ND UL	2.7	1.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND UL	2.7	0.93	ug/kg	
5103-71-9	alpha-Chlordane	ND UL	2.7	0.55	ug/kg	
5103-74-2	gamma-Chlordane	ND UL	2.7	0.60	ug/kg	
60-57-1	Dieldrin	ND UL	2.7	0.60	ug/kg	
72-54-8	4,4'-DDD	ND UL	5.5	1.1	ug/kg	
72-55-9	4,4'-DDE	ND UL	5.5	1.1	ug/kg	
50-29-3	4,4'-DDT	ND UL	5.5	1.3	ug/kg	
72-20-8	Endrin	ND UL	5.5	1.1	ug/kg	
1031-07-8	Endosulfan sulfate	ND UL	5.5	1.8	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	5.5	1.6	ug/kg	
53494-70-5	Endrin ketone	ND UL	5.5	1.1	ug/kg	
959-98-8	Endosulfan-I	ND UL	2.7	0.60	ug/kg	
33213-65-9	Endosulfan-II	ND UL	5.5	0.82	ug/kg	
76-44-8	Heptachlor	ND UL	2.7	0.76	ug/kg	
1024-57-3	Heptachlor epoxide	ND UL	2.7	0.55	ug/kg	
72-43-5	Methoxychlor	ND UL	5.5	1.1	ug/kg	
8001-35-2	Toxaphene	ND UL	140	68	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	49%		46-122%
2051-24-3	Decachlorobiphenyl	50%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64382.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	27	14	ug/kg	
11104-28-2	Aroclor 1221	ND	27	22	ug/kg	
11141-16-5	Aroclor 1232	ND	27	22	ug/kg	
53469-21-9	Aroclor 1242	ND	27	14	ug/kg	
12672-29-6	Aroclor 1248	ND	27	14	ug/kg	
11097-69-1	Aroclor 1254	ND	27	14	ug/kg	
11096-82-5	Aroclor 1260	ND	27	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	65%		44-126%
2051-24-3	Decachlorobiphenyl	76%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20768.D	1	08/08/07	FS	07/31/07	OP21686	GKK761
Run #2	KK20717.D	10	08/07/07	FS	07/31/07	OP21686	GKK759

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2	30.1 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND UL	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND UL	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND UL	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND UL	1.9	0.84	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND UL	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND UL	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND UL	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND UL	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND UL	3.8	0.77	ug/kg	
72-55-9	4,4'-DDE	ND UL	3.8	0.77	ug/kg	
50-29-3	4,4'-DDT	ND UL	3.8	0.88	ug/kg	
72-20-8	Endrin	ND UL	3.8	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND UL	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	3.8	1.2	ug/kg	
53494-70-5	Endrin ketone	ND UL	3.8	0.77	ug/kg	
959-98-8	Endosulfan-I	ND UL	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND UL	3.8	0.58	ug/kg	
76-44-8	Heptachlor	ND UL	1.9	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND UL	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND UL	3.8	0.77	ug/kg	
8001-35-2	Toxaphene	ND UL	96	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	46%	60%	46-122%
2051-24-3	Decachlorobiphenyl	44% [a]	65%	50-133%

(a) Outside control limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64383.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		44-126%
2051-24-3	Decachlorobiphenyl	67%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20725.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20725.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.6	0.63	ug/kg	
319-84-6	alpha-BHC	ND	2.6	0.73	ug/kg	
319-85-7	beta-BHC	ND	2.6	0.68	ug/kg	
319-86-8	delta-BHC	ND	2.6	1.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.6	0.89	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.6	0.52	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.6	0.57	ug/kg	
60-57-1	Dieldrin	ND	2.6	2.6	ug/kg	
72-54-8	4,4'-DDD	ND	5.2	1.0	ug/kg	
72-55-9	4,4'-DDE	ND	5.2	1.0	ug/kg	
50-29-3	4,4'-DDT	ND	5.2	1.2	ug/kg	
72-20-8	Endrin	ND	5.2	1.0	ug/kg	
1031-07-8	Endosulfan sulfate	ND	5.2	1.7	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	5.2	1.6	ug/kg	
53494-70-5	Endrin ketone	ND	5.2	1.0	ug/kg	
959-98-8	Endosulfan-I	ND	2.6	0.57	ug/kg	
33213-65-9	Endosulfan-II	ND	5.2	0.78	ug/kg	
76-44-8	Heptachlor	ND	2.6	0.73	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.6	0.52	ug/kg	
72-43-5	Methoxychlor	ND	5.2	1.0	ug/kg	
8001-35-2	Toxaphene	ND	130	65	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	54%		46-122%
2051-24-3	Decachlorobiphenyl	55%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64508.D	5	08/04/07	JB	07/31/07	OP21687	GST1700
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	130	65	ug/kg	
11104-28-2	Aroclor 1221	ND	130	100	ug/kg	
11141-16-5	Aroclor 1232	ND	130	100	ug/kg	
53469-21-9	Aroclor 1242	ND	130	65	ug/kg	
12672-29-6	Aroclor 1248	ND	130	65	ug/kg	
11097-69-1	Aroclor 1254	343	130	65	ug/kg	
11096-82-5	Aroclor 1260	ND	130	65	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	78%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20769.D KK20694.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20769.D	1	08/08/07	FS	07/31/07	OP21686	GKK761
Run #2	KK20694.D	10	08/06/07	FS	07/31/07	OP21686	GKK759

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2	30.5 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND UL	2.0	0.47	ug/kg	
319-84-6	alpha-BHC	ND UL	2.0	0.55	ug/kg	
319-85-7	beta-BHC	ND UL	2.0	0.51	ug/kg	
319-86-8	delta-BHC	ND UL	2.0	0.86	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND UL	2.0	0.67	ug/kg	
5103-71-9	alpha-Chlordane	ND UL	2.0	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND UL	2.0	0.43	ug/kg	
60-57-1	Dieldrin	ND UL	2.0	0.43	ug/kg	
72-54-8	4,4'-DDD	ND UL	3.9	0.78	ug/kg	
72-55-9	4,4'-DDE	ND UL	3.9	0.78	ug/kg	
50-29-3	4,4'-DDT	ND UL	3.9	0.90	ug/kg	
72-20-8	Endrin	ND UL	3.9	0.78	ug/kg	
1031-07-8	Endosulfan sulfate	ND UL	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	3.9	1.2	ug/kg	
53494-70-5	Endrin ketone	ND UL	3.9	0.78	ug/kg	
959-98-8	Endosulfan-I	ND UL	2.0	0.43	ug/kg	
33213-65-9	Endosulfan-II	ND UL	3.9	0.59	ug/kg	
76-44-8	Heptachlor	ND UL	2.0	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND UL	2.0	0.39	ug/kg	
72-43-5	Methoxychlor	ND UL	3.9	0.78	ug/kg	
8001-35-2	Toxaphene	ND UL	98	49	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	52%	70%	46-122%
2051-24-3	Decachlorobiphenyl	48% [a]	74%	50-133%

(a) Outside control limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64385.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64385.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	9.8	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	9.8	ug/kg	
12672-29-6	Aroclor 1248	ND	20	9.8	ug/kg	
11097-69-1	Aroclor 1254	ND	20	9.8	ug/kg	
11096-82-5	Aroclor 1260	ND	20	9.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	84%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20726.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20726.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND VL	2.7	0.64	ug/kg	
319-84-6	alpha-BHC	ND VL	2.7	0.75	ug/kg	
319-85-7	beta-BHC	ND VL	2.7	0.69	ug/kg	
319-86-8	delta-BHC	ND VL	2.7	1.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND VL	2.7	0.90	ug/kg	
5103-71-9	alpha-Chlordane	ND VL	2.7	0.53	ug/kg	
5103-74-2	gamma-Chlordane	ND VL	2.7	0.59	ug/kg	
60-57-1	Dieldrin	ND VL	2.7	0.59	ug/kg	
72-54-8	4,4'-DDD	ND VL	5.3	1.1	ug/kg	
72-55-9	4,4'-DDE	ND VL	5.3	1.1	ug/kg	
50-29-3	4,4'-DDT	ND VL	5.3	1.2	ug/kg	
72-20-8	Endrin	ND VL	5.3	1.1	ug/kg	
1031-07-8	Endosulfan sulfate	ND VL	5.3	1.8	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	5.3	1.6	ug/kg	
53494-70-5	Endrin ketone	ND VL	5.3	1.1	ug/kg	
959-98-8	Endosulfan-I	ND VL	2.7	0.59	ug/kg	
33213-65-9	Endosulfan-II	ND VL	5.3	0.80	ug/kg	
76-44-8	Heptachlor	ND VL	2.7	0.75	ug/kg	
1024-57-3	Heptachlor epoxide	ND VL	2.7	0.53	ug/kg	
72-43-5	Methoxychlor	ND VL	5.3	1.1	ug/kg	
8001-35-2	Toxaphene	ND VL	130	67	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	51%		46-122%
2051-24-3	Decachlorobiphenyl	52%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64509.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64509.D	10	08/04/07	JB	07/31/07	OP21687	GST1700
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	270	130	ug/kg	
11104-28-2	Aroclor 1221	ND	270	210	ug/kg	
11141-16-5	Aroclor 1232	ND	270	210	ug/kg	
53469-21-9	Aroclor 1242	ND	270	130	ug/kg	
12672-29-6	Aroclor 1248	ND	270	130	ug/kg	
11097-69-1	Aroclor 1254	706	270	130	ug/kg	
11096-82-5	Aroclor 1260	ND	270	130	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	79%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20727.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20727.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.43	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.50	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.47	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.79	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.61	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.36	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.39	ug/kg	
72-54-8	4,4'-DDD	ND	3.6	0.72	ug/kg	
72-55-9	4,4'-DDE	ND	3.6	0.72	ug/kg	
50-29-3	4,4'-DDT	ND	3.6	0.83	ug/kg	
72-20-8	Endrin	ND	3.6	0.72	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.6	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.6	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.6	0.72	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.6	0.54	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.50	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.8	0.36	ug/kg	
72-43-5	Methoxychlor	ND	3.6	0.72	ug/kg	
8001-35-2	Toxaphene	ND	90	45	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	59%		46-122%
2051-24-3	Decachlorobiphenyl	60%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64389.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.0	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.0	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.0	ug/kg	
11097-69-1	Aroclor 1254	10.4 J	18	9.0	ug/kg	J
11096-82-5	Aroclor 1260	ND	18	9.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		44-126%
2051-24-3	Decachlorobiphenyl	84%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20728.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20728.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.2	0.52	ug/kg	
319-84-6	alpha-BHC	ND	2.2	0.61	ug/kg	
319-85-7	beta-BHC	ND	2.2	0.56	ug/kg	
319-86-8	delta-BHC	ND	2.2	0.95	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.2	0.73	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.2	0.43	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.2	0.48	ug/kg	
60-57-1	Dieldrin	ND	2.2	0.48	ug/kg	
72-54-8	4,4'-DDD	ND	4.3	0.86	ug/kg	
72-55-9	4,4'-DDE	ND	4.3	0.86	ug/kg	
50-29-3	4,4'-DDT	ND	4.3	0.99	ug/kg	
72-20-8	Endrin	ND	4.3	0.86	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.3	1.4	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	4.3	1.3	ug/kg	
53494-70-5	Endrin ketone	ND	4.3	0.86	ug/kg	
959-98-8	Endosulfan-I	ND	2.2	0.48	ug/kg	
33213-65-9	Endosulfan-II	ND	4.3	0.65	ug/kg	
76-44-8	Heptachlor	ND	2.2	0.61	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.2	0.43	ug/kg	
72-43-5	Methoxychlor	ND	4.3	0.86	ug/kg	
8001-35-2	Toxaphene	ND	110	54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		46-122%
2051-24-3	Decachlorobiphenyl	66%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64390.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	22	11	ug/kg	
11104-28-2	Aroclor 1221	ND	22	17	ug/kg	
11141-16-5	Aroclor 1232	ND	22	17	ug/kg	
53469-21-9	Aroclor 1242	ND	22	11	ug/kg	
12672-29-6	Aroclor 1248	ND	22	11	ug/kg	
11097-69-1	Aroclor 1254	ND	22	11	ug/kg	
11096-82-5	Aroclor 1260	ND	22	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		44-126%
2051-24-3	Decachlorobiphenyl	88%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20729.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.43	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.50	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.78	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.61	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.36	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.39	ug/kg	
72-54-8	4,4'-DDD	ND	3.6	0.71	ug/kg	
72-55-9	4,4'-DDE	ND	3.6	0.71	ug/kg	
50-29-3	4,4'-DDT	ND	3.6	0.82	ug/kg	
72-20-8	Endrin	ND	3.6	0.71	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.6	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND vL	3.6	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.6	0.71	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.6	0.53	ug/kg	
76-44-8	Heptachlor	ND	1.8	0.50	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.8	0.36	ug/kg	
72-43-5	Methoxychlor	ND	3.6	0.71	ug/kg	
8001-35-2	Toxaphene	ND	89	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	55%		46-122%
2051-24-3	Decachlorobiphenyl	64%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64391.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	8.9	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	8.9	ug/kg	
12672-29-6	Aroclor 1248	ND	18	8.9	ug/kg	
11097-69-1	Aroclor 1254	ND	18	8.9	ug/kg	
11096-82-5	Aroclor 1260	ND	18	8.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		44-126%
2051-24-3	Decachlorobiphenyl	82%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20730.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.85	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.77	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.77	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.88	ug/kg	
72-20-8	Endrin	ND	3.8	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.8	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	3.8	0.77	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.58	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.77	ug/kg	
8001-35-2	Toxaphene	ND	96	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	60%		46-122%
2051-24-3	Decachlorobiphenyl	68%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64392.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		44-126%
2051-24-3	Decachlorobiphenyl	86%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08314.D	1	08/10/07	FS	07/31/07	OP21686	GTT281
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.47	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.55	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.51	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.86	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.66	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.39	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.43	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.43	ug/kg	
72-54-8	4,4'-DDD	ND	3.9	0.78	ug/kg	
72-55-9	4,4'-DDE	ND	3.9	0.78	ug/kg	
50-29-3	4,4'-DDT	ND	3.9	0.90	ug/kg	
72-20-8	Endrin	ND	3.9	0.78	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.9	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.9	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	3.9	0.78	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.43	ug/kg	
33213-65-9	Endosulfan-II	ND	3.9	0.59	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.55	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.39	ug/kg	
72-43-5	Methoxychlor	ND	3.9	0.78	ug/kg	
8001-35-2	Toxaphene	ND	98	49	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		46-122%
2051-24-3	Decachlorobiphenyl	79%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64395.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.7	ug/kg	
11104-28-2	Aroclor 1221	ND	19	16	ug/kg	
11141-16-5	Aroclor 1232	ND	19	16	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.7	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.7	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.7	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%		44-126%
2051-24-3	Decachlorobiphenyl	85%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20773.D	10	08/08/07	FS	07/31/07	OP21686	GKK761
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	24	5.8	ug/kg	
319-84-6	alpha-BHC	ND	24	6.7	ug/kg	
319-85-7	beta-BHC	ND	24	6.3	ug/kg	
319-86-8	delta-BHC	ND	24	11	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	24	8.2	ug/kg	
5103-71-9	alpha-Chlordane	ND	24	4.8	ug/kg	
5103-74-2	gamma-Chlordane	ND	24	5.3	ug/kg	
60-57-1	Dieldrin	ND	24	5.3	ug/kg	
72-54-8	4,4'-DDD	ND	48	9.6	ug/kg	
72-55-9	4,4'-DDE	ND	48	9.6	ug/kg	
50-29-3	4,4'-DDT	ND	48	11	ug/kg	
72-20-8	Endrin	ND	48	9.6	ug/kg	
1031-07-8	Endosulfan sulfate	ND	48	16	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	48	14	ug/kg	
53494-70-5	Endrin ketone	ND	48	9.6	ug/kg	
959-98-8	Endosulfan-I	ND	24	5.3	ug/kg	
33213-65-9	Endosulfan-II	ND	48	7.2	ug/kg	
76-44-8	Heptachlor	ND	24	6.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	24	4.8	ug/kg	
72-43-5	Methoxychlor	ND	48	9.6	ug/kg	
8001-35-2	Toxaphene	ND	1200	600	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%		46-122%
2051-24-3	Decachlorobiphenyl	69%		50-133%

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64538.D	10	08/06/07	JB	07/31/07	OP21687	GST1701
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	240	120	ug/kg	
11104-28-2	Aroclor 1221	ND	240	190	ug/kg	
11141-16-5	Aroclor 1232	ND	240	190	ug/kg	
53469-21-9	Aroclor 1242	ND	240	120	ug/kg	
12672-29-6	Aroclor 1248	ND	240	120	ug/kg	
11097-69-1	Aroclor 1254	939	240	120	ug/kg	
11096-82-5	Aroclor 1260	ND	240	120	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	97%		44-126%
2051-24-3	Decachlorobiphenyl	91%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20732.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND UL	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND UL	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND UL	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND UL	1.9	0.84	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND UL	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND UL	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND UL	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND UL	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND UL	3.8	0.76	ug/kg	
72-55-9	4,4'-DDE	ND UL	3.8	0.76	ug/kg	
50-29-3	4,4'-DDT	ND UL	3.8	0.87	ug/kg	
72-20-8	Endrin	ND UL	3.8	0.76	ug/kg	
1031-07-8	Endosulfan sulfate	ND UL	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	3.8	1.1	ug/kg	
53494-70-5	Endrin ketone	ND UL	3.8	0.76	ug/kg	
959-98-8	Endosulfan-I	ND UL	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND UL	3.8	0.57	ug/kg	
76-44-8	Heptachlor	ND UL	1.9	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND UL	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND UL	3.8	0.76	ug/kg	
8001-35-2	Toxaphene	ND UL	95	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	57%		46-122%
2051-24-3	Decachlorobiphenyl	52%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64397.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.5	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.5	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.5	ug/kg	
11097-69-1	Aroclor 1254	12.6 J	19	9.5	ug/kg	J
11096-82-5	Aroclor 1260	ND	19	9.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		44-126%
2051-24-3	Decachlorobiphenyl	70%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20733.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20733.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND VL	2.5	0.61	ug/kg	
319-84-6	alpha-BHC	ND VL	2.5	0.71	ug/kg	
319-85-7	beta-BHC	ND VL	2.5	0.66	ug/kg	
319-86-8	delta-BHC	ND VL	2.5	1.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND VL	2.5	0.86	ug/kg	
5103-71-9	alpha-Chlordane	ND VL	2.5	0.51	ug/kg	
5103-74-2	gamma-Chlordane	ND VL	2.5	0.56	ug/kg	
60-57-1	Dieldrin	ND VL	2.5	0.56	ug/kg	
72-54-8	4,4'-DDD	ND VL	5.1	1.0	ug/kg	
72-55-9	4,4'-DDE	ND VL	5.1	1.0	ug/kg	
50-29-3	4,4'-DDT	ND VL	5.1	1.2	ug/kg	
72-20-8	Endrin	ND VL	5.1	1.0	ug/kg	
1031-07-8	Endosulfan sulfate	ND VL	5.1	1.7	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	5.1	1.5	ug/kg	
53494-70-5	Endrin ketone	ND VL	5.1	1.0	ug/kg	
959-98-8	Endosulfan-I	ND VL	2.5	0.56	ug/kg	
33213-65-9	Endosulfan-II	ND VL	5.1	0.76	ug/kg	
76-44-8	Heptachlor	ND VL	2.5	0.71	ug/kg	
1024-57-3	Heptachlor epoxide	ND VL	2.5	0.51	ug/kg	
72-43-5	Methoxychlor	ND VL	5.1	1.0	ug/kg	
8001-35-2	Toxaphene	ND VL	130	64	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	56%		46-122%
2051-24-3	Decachlorobiphenyl	53%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64398.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	25	13	ug/kg	
11104-28-2	Aroclor 1221	ND	25	20	ug/kg	
11141-16-5	Aroclor 1232	ND	25	20	ug/kg	
53469-21-9	Aroclor 1242	ND	25	13	ug/kg	
12672-29-6	Aroclor 1248	ND	25	13	ug/kg	
11097-69-1	Aroclor 1254	28.3 J	25	13	ug/kg	
11096-82-5	Aroclor 1260	ND	25	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	75%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20736.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND VL	1.8	0.43	ug/kg	
319-84-6	alpha-BHC	ND VL	1.8	0.51	ug/kg	
319-85-7	beta-BHC	ND VL	1.8	0.47	ug/kg	
319-86-8	delta-BHC	ND VL	1.8	0.79	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND VL	1.8	0.61	ug/kg	
5103-71-9	alpha-Chlordane	ND VL	1.8	0.36	ug/kg	
5103-74-2	gamma-Chlordane	ND VL	1.8	0.40	ug/kg	
60-57-1	Dieldrin	ND VL	1.8	0.40	ug/kg	
72-54-8	4,4'-DDD	ND	3.6	0.72	ug/kg	
72-55-9	4,4'-DDE	ND VL	3.6	0.72	ug/kg	
50-29-3	4,4'-DDT	ND VL	3.6	0.83	ug/kg	
72-20-8	Endrin	ND	3.6	0.72	ug/kg	
1031-07-8	Endosulfan sulfate	ND VL	3.6	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.6	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.6	0.72	ug/kg	
959-98-8	Endosulfan-I	ND VL	1.8	0.40	ug/kg	
33213-65-9	Endosulfan-II	ND VL	3.6	0.54	ug/kg	
76-44-8	Heptachlor	ND VL	1.8	0.51	ug/kg	
1024-57-3	Heptachlor epoxide	ND VL	1.8	0.36	ug/kg	
72-43-5	Methoxychlor	ND VL	3.6	0.72	ug/kg	
8001-35-2	Toxaphene	ND	90	45	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	59%		46-122%
2051-24-3	Decachlorobiphenyl	62%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64401.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	9.0	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	9.0	ug/kg	
12672-29-6	Aroclor 1248	ND	18	9.0	ug/kg	
11097-69-1	Aroclor 1254	ND	18	9.0	ug/kg	
11096-82-5	Aroclor 1260	ND	18	9.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		44-126%
2051-24-3	Decachlorobiphenyl	84%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20739.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
50-29-3	4,4'-DDT	ND	4.0	0.92	ug/kg	
72-20-8	Endrin	ND	4.0	0.80	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	4.0	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
76-44-8	Heptachlor	ND	2.0	0.56	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND	4.0	0.80	ug/kg	
8001-35-2	Toxaphene	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		46-122%
2051-24-3	Decachlorobiphenyl	67%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64402.D	1	08/02/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254	ND	20	10	ug/kg	
11096-82-5	Aroclor 1260	ND	20	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%		44-126%
2051-24-3	Decachlorobiphenyl	87%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20740.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.53	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.84	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.76	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.76	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.88	ug/kg	
72-20-8	Endrin	ND	3.8	0.76	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.8	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.8	0.76	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.57	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.53	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.76	ug/kg	
8001-35-2	Toxaphene	ND	95	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	56%		46-122%
2051-24-3	Decachlorobiphenyl	66%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64403.D	1	08/03/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.5	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.5	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.5	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.5	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%		44-126%
2051-24-3	Decachlorobiphenyl	82%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8081A SW846 3550B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20741.D	1	08/07/07	FS	07/31/07	OP21686	GKK760
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.46	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.54	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.50	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.85	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.65	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.38	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.42	ug/kg	
60-57-1	Dieldrin	ND	1.9	0.42	ug/kg	
72-54-8	4,4'-DDD	ND	3.8	0.77	ug/kg	
72-55-9	4,4'-DDE	ND	3.8	0.77	ug/kg	
50-29-3	4,4'-DDT	ND	3.8	0.88	ug/kg	
72-20-8	Endrin	ND	3.8	0.77	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.8	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.8	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	3.8	0.77	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.42	ug/kg	
33213-65-9	Endosulfan-II	ND	3.8	0.58	ug/kg	
76-44-8	Heptachlor	ND	1.9	0.54	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.38	ug/kg	
72-43-5	Methoxychlor	ND	3.8	0.77	ug/kg	
8001-35-2	Toxaphene	ND	96	48	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		46-122%
2051-24-3	Decachlorobiphenyl	74%		50-133%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8082 SW846 3550B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64404.D	1	08/03/07	JB	07/31/07	OP21687	GST1699
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	ND	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		44-126%
2051-24-3	Decachlorobiphenyl	86%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F51247

DATE: December 10, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. Solid samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3050B/6010B for ICP metals and SW-846 7471A for mercury. A total of twenty solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
X		Laboratory Sample Duplicate
X		Matrix Spike and Spike Duplicate
X		ICP Serial Dilution
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

12/10/07
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F51247

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: For solid matrices, the samples are shipped cool @4°C±2°C with a maximum holding time is 180 days for ICP metals and 28 days for mercury.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: Samples were collected 07/23/07 for metals analysis. For solid samples, they were digested on 07/30/07 and analyzed on 07/30/07 and 07/31/07 (Fe, Mn, Ca, Cr, and Cu) for ICP metals. Mercury was digested on 07/26/07 and analyzed on 07/26/07. All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (DoD QSM <½ MRL) 3 – standards (r≥0.995) ICV/CCV (90-110%) (DoD QSM 90-110%) MRL (70-130%) (DoD QSM 80-120%) High Std. (95-105%)	Hg:	1 – blank (DoD QSM <½ MRL) 5 – standards (r≥0.995) ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%) MRL (80-120%) (DoD QSM 80-120%) High Std. (95-105%)

- The solid samples were analyzed for ICP metals on 07/30/07 and 07/31/07 (Fe, Mn, Ca, Cr, and Cu) for ICP metals. Mercury was analyzed for the solid samples on 07/26/07 with a correlation coefficient of 0.9998. All ICV/CCV/High Standard criteria were met for all metals and runs. **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL (mg/kg)	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
07/30/07	ICP-Sb	3.0	34.0%	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB012A, 50SB012B, 50SB013A, 50SB013B, 50SB014A, 50SB014B, 50SB015A, 50SB015B, 50SB06A, 50SB06B, 50SB07A, 50SB07B, 50SB08A, 50SB08B, 50SB09A, 50SB09B	L, UL
07/30/07	ICP-Pb	5.0	128%; 138%	50SB010B, 50SB011A, 50SB014B, 50SB015A, 50SB015B	K
07/30/07	ICP-Se	5.0	130%; 122%	50SB010A, 50SB011A, 50SB011B, 50SB012A, 50SB013A, 50SB014A, 50SB014B, 50SB015A, 50SB015B, 50SB06A, 50SB07A, 50SB08A, 50SB09A	K
07/30/07	ICP-Zn	1.0	121%	None	K
07/31/07	Fe, Mn, Ca, Cr, & Cu	Various	All within criteria	None	None
07/26/07	Hg	0.083	All within criteria	None	None

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 10 for ICP and Hg = 12) if needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/kg	Action Level mg/kg	B qualified samples
07/30/07	Copper	ICB/CCBs	0.24J	1.2	None
07/30/07	Lead	ICB/CCBs	0.63J	3.2	None
07/30/07	Magnesium	ICB/CCBs	1.04J	5.2	None
07/30/07	Potassium	ICB/CCBs	174J	870	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB014A, 50SB014B, 50SB015A, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/30/07	Selenium	ICB/CCBs	0.50J	2.5	50SB010A
07/30/07	Sodium	ICB/CCBs	194J	970	50SB010A, 50SB011A, 50SB011B, 50SB012B, 50SB013A, 50SB013B, 50SB014A, 50SB014B, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/30/07	Thallium	ICB/CCBs	0.56J	2.8	None
07/31/07	Fe, Mn, Ca, Cr, & Cu	ICB/CCBs	<2*MDL	NA	None
07/26/07	Mercury	ICB/CCBs	<2*MDL	NA	None
07/30/07	Potassium	MP12604-MB	86.3J	432	50SB010A, 50SB06B, 50SB07B, 50SB09B
07/30/07	Sodium	MP12604-MB	103J	515	50SB010A, 50SB011A, 50SB011B, 50SB012B, 50SB013A, 50SB013B, 50SB014A, 50SB014B, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/30/07	Thallium	MP12604-MB	0.37J	1.9	None
07/30/07	Zinc	MP12604-MB	0.18J	0.9	None
07/26/07	Mercury	MP12574-MB	<2*MDL	NA	None
07/26/07	Mercury	MP12575-MB	<2*MDL	NA	None
07/31/07	Lead	072407R	0.21J	1.1	None
07/31/07	Magnesium	072407R	0.53J	2.7	None
07/31/07	Potassium	072407R	176J	880	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB014A, 50SB014B, 50SB015A, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/28/07	Sodium	072407R	192J	960	50SB010A, 50SB011A, 50SB011B, 50SB012B, 50SB013A, 50SB013B, 50SB014A, 50SB014B, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/28/07	Mercury	072407R	<2*MDL	NA	None

Table 3 Blank Contamination Analysis Summary, Continued

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/kg	Action Level mg/kg	B qualified samples
07/28/07	Potassium	072507R	177J	885	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB014A, 50SB014B, 50SB015A, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/28/07	Sodium	072507R	213J	1065	50SB010A, 50SB011A, 50SB011B, 50SB012B, 50SB013A, 50SB013B, 50SB014A, 50SB014B, 50SB015B, 50SB06B, 50SB07A, 50SB07B, 50SB08B, 50SB09A, 50SB09B
07/28/07	Mercury	072507R	<2*MDL	NA	None

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
NA = Not Applicable
MDL = Method Detection Limit.

IV-ICP Interference Check Sample (ICS)
The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)
The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. All aqueous LCS results must fall within the control limits. The DoD QSM solid LCS recovery limits are specified in Table D-19 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12604-BS was used as solid LCS for ICP metals analysis on 07/30/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample MP12574-BS was used as solid LCS for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this LCS.

- Sample MP12575-BS was used as solid LCS for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample 50SB06A (F51247-1) was used as solid laboratory duplicate for ICP metals analysis on 07/30/07. Arsenic (26.2%) and chromium (32.7%) were above criteria. All other metals were within criteria. Arsenic and chromium were qualified estimated "J" based upon the high RPDs. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this laboratory duplicate.

- Sample 59SS08 (F51154-29) was used as solid laboratory duplicate for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this laboratory duplicate.

- Sample 50SB014A (F51247-17) was used as soil laboratory duplicate for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this laboratory duplicate.

VII-Matrix Spike/Spike Duplicate
MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD QSM solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-19 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample 50SB06A (F51247-1) was used as solid laboratory MS/MSD for ICP metals analysis on 07/30/07. Aluminum (73.1%, 153%), antimony (16.5%, 14.4%), arsenic (68.3%, 75.9%), cadmium (68.2%, 71.8%), calcium (412%, 362%), chromium (-31.4%, -0.09%), cobalt (76.1%), iron (-96.6%), magnesium (259%, 178%), manganese (-197%, 266%; RPD=21.6%), nickel (78.6%), selenium (62.4%, 69.5%), thallium (76.9%, 78.7%), vanadium (70.3%), and zinc (70.7%) were outside criteria. The sample concentration was >4 times the spike added for aluminum, iron, and manganese; therefore, no qualifiers were applied based upon these outliers. Antimony, arsenic, cadmium, chromium, cobalt, nickel, selenium, thallium, vanadium, and zinc were qualified bias low "L" for detects and "UL" for non-detects based upon the low recoveries. Calcium and magnesium were qualified bias high "K" for detects and no qualifier for non-detects based upon the high recoveries. All other metals were within criteria. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

- Sample 59SS08 (F51154-29) was used as solid MS/MSD for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this MS/MSD.

- Sample 50SB014A (F51247-17) was used as solid MS/MSD for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

VIII-ICP Serial Dilution

An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- The serial dilution for ICP metals was analyzed on 07/30/07 using solid sample 50SB06A (F51247-1). Aluminum (13.0%), antimony (11.8%), arsenic (29.1%), barium (10.8%), beryllium (22.5%), calcium (22.3%), chromium (19.4%), cobalt (21.6%), iron (20.6%), lead (21.8%), magnesium (19.4%), manganese (24.4%), nickel (23.2%), potassium (32.5%), selenium (39.5%), vanadium (17.4%), and zinc (29.0%) were outside of criteria limits. Sample concentrations were <50 times MDL for antimony, arsenic, and beryllium; therefore, no qualifiers were applied based upon these outliers. For aluminum, barium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, selenium, vanadium, and zinc, all detects were qualified estimated "J" and non-detects no qualifier based upon these outliers. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this serial dilution.

- The serial dilution for mercury was analyzed using solid sample 59SS08 (F51154-29) on 07/26/07. Mercury (34.5%) was above criteria. Sample concentration was <50 times MDL for mercury; therefore, no qualifiers were applied based upon this outlier. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this serial dilution.

- The serial dilution for mercury was analyzed using solid sample 50SB014A (F51247-17) on 07/26/07. All criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this serial dilution.

IX-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

X-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 50SB06A (F51247-1), Barium

Conc. (mg/kg) = {(conc. μg/L)*(Final Volume L)*(DF)} / {(Weight Sample g)*(Fraction Solids)}

Conc. (mg/kg) = {(1772 μg/L)*(0.050 L)*(1)} / {(1.05 g)*(0.8880)} = 95.0 μg/g = 95.0 mg/kg

Reported concentration = 95.0 mg/kg
%D = 0.0%
Values were within 10% difference.

Hg Sample: 50SB06A (F51247-1), Mercury

Conc. (mg/kg) = {(conc. μg/L)*(Final Volume L)*(DF)} / {(Weight Sample g)*(Fraction Solids)}

Conc. (mg/kg) = {(0.677 μg/L)*(0.050 L)*(1)} / {(0.67 g)*(0.8880)} = 0.057 μg/g = 0.057 mg/kg

Reported concentration = 0.057 mg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	15300 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.1 J	3.2	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	6.9 J	0.43	0.21	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	95.0 J	11	0.27	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.72	0.27	0.054	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.54 U UL	1.0	0.54	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	4050 J	270	3.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	37.0 J	0.54	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	10.9 J	2.7	0.054	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	12.2	1.3	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	20300 J	5.4	0.64	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	19.9 J	5.4	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2990 J	270	0.40	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	776 J	8.0	0.54	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.057 J J	0.084	0.0067	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	9.7 J	2.1	0.054	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1170 J	540	5.4	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	5.8 J	5.4	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.048 U	0.54	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	44 U	540	44	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	6.0 U UL	11	6.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	40.6 J	2.7	0.032	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	62.0 J	1.1	0.070	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11400 J	16	1.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.43 U UL	4.8	0.43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	3.7 J	0.65	0.31	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	39.8 J	16	0.40	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.45	0.40	0.081	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.081 U UL	0.32	0.081	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	187000 J	4000	81	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Chromium	165 J	0.81	0.073	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	3.4 J J	4.0	0.081	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	85.6	2.0	0.073	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	9930 J	8.1	0.97	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	234 J	8.1	0.16	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2150 J	400	0.60	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	179 J	1.2	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.11 J J	0.14	0.011	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	30.4 J	3.2	0.081	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	523 J B	810	8.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium [a]	16 U UL	32	16	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.076 J J	0.81	0.073	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	152 J B	810	67	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	4.8 U UL	8.1	4.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	16.7 J	4.0	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	44.1 J	1.6	0.10	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11800 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.4 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	3.5 J	0.45	0.22	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	92.7 J	11	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.60	0.28	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.057 U UL	0.23	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	13400 J	280	3.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	116 J	0.57	0.051	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	7.6 J	2.8	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	56.4	1.4	0.051	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	20700 J	5.7	0.68	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	178 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2420 J	280	0.42	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	518 J	8.5	0.57	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.15	0.086	0.0069	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	50.1 J	2.3	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	654 B	570	5.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	4.8 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.17 J	0.57	0.051	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	54.8 J B	570	47	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	5.2 U UL	11	5.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	29.0 J	2.8	0.034	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	78.8 J	1.1	0.074	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	3100 J	16	1.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.43 U J-	4.8	0.43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.5 J	0.64	0.31	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	12.0 J J	16	0.40	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.13 J J	0.40	0.080	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.080 U J-	0.32	0.080	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	230000 J	4000	80	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Chromium	42.5 J	0.80	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	1.3 J J	4.0	0.080	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	8.6	2.0	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	3060 J	8.0	0.96	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	16.6 J	8.0	0.16	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	966 J	400	0.59	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	25.1 J	1.2	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.012 J J	0.14	0.011	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	15.9 J	3.2	0.080	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	307 J B	800	8.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium [a]	32 U J-	40	32	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.072 U	0.80	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	180 J B	800	66	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	3.6 U J-	8.0	3.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	6.4 J	4.0	0.048	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	5.0 J	1.6	0.10	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18400 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.4 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	5.7 J	0.45	0.22	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	123 J	11	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.90	0.28	0.056	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.56 U VL	1.1	0.56	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1290 J	280	3.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	33.4 J	0.56	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	17.1 J	2.8	0.056	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	12.9	1.4	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	22700 J	5.6	0.67	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	18.9 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2030 J	280	0.41	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	1130 J	8.4	0.56	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.052 J J	0.089	0.0071	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	12.0 J	2.2	0.056	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1620 J	560	5.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	6.5 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050 U	0.56	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	46 U	560	46	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	13 U VL	22	13	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	48.9 J	2.8	0.034	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	77.1 J	1.1	0.073	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11900 J	15	1.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.1 J	4.5	0.40	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	11.2 J	0.60	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	61.6 J	15	0.38	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.61	0.38	0.076	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.076 U UL	0.30	0.076	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	193000 J	3800	76	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Chromium	29.8 J	0.76	0.068	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	4.4 J	3.8	0.076	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	216	1.9	0.068	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	23900 J	7.6	0.91	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	69.2 J	7.6	0.15	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	1820 J	380	0.56	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	172 J	1.1	0.045	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.12	0.12	0.0092	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	22.8 J	3.0	0.076	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	590 JB	760	7.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium [a]	15 U UL	30	15	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.069 J J	0.76	0.068	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	138 J B	760	62	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	4.2 U UL	7.6	4.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	13.8 J	3.8	0.045	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	33.4 J	1.5	0.098	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	17900 J	12	1.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.1 J L	3.5	0.31	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	7.4 J	0.47	0.23	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	79.9 J	12	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.58	0.29	0.058	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.2 U VL	2.2	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1340 J	290	3.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	29.9 J	0.58	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	10.3 J	2.9	0.058	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	8.9	1.5	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	21900 J	5.8	0.70	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	17.7 J	5.8	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	1160 J	290	0.43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	1180 J	8.8	0.58	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.10	0.092	0.0073	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	8.9 J	2.3	0.058	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	759 B	580	5.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	6.8 J	5.8	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.053 U	0.58	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	52.7 J B	580	48	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	5.2 U VL	12	5.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	46.1 J	2.9	0.035	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	33.6 J	1.2	0.076	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	6700 J	15	1.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.41 U J	4.6	0.41	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.3 J	0.61	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	28.0 J	15	0.38	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.20 J J	0.38	0.077	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.077 U J	0.31	0.077	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	237000 J	3800	77	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Chromium	27.7 J	0.77	0.069	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	1.4 J J	3.8	0.077	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	28.8	1.9	0.069	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	3060 J	7.7	0.92	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	56.5 J	7.7	0.15	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	1820 J	380	0.57	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	83.9 J	1.2	0.046	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.031 J J	0.12	0.0096	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	10.4 J	3.1	0.077	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	372 J B J	770	7.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium [a]	30 U J	38	30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.069 U	0.77	0.069	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	198 J B	770	63	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	3.6 U J	7.7	3.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	6.8 J	3.8	0.046	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	18.2 J	1.5	0.10	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	6590 J	10	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.33 J L	3.1	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.3 J	0.42	0.20	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	94.4 J	10	0.26	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.57	0.26	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	0.26 U VL	0.42	0.26	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	563 J	260	3.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	12.2 J	0.52	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	4.8 J	2.6	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	4.0	1.3	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	7510 J	5.2	0.63	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	13.2 J	5.2	0.10	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	312 J	260	0.39	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	933 J	7.9	0.52	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.048 J J	0.081	0.0064	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	4.1 J	2.1	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	292 J B	520	5.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	2.5 J B	5.2	0.10	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.047 U	0.52	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	84.4 J B	520	43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.4 U VL	5.2	2.4	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	17.2 J	2.6	0.031	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	17.0 J	1.0	0.068	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	31000 J	13	1.4	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	2.5 J	3.8	0.34	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.6 J	0.51	0.25	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	43.4 J	13	0.32	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.61	0.32	0.064	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.6 U UL	2.6	1.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	332 J	320	3.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	25.0 J	0.64	0.058	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	3.7 J	3.2	0.064	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	13.8	1.6	0.058	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	47200 J	64	9.0	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Lead	11.7 J	6.4	0.13	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	778 J	320	0.47	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	107 J	0.96	0.038	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.15	0.099	0.0079	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	10.8 J	2.6	0.064	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	924 B J	640	6.4	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	13.5 J	6.4	0.13	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.058 U	0.64	0.058	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	53 U	640	53	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	7.5 U UL	13	7.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	84.2 J	3.2	0.038	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	33.5 J	1.3	0.083	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	13300 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Antimony	1.0 J	3.2	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.9 J	0.42	0.21	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	68.7 J	11	0.26	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.47	0.26	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	1.1 U UL	2.1	1.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Calcium	706 J	260	3.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	16.0 J	0.53	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.4 J	2.6	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Copper	7.5	1.3	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	17500 J	5.3	0.63	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	9.3 J	5.3	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	651 J	260	0.39	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	175 J	0.79	0.032	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.057 J J	0.080	0.0064	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	6.1 J	2.1	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Potassium	587 B	530	5.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Selenium	5.6 J	5.3	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.047 U	0.53	0.047	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Sodium	58.0 J B	530	43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Thallium [a]	4.8 U UL	11	4.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	37.5 J	2.6	0.032	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Zinc	26.0 J	1.1	0.069	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Prep QC Batch: MP12574
(4) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	15000 J	11	1.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.75 J	3.4	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	3.3 J	0.46	0.22	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	42.5 J	11	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.22 J J	0.29	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.1 U UL	2.3	1.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	523 J	290	3.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	22.4 J	0.57	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	9.8 J	2.9	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	6.7	1.4	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	16200 J	5.7	0.69	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	22.6 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	514 J	290	0.42	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	697 J	8.6	0.57	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.12	0.090	0.0072	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	5.6 J	2.3	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	564 JB	570	5.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	5.3 J J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.052 U	0.57	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	71.8 J B	570	47	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	3.2 U UL	5.7	3.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	36.4 J	2.9	0.034	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	20.1 J	1.1	0.074	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18100 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.3 J	3.3	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	6.2 J	0.45	0.22	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	109 J	11	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.85	0.28	0.056	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.1 U VL	2.2	1.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	855 J	280	3.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	34.6 J	0.56	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	14.5 J	2.8	0.056	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	11.4	1.4	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	23400 J	5.6	0.67	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	14.9 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	1710 J	280	0.41	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	785 J	8.4	0.56	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.070 J J	0.089	0.0071	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	11.2 J	2.2	0.056	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1280 J	560	5.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	7.4 J	5.6	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050 U	0.56	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	46 U	560	46	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	13 U VL	22	13	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	49.1 J	2.8	0.033	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	80.7 J	1.1	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8010 J	14	1.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.38 U UL	4.3	0.38	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	6.0 J	0.58	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	53.0 J	14	0.36	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.44	0.36	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.072 U UL	0.29	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	188000 J	3600	72	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Chromium	33.3 J	0.72	0.065	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	3.3 J J	3.6	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	41.5	1.8	0.065	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	7500 J	7.2	0.87	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	115 J	7.2	0.14	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	2680 J	360	0.54	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	107 J	1.1	0.043	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.22	0.12	0.0094	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	16.9 J	2.9	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1820 J	720	7.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium [a]	14 U UL	36	14	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.065 U	0.72	0.065	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	92.8 J B	720	60	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	8.5 U UL	14	8.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	12.2 J	3.6	0.043	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	26.9 J	1.4	0.094	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18800 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.3 J	3.3	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	2.5 J	0.44	0.21	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	75.9 J	11	0.27	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.75	0.27	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.1 U UL	2.2	1.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	12900 J	270	3.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	23.5 J	0.55	0.049	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.3 J	2.7	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	21.2	1.4	0.049	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	25000 J	5.5	0.66	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	17.4 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	8820 J	270	0.41	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	496 J	8.2	0.55	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.18	0.087	0.0069	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	13.6 J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1140 J	550	5.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	5.6 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.049 U	0.55	0.049	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	100 J B	550	45	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	5.5	2.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	37.3 J	2.7	0.033	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	40.0 J	1.1	0.071	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	10500 J	15	1.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.8 J L	4.5	0.40	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	13.1 J	0.60	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	68.4 J	15	0.38	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.74	0.38	0.075	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.075 U VL	0.30	0.075	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	129000 J	3800	75	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Chromium	513 J	7.5	1.1	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Cobalt	6.1 J	3.8	0.075	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	438	19	1.4	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Iron	16300 J	7.5	0.90	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	128 J	7.5	0.15	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	1550 J	380	0.56	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	199 J	1.1	0.045	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Mercury	0.15	0.12	0.0094	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	160 J	3.0	0.075	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	1360 J	750	7.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	0.15 U VL	7.5	0.15	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.068 U	0.75	0.068	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	594 J B	750	62	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	6.8 U VL	15	6.8	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	21.7 J	3.8	0.045	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	33.1 J	1.5	0.098	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	11300 J	11	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.0 J L	3.3	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	4.1 J	0.44	0.22	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	74.1 J	11	0.28	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.35	0.28	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.1 U UL	2.2	1.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1390 J	280	3.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	26.6 J	0.55	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	8.2 J	2.8	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	6.2	1.4	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	18300 J	5.5	0.66	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	17.8 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	933 J	280	0.41	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	888 J	8.3	0.55	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.22	0.081	0.0065	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	4.7 J	2.2	0.055	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	511 J B	550	5.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	5.7 J	5.5	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.050 U	0.55	0.050	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	75.1 J B	550	46	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	5.5	2.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	38.9 J	2.8	0.033	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	17.7 J	1.1	0.072	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12575
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	26800 J	12	1.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Antimony	1.5 J L	3.6	0.32	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.8 J	0.48	0.24	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	47.5 J	12	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.50	0.30	0.060	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	1.2 U UL	2.4	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Calcium	844 J	300	3.4	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	32.3 J	0.60	0.054	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	3.3 J	3.0	0.060	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Copper	12.2	1.5	0.054	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	30500 J	6.0	0.72	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	11.1 J	6.0	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	863 J	300	0.45	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	46.8 J	0.91	0.036	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.22	0.088	0.0070	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	8.4 J	2.4	0.060	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Potassium	935 B J	600	6.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Selenium	10.1 J	6.0	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.054 U	0.60	0.054	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Sodium	50.6 J B	600	50	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Thallium [a]	7.0 U UL	12	7.0	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	77.8 J	3.0	0.036	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Zinc	23.4 J	1.2	0.079	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Prep QC Batch: MP12575
(4) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	14600 J	11	1.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Antimony	1.2 J L	3.4	0.30	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Arsenic	1.8 J	0.46	0.22	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	33.9 J	11	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Beryllium	0.70	0.29	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium [a]	1.1 U UL	2.3	1.1	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Calcium	512 J	290	3.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	14.4 J	0.57	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Cobalt	4.1 J	2.9	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Copper	11.5	1.4	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	19500 J	5.7	0.69	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	6.6 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Magnesium	607 J	290	0.42	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	62.8 J	0.86	0.034	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	0.051 J J	0.088	0.0071	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [3]
Nickel	9.3 J	2.3	0.057	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Potassium	649 B	570	5.7	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Selenium	6.6 J	5.7	0.11	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	0.052 U	0.57	0.052	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Sodium	47 U	570	47	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Thallium [a]	6.5 U UL	11	6.5	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Vanadium	42.2 J	2.9	0.034	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]
Zinc	19.4 J	1.1	0.075	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Prep QC Batch: MP12575
(4) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
		Percent Solids:	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	23500 J	12	1.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	1.0 J	3.5	0.31	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	1.9 J	0.47	0.23	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	101 J	12	0.29	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.59	0.29	0.059	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium [a]	1.2 U UL	2.3	1.2	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	25.4 J J	290	3.3	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	27.5 J	0.59	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	4.9 J	2.9	0.059	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.0	1.5	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	22400 J	5.9	0.70	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	7.3 J	5.9	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	820 J	290	0.43	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	1440 J	8.8	0.59	mg/kg	10	07/30/07	07/31/07	NS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.059 J J	0.092	0.0073	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	10.6 J	2.3	0.059	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	814 B	590	5.9	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	7.0 J	5.9	0.12	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.053 U	0.59	0.053	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	48.8 J B	590	48	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	2.6 U UL	5.9	2.6	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	31.1 J	2.9	0.035	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	26.1 J	1.2	0.076	mg/kg	1	07/30/07	07/30/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5885
(3) Instrument QC Batch: MA5886
(4) Prep QC Batch: MP12575
(5) Prep QC Batch: MP12604

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Eric Malarek, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F51247

DATE: December 11, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. Solid samples were analyzed for chlorinated herbicides using USEPA SW846 Method 3550B/8151A. A total of twenty solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

12/11/07
Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F51247

I-Holding Times

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For solid samples, chlorinated herbicides compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: The solid samples were collected on 07/23/07. For solid samples, the herbicides were extracted on 07/26/07 and analyzed on 07/29/07 and 07/30/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration was provided for MCPP and MCPA on instrument GC-GG. During discussions with the laboratory, they indicated that they perform a daily single point calibration rather than a five point calibration. All samples were non-detect and qualified estimated "UJ" based upon this outlier. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this single point calibration.

- For initial calibration performed on 07/29/07 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this initial calibration.

III-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A single point calibration was provided for MCPP and MCPA on instrument GC-GG for 07/29/07 run. The calibration standard indicated adequate response for MCPP and MCPA. However, since a five point calibration was not performed, %D calculation could not be verified. All samples were non-detect and qualified estimated "UJ" based upon this outlier. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this single point calibration.

- For initial calibration standard performed on 07/29/07 @15:00 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. See Section II for initial calibration discussion. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), and 50SB08B (F51247-6) apply to this continuing calibration.

- For continuing calibration performed on 07/29/07 @22:40 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this continuing calibration.

- For continuing calibration performed on 07/30/07 @04:04 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this continuing calibration.

- For continuing calibration performed on 07/30/07 @06:46 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. . No qualifiers were applied. No samples reported apply to this continuing calibration.

IV-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
07/29/07	OP7763-MB	All target compounds <½MRL	NA	NA	None
08/03/07	072407R	All target compounds <½MRL	NA	NA	None
08/03/07	072507R	All target compounds <½MRL	NA	NA	None

MRL = Method Reporting Limit.
NA = Not Applicable.

V-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Solid Control Limit: 2,4-DCAA (34-179%)

- All criteria were met. No qualifiers were applied.

VI-Laboratory Control Samples
Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD QSM solid LCS recovery limits are specified in Table D-2 and Table D-9 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP7763-BS was used as the solid LCS for the 07/29/07 run. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-9 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 50SB011A (F51247-11) was used as the solid MS/MSD for the 07/30/07 run. 2,4-D (RPD=36%), 2,4,5-TP (RPD=51%), 2,4,5-T (RPD=42%), dinoseb (61%, RPD=200%), and dichloroprop (RPD=27%) were above DoD QSM criteria and/or laboratory criteria. The LCS was within criteria (Section VI) for all herbicides. All samples were non-detect for 2,4-D, 2,4,5-TP, 2,4,5-T, dinoseb, and dichloroprop; therefore, no qualifiers were applied based upon these outliers. All other herbicides were within criteria. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

VIII-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

IX-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: 50SB010B (F51247-10), dicamba

Conc. µg/kg = (Amt * Ve * DF) / (CF * Ws * D)

where: Amt = the response on column (µg/mL) of the sample
CF = Calibration Factor (from initial calibration)
Ve = Final Volume of extract (mL)
DF = Dilution factor
W(s) = Weight of sample in grams.
D = Percent dry weight (100 - % moisture in sample)/100

Conc. µg/kg = (1398115 * 10 * 1) / (43400* 30.3 * 0.7660) = 13.9 µg/kg

Reported value = 13.9 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: GG36408.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36408.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.4	3.7	ug/kg	
1918-00-9	Dicamba	ND	7.4	5.6	ug/kg	
88-85-7	Dinoseb	ND	7.4	4.8	ug/kg	
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	10	ug/kg	
94-82-6	2,4-DB	ND	74	60	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	124%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36409.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36409.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	56	22	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	22	20	ug/kg	
93-76-5	2,4,5-T	ND	11	5.6	ug/kg	
1918-00-9	Dicamba	ND	11	8.4	ug/kg	
88-85-7	Dinoseb	ND	11	7.3	ug/kg	
75-99-0	Dalapon	ND	56	39	ug/kg	
120-36-5	Dichloroprop	ND	56	15	ug/kg	
94-82-6	2,4-DB	ND	110	91	ug/kg	
93-65-2	MCPP	ND UJ	280		ug/kg	
94-74-6	MCPA	ND UJ	280		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	109%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36410.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.5	3.7	ug/kg	
1918-00-9	Dicamba	ND	7.5	5.6	ug/kg	
88-85-7	Dinoseb	ND	7.5	4.9	ug/kg	
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	10	ug/kg	
94-82-6	2,4-DB	ND	75	61	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	91%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36411.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36411.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	55	22	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	22	19	ug/kg	
93-76-5	2,4,5-T	ND	11	5.5	ug/kg	
1918-00-9	Dicamba	ND	11	8.2	ug/kg	
88-85-7	Dinoseb	ND	11	7.1	ug/kg	
75-99-0	Dalapon	ND	55	38	ug/kg	
120-36-5	Dichloroprop	ND	55	15	ug/kg	
94-82-6	2,4-DB	ND	110	90	ug/kg	
93-65-2	MCPP	ND UJ	270		ug/kg	
94-74-6	MCPA	ND UJ	270		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	111%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36412.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36412.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	77	62	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	135%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36413.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	52	21	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	21	18	ug/kg	
93-76-5	2,4,5-T	ND	10	5.2	ug/kg	
1918-00-9	Dicamba	ND	10	7.8	ug/kg	
88-85-7	Dinoseb	ND	10	6.8	ug/kg	
75-99-0	Dalapon	ND	52	37	ug/kg	
120-36-5	Dichloroprop	ND	52	14	ug/kg	
94-82-6	2,4-DB	ND	100	85	ug/kg	
93-65-2	MCPP	ND VJ	260		ug/kg	
94-74-6	MCPA	ND VJ	260		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	116%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36416.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36416.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.9	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.9	5.9	ug/kg	
88-85-7	Dinoseb	ND	7.9	5.1	ug/kg	
75-99-0	Dalapon	ND	39	28	ug/kg	
120-36-5	Dichloroprop	ND	39	11	ug/kg	
94-82-6	2,4-DB	ND	79	64	ug/kg	
93-65-2	MCPP	ND UJ	200		ug/kg	
94-74-6	MCPA	ND UJ	200		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	94%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36417.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36417.D	1	07/29/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	53	21	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	21	19	ug/kg	
93-76-5	2,4,5-T	ND	11	5.3	ug/kg	
1918-00-9	Dicamba	ND	11	8.0	ug/kg	
88-85-7	Dinoseb	ND	11	7.0	ug/kg	
75-99-0	Dalapon	ND	53	37	ug/kg	
120-36-5	Dichloroprop	ND	53	14	ug/kg	
94-82-6	2,4-DB	ND	110	87	ug/kg	
93-65-2	MCPP	ND UJ	270		ug/kg	
94-74-6	MCPA	ND UJ	270		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	84%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36418.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36418.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	12	ug/kg	
93-76-5	2,4,5-T	ND	7.1	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.1	5.3	ug/kg	
88-85-7	Dinoseb	ND	7.1	4.6	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.6	ug/kg	
94-82-6	2,4-DB	ND	71	58	ug/kg	
93-65-2	MCPP	ND UJ	180		ug/kg	
94-74-6	MCPA	ND UJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	128%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36419.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	43	17	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	17	15	ug/kg	
93-76-5	2,4,5-T	ND	8.6	4.3	ug/kg	
1918-00-9	Dicamba	13.9 J	8.6	6.5	ug/kg	
88-85-7	Dinoseb	ND	8.6	5.6	ug/kg	
75-99-0	Dalapon	ND	43	30	ug/kg	
120-36-5	Dichloroprop	ND	43	12	ug/kg	
94-82-6	2,4-DB	ND	86	70	ug/kg	
93-65-2	MCPP	ND UT	220		ug/kg	
94-74-6	MCPA	ND UT	220		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	60%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36420.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	13	ug/kg	
93-76-5	2,4,5-T	ND	7.2	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.2	5.4	ug/kg	
88-85-7	Dinoseb	ND	7.2	4.7	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.8	ug/kg	
94-82-6	2,4-DB	ND	72	59	ug/kg	
93-65-2	MCPP	ND UJ	180		ug/kg	
94-74-6	MCPA	ND UJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	87%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36421.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	14	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND VJ	190		ug/kg	
94-74-6	MCPA	ND VJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	76%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36422.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	81%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36423.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	49	20	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	20	17	ug/kg	
93-76-5	2,4,5-T	ND	9.8	4.9	ug/kg	
1918-00-9	Dicamba	ND	9.8	7.4	ug/kg	
88-85-7	Dinoseb	ND	9.8	6.4	ug/kg	
75-99-0	Dalapon	ND	49	34	ug/kg	
120-36-5	Dichloroprop	ND	49	13	ug/kg	
94-82-6	2,4-DB	ND	98	80	ug/kg	
93-65-2	MCPP	ND VT	250		ug/kg	
94-74-6	MCPA	ND VT	250		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	86%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36424.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	4.9	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	65%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36425.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	51	21	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	21	18	ug/kg	
93-76-5	2,4,5-T	ND	10	5.1	ug/kg	
1918-00-9	Dicamba	ND	10	7.7	ug/kg	
88-85-7	Dinoseb	ND	10	6.7	ug/kg	
75-99-0	Dalapon	ND	51	36	ug/kg	
120-36-5	Dichloroprop	ND	51	14	ug/kg	
94-82-6	2,4-DB	ND	100	84	ug/kg	
93-65-2	MCPP	ND VT	260		ug/kg	
94-74-6	MCPA	ND VT	260		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	64%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36428.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.3	3.7	ug/kg	
1918-00-9	Dicamba	ND	7.3	5.5	ug/kg	
88-85-7	Dinoseb	ND	7.3	4.8	ug/kg	
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	9.9	ug/kg	
94-82-6	2,4-DB	ND	73	60	ug/kg	
93-65-2	MCPP	ND UJ	180		ug/kg	
94-74-6	MCPA	ND UJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	91%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36429.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	8.0	4.0	ug/kg	
1918-00-9	Dicamba	ND	8.0	6.0	ug/kg	
88-85-7	Dinoseb	ND	8.0	5.2	ug/kg	
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	
94-82-6	2,4-DB	ND	80	65	ug/kg	
93-65-2	MCPP	ND UJ	200		ug/kg	
94-74-6	MCPA	ND UJ	200		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	72%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36430.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND VJ	190		ug/kg	
94-74-6	MCPA	ND VJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	51%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8151 SW846 3550B	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36431.D	1	07/30/07	ATX	07/26/07	T:OP7763	T:GGG1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.8	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.8	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.8	5.0	ug/kg	
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	
94-82-6	2,4-DB	ND	78	63	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	90%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F51247

DATE: December 10, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. Solid samples were analyzed for explosives, nitroglycerin, and PETN using USEPA SW-846 8330A. A total of twenty solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

12/10/07
Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F51247

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For solid samples, explosive compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: The solid samples were collected on 07/23/07. For the solid samples, the explosives were extracted on 08/06/07 and analyzed on 08/07/07 and 08/08/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 10) if needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
08/07/07	OP21756-MB	All target explosives <½MRL	NA	NA	None
08/08/07	OP21756-MB	All target explosives <½MRL	NA	NA	None
08/08/07	OP21756-MB	All target explosives <½MRL	NA	NA	None
08/07/07	OP21756-MB	PETN & NG <½MRL	NA	NA	None
08/01/07	072407R	All target explosives <½MRL	NA	NA	None
08/01/07	072407R	PETN & NG <½MRL	NA	NA	None
08/01/07	072507R	All target explosives <½MRL	NA	NA	None
08/01/07	072507R	PETN & NG <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient must be ≥0.995 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- For the explosives initial calibration performed on 10/18/06 on instrument G1315B, all criteria were met for target explosives compounds. All compounds were determined using calibration factors with RSDs ≤20%. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this initial calibration.

- For the explosives initial calibration performed on 01/19/07 on instrument G1315B, all criteria were met for target explosives compounds. All compounds were determined using calibration factors with RSDs ≤20%. No qualifiers were applied. Confirmations for samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB012B (F51247-14), and 50SB014A (F51247-17) apply to this initial calibration.

- For the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. All compounds were determined using calibration factors with RSDs ≤20%. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- For explosives initial calibration verification performed on 10/18/06 @17:39 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives initial calibration verification performed on 10/19/06 @13:44 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives continuing calibration performed on 08/07/07 @19:18 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), and 50SB09A (F51247-7) apply to this continuing calibration.

- For explosives continuing calibration performed on 08/08/07 @00:22 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), and 50SB012B (F51247-14) apply to this continuing calibration.

- For explosives continuing calibration performed on 08/08/07 @05:25 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For explosives continuing calibration performed on 08/08/07 @13:48 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this continuing calibration.

- For explosives continuing calibration performed on 08/08/07 @18:51 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For explosives initial calibration verification performed on 01/19/07 @14:58 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives continuing calibration performed on 08/08/07 @11:46 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Confirmations for samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB012B (F51247-14), and 50SB014A (F51247-17) apply to this continuing calibration.

- For explosives continuing calibration performed on 08/08/07 @15:08 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PETN and nitroglycerin initial calibration verification performed on 03/15/07 @12:35 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/07/07 @15:38 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), and 50SB08B (F51247-6) apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/07/07 @17:03 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), and 50SB012B (F51247-14) apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/07/07 @18:31 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/07/07 @19:39 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	3,4-dinitrotoluene (70-136%)
Solid Criteria:	3,4-dinitrotoluene (72-145%)

- All criteria were met for explosives, PETN, and nitroglycerin. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM solid LCS recovery limits are specified in Table D-2 and Table D-13 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21756-BS was used as solid LCS for explosives analyzed on 08/07/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample OP22176-BS was used as solid LCS for explosives analyzed on 08/08/07. HMX (138%) was outside DoD QSM criteria and within laboratory criteria. HMX was non-detect for all associated samples; therefore, no qualifiers were applied based upon this outlier. Confirmations for samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB012B (F51247-14), and 50SB014A (F51247-17) apply to this LCS.

- Sample OP21756-BS2 was used as solid LCS for PETN and nitroglycerin analyzed on 08/07/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD QSM solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-13 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample APSD01 (F51154-18) was used as the solid MS/MSD for the explosive analysis on 08/08/07. 2,6-Dinitrotoluene (RPD=18%) was outside DoD QSM criteria and/or laboratory criteria. The spiked sample was non-detect for this compound; therefore, no qualifiers were applied based upon this outlier. The associated LCS (Section VI) was within criteria. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

- Sample 50SB09A (F51247-7) was used as the solid MS/MSD for the PETN and nitroglycerin analysis on 08/07/07. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08A (F51247-5), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this MS/MSD.

VIII-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

IX-Quantitation Verification
The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all detected explosives, PETN, and nitroglycerin.

Sample: 50SB06B (F51247-2), 2,4,6-trinitrotoluene

Conc. µg/kg = (Ax * Vt * DF) / (CF * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
W(s) = Weight of sample in kilograms.
D = Percent dry weight (100 - % moisture in sample)/100 (Air dried =1)
DF = Dilution factor

Conc. µg/kg = (72962 * 20 * 1) / (7320 * 2.16 * 1) = 92.3 µg/kg (Signal #1)
Reported Value = 92.3 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: 50SB09AMS (F51247-7MS), nitroglycerin

Conc. µg/kg = (Ax * Vt * DF) / (CF * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
W(s) = Weight of sample in kilograms.
D = Percent dry weight (100 - % moisture in sample)/100
DF = Dilution factor

Conc. µg/kg = (3335480 * 20 * 1) / (1228 * 2.12 * 1) = 25600 µg/kg (Signal #1)
Reported Value = 25600 µg/kg
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: GG023178.D PP022074.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06A		
Lab Sample ID:	F51247-1	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	88.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023178.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022074.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2	2.09 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	85	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	720	ug/kg	
78-11-5	PETN	ND [a]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	104%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB06B		
Lab Sample ID:	F51247-2	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	59.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023179.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022075.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764
Run #3 [b]	PP022105.D	1	08/08/07	NAF	08/06/07	OP21756	GPP765

	Initial Weight	Final Volume
Run #1	2.16 g	20.0 ml
Run #2	2.16 g	20.0 ml
Run #3	2.16 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	46	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	46	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	82	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	46	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	46	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	71	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	95	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	460	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	92.3 J	230	46	ug/kg	J
55-63-0	Nitroglycerine	ND [c]	1900	690	ug/kg	
78-11-5	PETN	ND [c]	1900	690	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	93%	91%	98%	72-145%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023180.D PP022076.D PP022106.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07A		
Lab Sample ID:	F51247-3	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	88.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023180.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022076.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764
Run #3 [b]	PP022106.D	1	08/08/07	NAF	08/06/07	OP21756	GPP765

	Initial Weight	Final Volume
Run #1	2.32 g	20.0 ml
Run #2	2.32 g	20.0 ml
Run #3	2.32 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	220	45	ug/kg	
121-82-4	RDX	ND	220	43	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	220	43	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	77	ug/kg	
121-14-2	2,4-Dinitrotoluene	888	220	43	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	220	43	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	220	47	ug/kg	
98-95-3	Nitrobenzene	ND	220	61	ug/kg	
88-72-2	o-Nitrotoluene	ND	220	66	ug/kg	
99-08-1	m-Nitrotoluene	ND	220	89	ug/kg	
99-99-0	p-Nitrotoluene	ND	220	59	ug/kg	
479-45-8	Tetryl	ND	430	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	220	51	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	220	43	ug/kg	
55-63-0	Nitroglycerine	ND [c]	1700	650	ug/kg	
78-11-5	PETN	ND [c]	1700	650	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	106%	98%	108%	72-145%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB07B		
Lab Sample ID:	F51247-4	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023181.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022077.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	100%	105%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08A		
Lab Sample ID:	F51247-5	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023182.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022078.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764
Run #3 [b]	PP022107.D	1	08/08/07	NAF	08/06/07	OP21756	GPP765

	Initial Weight	Final Volume
Run #1	2.05 g	20.0 ml
Run #2	2.05 g	20.0 ml
Run #3	2.05 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	51	ug/kg	
121-82-4	RDX	ND	240	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	87	ug/kg	
121-14-2	2,4-Dinitrotoluene	101 J	240	49	ug/kg	J
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	53	ug/kg	
98-95-3	Nitrobenzene	ND	240	69	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	75	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	67	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	49	ug/kg	
55-63-0	Nitroglycerine	ND [c]	2000	730	ug/kg	
78-11-5	PETN	ND [c]	2000	730	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	117%	113%	121%	72-145%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023183.D PP022079.D PP022108.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB08B		
Lab Sample ID:	F51247-6	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	63.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023183.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022079.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764
Run #3 [b]	PP022108.D	1	08/08/07	NAF	08/06/07	OP21756	GPP765

	Initial Weight	Final Volume
Run #1	2.30 g	20.0 ml
Run #2	2.30 g	20.0 ml
Run #3	2.30 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	220	45	ug/kg	
121-82-4	RDX	ND	220	43	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	220	43	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	77	ug/kg	
121-14-2	2,4-Dinitrotoluene	77.9 J	220	43	ug/kg	J
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	220	43	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	220	47	ug/kg	
98-95-3	Nitrobenzene	ND	220	62	ug/kg	
88-72-2	o-Nitrotoluene	ND	220	67	ug/kg	
99-08-1	m-Nitrotoluene	ND	220	90	ug/kg	
99-99-0	p-Nitrotoluene	ND	220	60	ug/kg	
479-45-8	Tetryl	ND	430	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	220	51	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	220	43	ug/kg	
55-63-0	Nitroglycerine	ND [c]	1700	650	ug/kg	
78-11-5	PETN	ND [c]	1700	650	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	102%	100%	104%	72-145%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09A		
Lab Sample ID:	F51247-7	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	83.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023184.D	1	08/07/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022082.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.15 g	20.0 ml
Run #2	2.15 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	119%	119%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB09B		
Lab Sample ID:	F51247-8	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	62.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023187.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022085.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.11 g	20.0 ml
Run #2	2.11 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	98	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	105%	100%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010A		
Lab Sample ID:	F51247-9	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	92.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023188.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022086.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.02 g	20.0 ml
Run #2	2.02 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	50	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	50	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	50	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	50	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	500	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	50	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	113%	116%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB010B		
Lab Sample ID:	F51247-10	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	76.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023189.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022087.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.14 g	20.0 ml
Run #2	2.14 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	49	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	102%	105%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011A		
Lab Sample ID:	F51247-11	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	92.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023192.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022088.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.14 g	20.0 ml
Run #2	2.14 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	49	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	111%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB011B		
Lab Sample ID:	F51247-12	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	85.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023193.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022089.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.12 g	20.0 ml
Run #2	2.12 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	97	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	103%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012A		
Lab Sample ID:	F51247-13	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	85.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023194.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022090.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.15 g	20.0 ml
Run #2	2.15 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	83	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	72	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	96	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	700	ug/kg	
78-11-5	PETN	ND [a]	1900	700	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	86%	94%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB012B		
Lab Sample ID:	F51247-14	Date Sampled:	07/23/07
Matrix:	SO - Soil	Date Received:	07/24/07
Method:	SW846 8330A SW846 8330A	Percent Solids:	67.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023195.D	1	08/08/07	NAF	08/06/07	OP21756	GGG994
Run #2	PP022091.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764
Run #3 [b]	PP022110.D	1	08/08/07	NAF	08/06/07	OP21756	GPP765

	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2	2.09 g	20.0 ml
Run #3	2.09 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	179 J	240	85	ug/kg	J
121-14-2	2,4-Dinitrotoluene	645	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [c]	1900	720	ug/kg	
78-11-5	PETN	ND [c]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	98%	95%	101%	72-145%

(a) All hits confirmed by spectral match using a diode array detector.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013A		
Lab Sample ID:	F51247-15	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023210.D	1	08/08/07	NAF	08/06/07	OP21756	GGG995
Run #2	PP022094.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.19 g	20.0 ml
Run #2	2.19 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	47	ug/kg	
121-82-4	RDX	ND	230	46	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	46	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	81	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	46	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	46	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	49	ug/kg	
98-95-3	Nitrobenzene	ND	230	65	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	70	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	94	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	63	ug/kg	
479-45-8	Tetryl	ND	460	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	54	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	46	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	680	ug/kg	
78-11-5	PETN	ND [a]	1800	680	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB013B		
Lab Sample ID:	F51247-16	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	64.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023211.D	1	08/08/07	NAF	08/06/07	OP21756	GGG995
Run #2	PP022095.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2	2.09 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	85	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	720	ug/kg	
78-11-5	PETN	ND [a]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	102%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014A		
Lab Sample ID:	F51247-17	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	90.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023212.D	1	08/08/07	NAF	08/06/07	OP21756	GGG995
Run #2	PP022096.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764
Run #3 [b]	PP022111.D	1	08/08/07	NAF	08/06/07	OP21756	GPP765

	Initial Weight	Final Volume
Run #1	2.01 g	20.0 ml
Run #2	2.01 g	20.0 ml
Run #3	2.01 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	52	ug/kg	
121-82-4	RDX	ND	250	50	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	50	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	89	ug/kg	
121-14-2	2,4-Dinitrotoluene	134 J	250	50	ug/kg	J
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	50	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	54	ug/kg	
98-95-3	Nitrobenzene	ND	250	71	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	77	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	69	ug/kg	
479-45-8	Tetryl	ND	500	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	59	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	50	ug/kg	
55-63-0	Nitroglycerine	ND [c]	2000	750	ug/kg	
78-11-5	PETN	ND [c]	2000	750	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	112%	104%	111%	72-145%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB014B		
Lab Sample ID:	F51247-18	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	82.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023213.D	1	08/08/07	NAF	08/06/07	OP21756	GGG995
Run #2	PP022097.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2	2.09 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	50	ug/kg	
121-82-4	RDX	ND	240	48	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	48	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	85	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	48	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	48	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	52	ug/kg	
98-95-3	Nitrobenzene	ND	240	68	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	74	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	99	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	66	ug/kg	
479-45-8	Tetryl	ND	480	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	48	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	720	ug/kg	
78-11-5	PETN	ND [a]	1900	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023214.D PP022098.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015A		
Lab Sample ID:	F51247-19	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	87.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023214.D	1	08/08/07	NAF	08/06/07	OP21756	GGG995
Run #2	PP022098.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.03 g	20.0 ml
Run #2	2.03 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	250	51	ug/kg	
121-82-4	RDX	ND	250	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	250	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	88	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	250	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	250	53	ug/kg	
98-95-3	Nitrobenzene	ND	250	70	ug/kg	
88-72-2	o-Nitrotoluene	ND	250	76	ug/kg	
99-08-1	m-Nitrotoluene	ND	250	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	250	68	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	250	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	250	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	740	ug/kg	
78-11-5	PETN	ND [a]	2000	740	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	108%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	50SB015B		
Lab Sample ID:	F51247-20	**Date Sampled:**	07/23/07
Matrix:	SO - Soil	**Date Received:**	07/24/07
Method:	SW846 8330A SW846 8330A	**Percent Solids:**	85.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023215.D	1	08/08/07	NAF	08/06/07	OP21756	GGG995
Run #2	PP022099.D	1	08/07/07	NAF	08/06/07	OP21756	GPP764

	Initial Weight	Final Volume
Run #1	2.05 g	20.0 ml
Run #2	2.05 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	51	ug/kg	
121-82-4	RDX	ND	240	49	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	49	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	87	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	49	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	49	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	53	ug/kg	
98-95-3	Nitrobenzene	ND	240	69	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	75	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	100	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	67	ug/kg	
479-45-8	Tetryl	ND	490	140	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	58	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	49	ug/kg	
55-63-0	Nitroglycerine	ND [a]	2000	730	ug/kg	
78-11-5	PETN	ND [a]	2000	730	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. SDGs G383-584
(Accutest SDG F51247)

DATE: November 30, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 23, 2007. The samples were analyzed for Dioxin Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of twenty solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
50SB06A	F51247-1	50SB011A	F51247-11
50SB06B	F51247-2	50SB011B	F51247-12
50SB07A	F51247-3	50SB012A	F51247-13
50SB07B	F51247-4	50SB012B	F51247-14
50SB08A	F51247-5	50SB013A	F51247-15
50SB08B	F51247-6	50SB013B	F51247-16
50SB09A	F51247-7	50SB014A	F51247-17
50SB09B	F51247-8	50SB014B	F51247-18
50SB010A	F51247-9	50SB015A	F51247-19
50SB010B	F51247-10	50SB015B	F51247-20

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
X		Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

11/30/07
Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDGs G383-584
(Accutest SDG F51247)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For solid samples, dioxin and furans are shipped cooled (@4°C ± 2°C) with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/23/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 2.8°C, and 3.2°C. The herbicides were subcontracted to Accutest TX and were received the samples at 3.4°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 1.2°C. Even though the receipt temperature was below criteria for some coolers, there were no impacts to the data quality. No qualifiers were applied based upon this outlier.

- Holding Time Review: The soil samples were collected on 07/23/07. The dioxins and furans were extracted on 07/31/07, 08/01/07, and 08/05/07 and analyzed on 08/01/07, 08/02/07, 08/03/07, and 08/08/07. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 100) if needed. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. pg/g	Action Level pg/g	B qualified samples
08/01/07	LMB14389	OCDD	0.702J	7.02	None
08/01/07	LMB14389	2,3,7,8-TCDF	0.122J	0.61	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB012A, 50SB013A, 50SB013B, 50SB06A, 50SB07B, 50SB09A
08/01/07	LMB14389	2,3,4,7,8-PeCDF	0.0680J, EMPC	0.34	50SB010A, 50SB010B, 50SB011A, 50SB013A, 50SB09A
08/01/07	LMB14389	1,2,3,4,6,7,8-HpCDF	0.650J	3.25	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB07B
08/01/07	LMB14389	OCDF	1.12J	11.2	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB07B
08/01/07	LMB14389	Total TCDFs	0.122J	0.61	50SB010B, 50SB011A, 50SB011B, 50SB07B
08/01/07	LMB14389	Total PeCDFs	0.0680J	0.34	50SB011B, 50SB07B
08/01/07	LMB14389	Total HxCDFs	0.0940J	0.47	None
08/01/07	LMB14389	Total HpCDFs	0.650J	3.25	50SB011A
08/04/07	LMB14391	OCDD	3.26J	32.6	None
08/04/07	LMB14391	1,2,3,4,6,7,8-HpCDF	1.05J	5.25	50SB014B, 50SB015A, 50SB015B
08/04/07	LMB14391	OCDF	1.83J	18.3	50SB014B, 50SB015A, 50SB015B
08/04/07	LMB14391	Total HpCDFs	1.05J	5.25	50SB014B, 50SB015A, 50SB015B
08/08/07	LMB14398	OCDD	3.63J	18.2	None
08/08/07	LMB14398	1,2,3,4,6,7,8-HpCDF	0.966J	4.83	None
08/08/07	LMB14398	OCDF	1.78J	8.90	None
08/08/07	LMB14398	Total HpCDFs	0.966J	4.83	None
07/28/07	RB071807	All congeners <EDL	NA	NA	None
08/03/07	072407R	All congeners <EDL	NA	NA	None
08/08/07	072507R	1,2,3,4,6,7,8-HpCDF	0.849J	4.25	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB014B, 50SB015A, 50SB015B, 50SB07B
08/08/07	072507R	OCDF	1.42J	14.2	50SB010A, 50SB010B, 50SB011A, 50SB011B, 50SB014B, 50SB015A, 50SB015B, 50SB07B
08/08/07	072507R	Total HpCDFs	0.849J	4.25	50SB011A, 50SB011B, 50SB014B, 50SB015A, 50SB015B

J = Estimated value <MRL and >EDL.
EMPC = Estimated Maximum Possible Concentration.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

- The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
- The signal to noise ratio ≥10% for all target ions;
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- For initial calibration performed on 11/02/07 for all target compounds on instrument HRMS3, all criteria were met. No qualifiers were applied. Sample 50SB08A (F51247-5) applies to this initial calibration.

- For 2,3,7,8-TCDF initial calibration performed on 04/18/07 for all target compounds on instrument HRMS3, all criteria were met. No qualifiers were applied. 2,3,7,8-TCDF confirmations for samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB09B (F51247-8), and 50SB012B (F51247-14) apply to this initial calibration.

- For initial calibration performed on 07/10/07 for all target compounds on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB013B (F51247-16), 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

- The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
- The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- For continuing calibration performed on 07/30/07 @17:04 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 07/31/07 @04:20 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 07/31/07 @13:17 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/01/07 @00:39 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/01/07 @10:25 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/01/07 @14:32 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08B (F51247-6), 50SB09A (F51247-7), and 50SB09B (F51247-8) apply to this continuing calibration.

- For continuing calibration performed on 08/02/07 @01:54 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this continuing calibration.

- For continuing calibration performed on 08/02/07 @12:28 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/02/07 @16:03 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B and (F51247-18) apply to this continuing calibration.

- For continuing calibration performed on 08/03/07 @03:24 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/03/07 @14:47 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/04/07 @13:46 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 50SB015A (F51247-19) and 50SB015B (F51247-20) apply to this continuing calibration.

- For continuing calibration performed on 08/05/07 @01:03 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/08/07 @15:10 on instrument HRMS3, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/08/07 @14:36 on instrument HRMS3, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/09/07 @01:59 on instrument HRMS3, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/09/07 @13:23 on instrument HRMS3, all criteria were met. No qualifiers were applied. Sample 50SB08A (F51247-5) applies to this continuing calibration.

- For continuing calibration performed on 08/09/07 @22:34 on instrument HRMS3, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/10/07 @05:55 on instrument HRMS3, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For 2,3,7,8-TCDF continuing calibration performed on 08/11/07 @10:20 on instrument HRMS3, all criteria were met. No qualifiers were applied. 2,3,7,8-TCDF confirmations for samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB09B (F51247-8), and 50SB012B (F51247-14) apply to this continuing calibration.

- For 2,3,7,8-TCDF continuing calibration performed on 08/11/07 @19:53 on instrument HRMS3, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within ±35% when spiked at the method quantitation limit and within ±30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within ±20% when spiked above 20 times the method quantitation limit.

- Sample OPR14389 was used as LCS and LCSD on 08/01/07 analytical run. All criteria were met. No qualifiers were applied. Samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB07B (F51247-4), 50SB08B (F51247-6), 50SB09A (F51247-7), 50SB09B (F51247-8), 50SB010A (F51247-9), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), and 50SB013B (F51247-16) apply to this LCS. The 2,3,7,8-TCDF confirmations for samples 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB09B (F51247-8), and 50SB012B (F51247-14) also apply to this LCS.

- Sample OPR14391 was used as LCS and LCSD on 08/04/07 analytical run. All criteria were met. No qualifiers were applied. Samples 50SB014A (F51247-17), 50SB014B (F51247-18), 50SB015A (F51247-19), and 50SB015B (F51247-20) apply to this LCS.

- Sample OPR14398 was used as LCS and LCSD on 08/09/07 analytical run. All criteria were met. No qualifiers were applied. Sample 50SB08A (F51247-5) applies to this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD ≤20%.

- No project specific solid matrix MS/MSD was performed; therefore, it was not evaluated.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No project specific solid field duplicate was analyzed with this SDG; therefore, it was not evaluated.

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". For where presence of quantitation interference (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- For sample 50SB06A (F51247-1), Total PeCDDs was qualified estimated "J" based upon the presence of quantitation interference.

- For sample 50SB06B (F51247-2), Total PeCDDs was qualified estimated "J" based upon the presence of quantitation interference.

- For sample 50SB07A (F51247-3), Total PeCDDs and Total PeCDFs were qualified estimated "J" based upon the presence of quantitation interference.

- For sample 50SB09B (F51247-8), 2,3,4,7,8-PeCDF, Total PeCDDs, and Total PeCDFs were qualified estimated "J" based upon the presence of quantitation interference.

- OCDD exceeded upper calibration limit for samples 50SB06A (F51247-1), 50SB06B (F51247-2), 50SB07A (F51247-3), 50SB08A (F51247-5), 50SB09A (F51247-7), 50SB010B (F51247-10), 50SB011A (F51247-11), 50SB011B (F51247-12), 50SB012A (F51247-13), 50SB012B (F51247-14), 50SB013A (F51247-15), 50SB014A (F51247-17), 50SB015A (F51247-19), and 50SB015B (F51247-20). OCDD was qualified estimated "J" for all associated samples based upon these outliers.

- 1,2,3,4,6,7,8-HpCDD exceeded upper calibration limit for samples 50SB06A (F51247-1) and 50SB012A (F51247-13). 1,2,3,4,6,7,8-HpCDD was qualified estimated "J" for all associated samples based upon these outliers.

Sample: 41SD09 (F51154-10), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;

A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;

Q(is) = quantity, in pg, of the internal standard added to the sample before extraction; Here need to multiply concentration (pg/uL) by final extract volume (uL).

W = weight, in g, of the sample (solid or organic liquid) as dry weight, or volume in mL of an aqueous sample; and

Avg. RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/kg)} = \frac{(A(x))\ *Q(is)}{A(is) * W * \text{Avg. RRF}} = \frac{(3490000000+3900000000)*4.0*1000}{(26000000+28900000) * (11.35 * 0.8770) * 1.0783} =$$

= 50200 ng/kg = 50200 pg/g

Reported Value = 50200 pg/g
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I Copy

SGS Environmental Services

Method 8290
F51247-1
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.454 J			31:39	0.78	A
1,2,3,7,8-PeCDD	5.88			34:25	1.59	
1,2,3,4,7,8-HxCDD	13.8			37:04	1.19	
1,2,3,6,7,8-HxCDD	122			37:10	1.26	
1,2,3,7,8,9-HxCDD	41.2			37:25	1.25	
1,2,3,4,6,7,8-HpCDD	4610 J			40:37	1.04	E
OCDD	50200 J			45:09	0.90	E
2,3,7,8-TCDF	0.599 B			31:06	0.81	A
1,2,3,7,8-PeCDF	1.76 J			33:36	1.52	A
2,3,4,7,8-PeCDF	2.73 J			34:13	1.49	A
1,2,3,4,7,8-HxCDF	15.3			36:22	1.30	
1,2,3,6,7,8-HxCDF	7.40			36:28	1.22	
2,3,4,6,7,8-HxCDF	12.8			36:58	1.28	
1,2,3,7,8,9-HxCDF	2.79 J			37:46	1.26	A
1,2,3,4,6,7,8-HpCDF	519			39:19	1.05	
1,2,3,4,7,8,9-HpCDF	29.7			41:19	0.99	
OCDF	2090			45:25	0.89	
Total TCDDs	0.454					
Total PeCDDs	~~16.3~~		16.9 J			Q
Total HxCDDs	404					
Total HpCDDs	7350					
Total TCDFs	2.42					
Total PeCDFs	48.2					
Total HxCDFs	518					
Total HpCDFs	~~2030~~		2040 J			
WHO-2005 TEQ (ND=0)	96.1		96.1			
WHO-2005 TEQ (ND=½)	96.1		96.1			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-1		Weight / Volume:	11.35 g
			Solids / Lipids:	87.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-1B		Filename:	a30jul07a_7-12
Collection Date/Time:	07/23/07	14:45	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	11:39	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-1
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.55	77.6	31:37	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.53	76.6	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.70	85.0	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.85	92.7	40:37	1.06	
13C12-OCDD	4.0	4.08	102	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.72	86.0	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.48	74.0	33:36	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.56	78.2	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.62	80.8	39:19	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.350	87.5	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.266	66.6	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.295	73.9	37:04	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.315	78.8	36:21	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.296	74.1	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-1		Weight / Volume:	11.35 g	
			Solids / Lipids:	87.7	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-584		Instrument:	HRMS1	
Sample ID:	G383-584-1B		Filename:	a30jul07a_7-12	
Collection Date/Time:	07/23/07	14:45	Retchk:	a30jul07a_6-14	
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14	
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13	
Analysis Date/Time:	08/02/07	11:39	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JWP
Date: 080907

Reviewed by: [signature]
Date: 8/9/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-2
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	EMPC	~~0.220~~	0.314 J	31:37	0.57 *	A
1,2,3,7,8-PeCDD	2.10 J			34:25	1.54	A
1,2,3,4,7,8-HxCDD	5.35 J			37:06	1.33	A
1,2,3,6,7,8-HxCDD	24.0			37:10	1.25	
1,2,3,7,8,9-HxCDD	15.1			37:25	1.26	
1,2,3,4,6,7,8-HpCDD	889			40:37	1.04	
OCDD	7920 J			45:07	0.90	E
2,3,7,8-TCDF	3.81			31:06	0.74	
1,2,3,7,8-PeCDF	1.53 J			33:37	1.56	A
2,3,4,7,8-PeCDF	3.48 J			34:13	1.73	A
1,2,3,4,7,8-HxCDF	14.7			36:22	1.31	
1,2,3,6,7,8-HxCDF	5.43 J			36:28	1.23	A
2,3,4,6,7,8-HxCDF	6.97			36:58	1.19	
1,2,3,7,8,9-HxCDF	1.73 J			37:48	1.06	A
1,2,3,4,6,7,8-HpCDF	212			39:21	1.05	
1,2,3,4,7,8,9-HpCDF	10.3			41:19	1.06	
OCDF	716			45:25	0.89	
Total TCDDs	~~0.347~~		0.971 J			
Total PeCDDs	~~5.88~~		6.35 J			Q
Total HxCDDs	110					
Total HpCDDs	1420					
Total TCDFs	~~23.7~~		25.2 J			
Total PeCDFs	~~41.2~~		42.0 J			
Total HxCDFs	224					
Total HpCDFs	731					
WHO-2005 TEQ (ND=0)	24.6		24.9			
WHO-2005 TEQ (ND=½)	24.7		24.9			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-2		Weight / Volume:	10.18 g
			Solids / Lipids:	71.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-2B		Filename:	a30jul07a_6-7
Collection Date/Time:	07/23/07	14:55	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/01/07	20:15	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-2
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.56	78.1	31:37	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.54	76.9	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.62	81.2	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.75	87.5	40:37	1.06	
13C12-OCDD	4.0	3.74	93.6	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.76	88.2	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.45	72.3	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.51	75.4	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.56	77.9	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.342	85.6	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.266	66.4	34:13	1.65	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.322	80.4	37:04	1.29	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.318	79.6	36:21	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.279	69.8	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-2		Weight / Volume:	10.18 g
			Solids / Lipids:	71.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-2B		Filename:	a30jul07a_6-7
Collection Date/Time:	07/23/07	14:55	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/01/07	20:15	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 08/01/07

Reviewed by: _____
Date: 8/10/07

Form I Copy

TCDF Confirmation - Method 8290
F51247-2
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	5.62	0.284		20.82	0.81	

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
$^{13}C_{12}$-2,3,7,8-TCDF	2.00	20.80	0.78	

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-2		Weight / Volume:	10.18	g
			Solids / Lipids:	71.84	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-584		Instrument:	hrms3	
Sample ID:	G383-584-2B		Filename:	c11aug07a-10	
Collection Date/Time:	07/23/07	14:55	Retchk:	c11aug07a-2	
Receipt Date:	07/25/07	10:15	Begin ConCal:	c11aug07a-1	
Extraction Date:	07/31/07		End ConCal:	c11aug07a-25	
Analysis Date/Time:	08/11/07	13:55	Initial Cal:	mcf-c041807a	

Analyzed by: JW
Date: 8/13/07

Reviewed by: [illegible]
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-3
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.563 J			31:40	0.76	A
1,2,3,7,8-PeCDD	6.68			34:27	1.60	
1,2,3,4,7,8-HxCDD	14.6			37:07	1.27	
1,2,3,6,7,8-HxCDD	48.7			37:13	1.29	
1,2,3,7,8,9-HxCDD	38.7			37:28	1.28	
1,2,3,4,6,7,8-HpCDD	1580			40:40	1.04	
OCDD	16200 J			45:10	0.90	E
2,3,7,8-TCDF	7.79			31:07	0.81	
1,2,3,7,8-PeCDF	4.08 J			33:37	1.57	A
2,3,4,7,8-PeCDF	9.63			34:15	1.64	
1,2,3,4,7,8-HxCDF	37.0			36:24	1.28	
1,2,3,6,7,8-HxCDF	16.6			36:30	1.28	
2,3,4,6,7,8-HxCDF	15.3			37:00	1.29	
1,2,3,7,8,9-HxCDF	4.27 J			37:49	1.34	A
1,2,3,4,6,7,8-HpCDF	385			39:22	1.04	
1,2,3,4,7,8,9-HpCDF	21.9			41:21	1.06	
OCDF	1160			45:28	0.89	
Total TCDDs	~~3.04~~		3.41 J			
Total PeCDDs	~~17.4~~		17.8 J			Q
Total HxCDDs	256					
Total HpCDDs	2540					
Total TCDFs	~~55.4~~		56.2 J			
Total PeCDFs	~~109~~		109 J			Q
Total HxCDFs	415					
Total HpCDFs	1140					
WHO-2005 TEQ (ND=0)	53.6		53.6			
WHO-2005 TEQ (ND=½)	53.6		53.6			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-3		Weight / Volume:	10.73 g
			Solids / Lipids:	91.4 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-3B		Filename:	a30jul07a_6-8
Collection Date/Time:	07/23/07	16:15	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/01/07	21:04	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-3
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.66	83.0	31:40	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.59	79.7	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.70	85.0	37:13	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.90	94.8	40:39	1.06	
13C12-OCDD	4.0	4.10	103	45:10	0.90	
13C12-2,3,7,8-TCDF	2.0	1.89	94.6	31:07	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.49	74.3	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.65	82.6	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.68	84.1	39:21	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.365	91.2	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.296	73.9	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.375	93.8	37:07	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.305	76.3	36:22	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.301	75.2	41:21	0.40	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:28	1.26	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-3		Weight / Volume:	10.73 g
			Solids / Lipids:	91.4 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-3B		Filename:	a30jul07a_6-8
Collection Date/Time:	07/23/07	16:15	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/01/07	21:04	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: JW
Date: 8/10/07

Reviewed by: [signature]
Date: 8/10/07

Form I Copy

TCDF Confirmation - Method 8290
F51247-3
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	10.0	0.392		20.81	0.78	

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
$^{13}C_{12}$-2,3,7,8-TCDF	2.00	20.80	0.78	

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-3		Weight / Volume:	10.73	g
			Solids / Lipids:	91.41	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-584		Instrument:	hrms3	
Sample ID:	G383-584-3B		Filename:	c11aug07a-11	
Collection Date/Time:	07/23/07	16:15	Retchk:	c11aug07a-2	
Receipt Date:	07/25/07	10:15	Begin ConCal:	c11aug07a-1	
Extraction Date:	07/31/07		End ConCal:	c11aug07a-25	
Analysis Date/Time:	08/11/07	14:19	Initial Cal:	mcf-c041807a	

Analyzed by: _____
Date: 081307

Reviewed by: _____
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-4
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.265				
1,2,3,7,8-PeCDD	ND	0.798				
1,2,3,4,7,8-HxCDD	ND	0.798				
1,2,3,6,7,8-HxCDD	ND	0.798				
1,2,3,7,8,9-HxCDD	ND	0.798				
1,2,3,4,6,7,8-HpCDD	14.5			40:39	1.07	
OCDD	472			45:07	0.89	
2,3,7,8-TCDF	0.370 B			31:06	0.79	A
1,2,3,7,8-PeCDF	ND	0.798				
2,3,4,7,8-PeCDF	ND	0.798				
1,2,3,4,7,8-HxCDF	0.399 J			36:22	1.38	A
1,2,3,6,7,8-HxCDF	ND	0.798				
2,3,4,6,7,8-HxCDF	ND	0.798				
1,2,3,7,8,9-HxCDF	ND	0.798				
1,2,3,4,6,7,8-HpCDF	2.87 B			39:19	1.10	A
1,2,3,4,7,8,9-HpCDF	ND	0.798				
OCDF	11.8 B			45:25	0.88	A
Total TCDDs	0.182					
Total PeCDDs	ND	0.798				
Total HxCDDs	1.19					
Total HpCDDs	28.7					
Total TCDFs	~~0.370~~		0.779 B			
Total PeCDFs	~~ND~~	~~0.798~~	0.207 B			
Total HxCDFs	~~1.34~~		2.11 J			
Total HpCDFs	7.80					
WHO-2005 TEQ (ND=0)	0.396		0.396			
WHO-2005 TEQ (ND=½)	1.30		1.30			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-4		Weight / Volume:	10.80 g
			Solids / Lipids:	58.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-4B		Filename:	a30jul07a_6-9
Collection Date/Time:	07/23/07	16:25	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_5-5
Analysis Date/Time:	08/01/07	21:52	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-4
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.44	72.0	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.42	71.0	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.49	74.5	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.56	78.1	40:37	1.06	
13C12-OCDD	4.0	3.19	79.8	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.59	79.5	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.32	65.8	33:37	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.37	68.5	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.42	71.0	39:19	0.43	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.312	78.0	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.240	60.0	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.280	70.0	37:04	1.31	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.279	69.8	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.246	61.6	41:19	0.40	
Injection Standards						
13C12-1,2,3,4-TCDD	10.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	10.0	-	-	37:25	1.26	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-4		Weight / Volume:	10.80 g
			Solids / Lipids:	58.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-4B		Filename:	a30jul07a_6-9
Collection Date/Time:	07/23/07	16:25	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_5-5
Analysis Date/Time:	08/01/07	21:52	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: JMP
Date: 080307

Reviewed by: [signature]
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-5
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.321					
1,2,3,7,8-PeCDD	2.22 J			34.03	1.54		A
1,2,3,4,7,8-HxCDD	6.02			36.58	1.26		
1,2,3,6,7,8-HxCDD	55.6			36.67	1.26		
1,2,3,7,8,9-HxCDD	21.4			36.91	1.27		
1,2,3,4,6,7,8-HpCDD	1850			39.90	1.07		
OCDD	19500 J			44.04	0.90		E
2,3,7,8-TCDF	EMPC	~~0.401~~	0.302 J	30.21	1.09	*	A
1,2,3,7,8-PeCDF	EMPC	~~0.532~~	0.615 J	33.22	1.29	*	A
2,3,4,7,8-PeCDF	1.35 J			33.84	1.52		A
1,2,3,4,7,8-HxCDF	12.1			35.88	1.29		
1,2,3,6,7,8-HxCDF	6.12			35.98	1.10		
2,3,4,6,7,8-HxCDF	9.24			36.46	1.28		
1,2,3,7,8,9-HxCDF	2.71 J			37.24	1.39		A
1,2,3,4,6,7,8-HpCDF	280			38.68	1.04		
1,2,3,4,7,8,9-HpCDF	23.2			40.55	1.04		
OCDF	1150			44.32	0.88		
Total TCDDs	~~0.649~~		0.970 J				
Total PeCDDs	10.6						
Total HxCDDs	200						
Total HpCDDs	3580						
Total TCDFs	~~1.24~~		1.93 J				
Total PeCDFs	~~5.90~~		15.2 J				
Total HxCDFs	206						
Total HpCDFs	~~1150~~		1160 J				
WHO-2005 TEQ (ND=0)	41.7		41.7				
WHO-2005 TEQ (ND=½)	41.9		41.9				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-5		Weight / Volume:	10.96 g
			Solids / Lipids:	85.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14398
Project ID:	G383-584		Instrument:	HRMS3
Sample ID:	G383-584-5C		Filename:	c08aug07a_2-5
Collection Date/Time:	07/23/07	14:20	Retchk:	c08aug07a-7
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	c08aug07a-7
Extraction Date:	08/05/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/08/07	18:44	Initial Cal:	m8290-c110206a

Form I Copy

SGS Environmental Services

Method 8290
F51247-5
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.07	53.6	31.03	0.81	
13C12-1,2,3,7,8-PeCDD	2.0	1.08	54.2	34.01	1.63	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.06	53.2	36.66	1.22	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.18	59.0	39.89	1.03	
13C12-OCDD	4.0	2.13	53.3	44.02	0.92	
13C12-2,3,7,8-TCDF	2.0	1.47	73.3	30.19	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.16	57.9	33.20	1.55	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.11	55.3	35.97	0.55	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.20	60.2	38.67	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.234	58.5	31.05	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.221	55.3	33.81	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.189	47.3	36.57	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.208	51.9	35.86	0.54	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.203	50.9	40.53	0.46	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	30.42	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	36.90	1.29	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-5		Weight / Volume:	10.96 g
			Solids / Lipids:	85.8 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14398
Project ID:	G383-584		Instrument:	HRMS3
Sample ID:	G383-584-5C		Filename:	c08aug07a_2-5
Collection Date/Time:	07/23/07	14:20	Retchk:	c08aug07a-7
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	c08aug07a-7
Extraction Date:	08/05/07		End ConCal:	c08aug07a_2-14
Analysis Date/Time:	08/08/07	18:44	Initial Cal:	m8290-c110206a

Form Version:[8290_DB_2.14]Report

Analyzed by: HMP
Date: 09Aug07

Reviewed by: KC
Date: 8/9/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-6
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	EMPC	~~0.238~~	0.351 J	31:39	0.52 *	A
1,2,3,7,8-PeCDD	0.794 J			34:25	1.50	A
1,2,3,4,7,8-HxCDD	1.37 J			37:04	1.31	A
1,2,3,6,7,8-HxCDD	4.95 J			37:10	1.32	A
1,2,3,7,8,9-HxCDD	3.90 J			37:25	1.23	A
1,2,3,4,6,7,8-HpCDD	205			40:37	1.05	
OCDD	2150			45:07	0.90	
2,3,7,8-TCDF	1.10 J			31:06	0.79	A
1,2,3,7,8-PeCDF	0.487 J			33:37	1.47	A
2,3,4,7,8-PeCDF	1.36 J			34:13	1.62	A
1,2,3,4,7,8-HxCDF	4.55 J			36:22	1.23	A
1,2,3,6,7,8-HxCDF	1.97 J			36:28	1.38	A
2,3,4,6,7,8-HxCDF	1.63 J			36:58	1.23	A
1,2,3,7,8,9-HxCDF	0.819 J			37:46	1.27	A
1,2,3,4,6,7,8-HpCDF	43.3			39:19	1.07	
1,2,3,4,7,8,9-HpCDF	2.68 J			41:19	0.97	A
OCDF	155			45:25	0.88	
Total TCDDs	~~0.438~~		1.58 J			
Total PeCDDs	2.71					
Total HxCDDs	~~25.0~~		26.3 J			
Total HpCDDs	329					
Total TCDFs	~~6.81~~		7.55 J			
Total PeCDFs	11.7					
Total HxCDFs	46.7					
Total HpCDFs	~~147~~		148 J			
WHO-2005 TEQ (ND=0)	6.45		6.80			
WHO-2005 TEQ (ND=½)	6.57		6.80			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-6		Weight / Volume:	10.34 g
			Solids / Lipids:	62.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-6B		Filename:	a30jul07a_6-11
Collection Date/Time:	07/23/07	14:30	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_5-5
Analysis Date/Time:	08/01/07	23:29	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-6
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.44	72.1	31:37	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.45	72.6	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.59	79.7	37:10	1.27	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.65	82.6	40:37	1.05	
13C12-OCDD	4.0	3.43	85.7	45:06	0.89	
13C12-2,3,7,8-TCDF	2.0	1.62	80.9	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.33	66.3	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.44	72.2	36:28	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.49	74.3	39:19	0.43	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.317	79.2	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.253	63.2	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.263	65.8	37:04	1.31	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.283	70.8	36:21	0.52	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.262	65.5	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	10.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	10.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-6		Weight / Volume:	10.34 g
			Solids / Lipids:	62.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-6B		Filename:	a30jul07a_6-11
Collection Date/Time:	07/23/07	14:30	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_5-5
Analysis Date/Time:	08/01/07	23:29	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: JWP
Date: 08/3/07

Reviewed by: [signature]
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-7
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	0.130 J			31:37	0.77		A
1,2,3,7,8-PeCDD	0.411 J			34:25	1.52		A
1,2,3,4,7,8-HxCDD	0.712 J			37:06	1.31		A
1,2,3,6,7,8-HxCDD	1.87 J			37:10	1.18		A
1,2,3,7,8,9-HxCDD	1.76 J			37:25	1.24		A
1,2,3,4,6,7,8-HpCDD	84.9			40:37	1.04		
OCDD	4740 J			45:07	0.89		E
2,3,7,8-TCDF	0.267 B			31:06	0.83		A
1,2,3,7,8-PeCDF	0.0999 J			33:37	1.45		A
2,3,4,7,8-PeCDF	0.187 B			34:13	1.55		A
1,2,3,4,7,8-HxCDF	0.658 J			36:22	1.34		A
1,2,3,6,7,8-HxCDF	EMPC	~~0.543~~	0.365 J	36:28	1.45	*	A
2,3,4,6,7,8-HxCDF	0.463 J			36:58	1.19		A
1,2,3,7,8,9-HxCDF	ND	0.543					
1,2,3,4,6,7,8-HpCDF	14.1			39:19	1.04		
1,2,3,4,7,8,9-HpCDF	0.615 J			41:19	0.89		A
OCDF	40.4			45:25	0.89		
Total TCDDs	0.413						
Total PeCDDs	1.68						
Total HxCDDs	~~12.3~~		12.5 J				
Total HpCDDs	152						
Total TCDFs	~~0.788~~		0.901 J				
Total PeCDFs	~~2.05~~		2.44 J				
Total HxCDFs	~~10.5~~		10.8 J				
Total HpCDFs	35.1						
WHO-2005 TEQ (ND=0)	3.60		3.64				
WHO-2005 TEQ (ND=½)	3.66		3.67				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-7		Weight / Volume:	10.59 g
			Solids / Lipids:	86.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-7B		Filename:	a30jul07a_6-12
Collection Date/Time:	07/23/07	15:10	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_5-5
Analysis Date/Time:	08/02/07	0:17	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-7
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.45	72.6	31:37	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.47	73.5	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.59	79.5	37:10	1.27	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.64	81.8	40:37	1.05	
13C12-OCDD	4.0	3.49	87.3	45:06	0.89	
13C12-2,3,7,8-TCDF	2.0	1.63	81.6	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.36	68.1	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.45	72.4	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.46	73.0	39:19	0.43	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.322	80.6	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.252	63.1	34:13	1.64	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.264	65.9	37:04	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.278	69.5	36:21	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.255	63.7	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	10.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	10.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-7		Weight / Volume:	10.59 g
			Solids / Lipids:	86.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-7B		Filename:	a30jul07a_6-12
Collection Date/Time:	07/23/07	15:10	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_5-5
Analysis Date/Time:	08/02/07	0:17	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14|Report

Analyzed by: JWP
Date: 08-13-07

Reviewed by: [illegible]
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-8
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	EMPC	~~0.256~~	0.248 J	31:39	0.45 *	A
1,2,3,7,8-PeCDD	1.22 J			34:25	1.56	A
1,2,3,4,7,8-HxCDD	2.79 J			37:04	1.42	A
1,2,3,6,7,8-HxCDD	11.2			37:10	1.30	
1,2,3,7,8,9-HxCDD	7.89 J			37:25	1.27	A
1,2,3,4,6,7,8-HpCDD	541			40:37	1.04	
OCDD	5540			45:07	0.90	
2,3,7,8-TCDF	5.49			31:06	0.81	
1,2,3,7,8-PeCDF	2.00 J			33:37	1.65	A
2,3,4,7,8-PeCDF	4.76 J			34:13	1.67	Q A
1,2,3,4,7,8-HxCDF	12.9			36:22	1.24	
1,2,3,6,7,8-HxCDF	5.72 J			36:28	1.21	A
2,3,4,6,7,8-HxCDF	5.25 J			36:58	1.29	A
1,2,3,7,8,9-HxCDF	1.48 J			37:48	1.17	A
1,2,3,4,6,7,8-HpCDF	124			39:19	1.04	
1,2,3,4,7,8,9-HpCDF	7.15 J			41:19	1.06	A
OCDF	416			45:25	0.89	
Total TCDDs	0.626					
Total PeCDDs	4.52 J					Q
Total HxCDDs	~~58.1~~		58.8 J			
Total HpCDDs	864					
Total TCDFs	~~26.3~~		27.5 J			
Total PeCDFs	~~38.3~~		40.2 J			Q
Total HxCDFs	129					
Total HpCDFs	376					
WHO-2005 TEQ (ND=0)	16.5		16.7			
WHO-2005 TEQ (ND=½)	16.6		16.7			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-8		Weight / Volume:	10.75 g
			Solids / Lipids:	57.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-8B		Filename:	a30jul07a_6-13
Collection Date/Time:	07/23/07	15:20	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/02/07	1:06	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-8
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.49	74.4	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.49	74.7	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.64	82.2	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.69	84.3	40:37	1.06	
13C12-OCDD	4.0	3.58	89.4	45:06	0.88	
13C12-2,3,7,8-TCDF	2.0	1.69	84.3	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.40	70.0	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.50	75.1	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.53	76.3	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.328	82.0	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.255	63.6	34:13	1.64	Q
13C12-1,2,3,4,7,8-HxCDD	0.4	0.272	68.0	37:04	1.29	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.281	70.1	36:21	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.269	67.3	41:19	0.40	
Injection Standards						
13C12-1,2,3,4-TCDD	10.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	10.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-8		Weight / Volume:	10.75 g
			Solids / Lipids:	57.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-8B		Filename:	a30jul07a_6-13
Collection Date/Time:	07/23/07	15:20	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/02/07	1:06	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: DWP
Date: 08-14-07

Reviewed by: [signature]
Date: 8/14/07

Form I Copy

TCDF Confirmation - Method 8290
F51247-8
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	7.11	0.371		20.82	0.72	

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
$^{13}C_{12}$-2,3,7,8-TCDF	2.00	20.80	0.79	

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-8		Weight / Volume:	10.75	g
			Solids / Lipids:	57.05	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Projec: ID:	G383-584		Instrument:	hrms3	
Sample ID:	G383-584-8B		Filename:	c11aug07a-12	
Collection Date/Time:	07/23/07	15:20	Retchk:	c11aug07a-2	
Receipt Date:	07/25/07	10:15	Begin ConCal:	c11aug07a-1	
Extraction Date:	07/31/07		End ConCal:	c11aug07a-25	
Analysis Date/Time:	08/11/07	14:43	Initial Cal:	mcf-c041807a	

Analyzed by: JWC
Date: 8/13/07

Reviewed by: DEJ
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-9
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.166					
1,2,3,7,8-PeCDD	0.353 J			34:25	1.64		A
1,2,3,4,7,8-HxCDD	EMPC	~~0.510~~	0.512 J	37:06	0.98	*	A
1,2,3,6,7,8-HxCDD	1.02 J			37:10	1.40		A
1,2,3,7,8,9-HxCDD	1.09 J			37:25	1.14		A
1,2,3,4,6,7,8-HpCDD	52.7			40:37	1.05		
OCDD	3810			45:07	0.89		
2,3,7,8-TCDF	EMPC	~~0.148~~	0.483 B	31:06	0.92	*	A
1,2,3,7,8-PeCDF	0.173 J			33:36	1.50		A
2,3,4,7,8-PeCDF	0.232 B			34:13	1.45		A
1,2,3,4,7,8-HxCDF	0.324 J			36:22	1.20		A
1,2,3,6,7,8-HxCDF	0.120 J			36:28	1.31		A
2,3,4,6,7,8-HxCDF	0.183 J			36:58	1.11		A
1,2,3,7,8,9-HxCDF	ND	0.510					
1,2,3,4,6,7,8-HpCDF	2.44 B			39:19	1.02		A
1,2,3,4,7,8,9-HpCDF	ND	0.510					
OCDF	6.53 B			45:25	0.87		A
Total TCDDs	0.838						
Total PeCDDs	2.04						
Total HxCDDs	~~9.07~~		9.86 J				
Total HpCDDs	~~109~~		110 J				
Total TCDFs	~~1.47~~		2.49 J				
Total PeCDFs	2.05						
Total HxCDFs	2.64						
Total HpCDFs	6.17						
WHO-2005 TEQ (ND=0)	2.40		2.50				
WHO-2005 TEQ (ND=½)	2.54		2.61				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-9		Weight / Volume:	10.70 g
			Solids / Lipids:	91.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-9B		Filename:	a30jul07a_7-2
Collection Date/Time:	07/23/07	15:40	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	3:35	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-9
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.35	67.5	31:37	0.79	
13C12-1,2,3,7,8-PeCDD	2.0	1.27	63.6	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.44	72.0	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.45	72.5	40:37	1.06	
13C12-OCDD	4.0	3.16	79.1	45:06	0.90	
13C12-2,3,7,8-TCDF	2.0	1.46	73.1	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.23	61.4	33:36	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.31	65.4	36:27	0.51	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.35	67.3	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.297	74.3	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.242	60.4	34:13	1.61	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.237	59.3	37:04	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.250	62.5	36:21	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.225	56.3	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-9		Weight / Volume:	10.70 g
			Solids / Lipids:	91.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-9B		Filename:	a30jul07a_7-2
Collection Date/Time:	07/23/07	15:40	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	3:35	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 080907

Reviewed by: _____
Date: 8/9/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-10
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.187					
1,2,3,7,8-PeCDD	ND	0.609					
1,2,3,4,7,8-HxCDD	ND	0.609					
1,2,3,6,7,8-HxCDD	EMPC	~~0.609~~	0.300 J	37:10	1.67	*	A
1,2,3,7,8,9-HxCDD	EMPC	~~0.609~~	0.293 J	37:25	0.95	*	A
1,2,3,4,6,7,8-HpCDD	64.4			40:37	1.04		
OCDD	10900 J			45:07	0.90		E
2,3,7,8-TCDF	0.244 B			31:06	0.73		A
1,2,3,7,8-PeCDF	ND	0.609					
2,3,4,7,8-PeCDF	EMPC	~~0.609~~	0.107 B	34:13	2.14	*	A
1,2,3,4,7,8-HxCDF	1.20 J			36:22	1.16		A
1,2,3,6,7,8-HxCDF	0.210 J			36:28	1.22		A
2,3,4,6,7,8-HxCDF	ND	0.609					
1,2,3,7,8,9-HxCDF	ND	0.609					
1,2,3,4,6,7,8-HpCDF	4.48 B			39:19	1.08		A
1,2,3,4,7,8,9-HpCDF	ND	0.609					
OCDF	4.89 B			45:25	0.93		A
Total TCDDs	ND	0.187					
Total PeCDDs	ND	0.609					
Total HxCDDs	~~1.76~~		2.35 J				
Total HpCDDs	140						
Total TCDFs	0.244						
Total PeCDFs	~~0.107~~		0.478 J				
Total HxCDFs	~~2.30~~		2.53 J				
Total HpCDFs	5.45						
WHO-2005 TEQ (ND=0)	4.13		4.22				
WHO-2005 TEQ (ND=½)	4.78		4.72				

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-10		Weight / Volume:	10.74 g	
			Solids / Lipids:	76.4	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-584		Instrument:	HRMS1	
Sample ID:	G383-584-10B		Filename:	a30jul07a_7-3	
Collection Date/Time:	07/23/07	15:40	Retchk:	a30jul07a_6-14	
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14	
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13	
Analysis Date/Time:	08/02/07	4:24	Initial Cal:	m8290-071007a	

Form I Copy

SGS Environmental Services

Method 8290
F51247-10
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.45	72.4	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.40	69.8	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.52	75.8	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.55	77.4	40:37	1.06	
13C12-OCDD	4.0	3.31	82.8	45:06	0.90	
13C12-2,3,7,8-TCDF	2.0	1.61	80.4	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.32	66.2	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.43	71.3	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.43	71.4	39:19	0.43	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.328	81.9	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.264	66.0	34:13	1.65	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.295	73.8	37:04	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.271	67.7	36:21	0.48	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.251	62.7	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-10		Weight / Volume:	10.74 g
			Solids / Lipids:	76.4 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-10B		Filename:	a30jul07a_7-3
Collection Date/Time:	07/23/07	15:40	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	4:24	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14|Report

Analyzed by: _____
Date: 08/10/07

Reviewed by: _____
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-11
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.139					
1,2,3,7,8-PeCDD	0.346 J			34:25	1.43		A
1,2,3,4,7,8-HxCDD	0.478 J			37:04	1.40		A
1,2,3,6,7,8-HxCDD	0.659 J			37:10	1.29		A
1,2,3,7,8,9-HxCDD	0.760 J			37:25	1.11		A
1,2,3,4,6,7,8-HpCDD	162			40:37	1.04		
OCDD	23800 J			45:07	0.90		E
2,3,7,8-TCDF	0.216 B			31:06	0.84		A
1,2,3,7,8-PeCDF	EMPC	~~0.486~~	0.122 J	33:36	1.05	*	A
2,3,4,7,8-PeCDF	EMPC	~~0.486~~	0.146 B	34:13	1.89	*	A
1,2,3,4,7,8-HxCDF	0.435 J			36:22	1.38		A
1,2,3,6,7,8-HxCDF	0.167 J			36:28	1.32		A
2,3,4,6,7,8-HxCDF	EMPC	~~0.486~~	0.181 J	36:58	0.84	*	A
1,2,3,7,8,9-HxCDF	ND	0.486					
1,2,3,4,6,7,8-HpCDF	1.86 B			39:19	1.02		A
1,2,3,4,7,8,9-HpCDF	ND	0.486					
OCDF	3.06 B			45:25	0.82		A
Total TCDDs	~~ND~~	~~0.139~~	0.371 J				
Total PeCDDs	~~0.684~~		0.870 J				
Total HxCDDs	~~6.67~~		7.23 J				
Total HpCDDs	~~362~~		363 J				
Total TCDFs	~~0.313~~		0.604 B				
Total PeCDFs	~~0.544~~		0.882 J				
Total HxCDFs	1.77						
Total HpCDFs	3.06 B						
WHO-2005 TEQ (ND=0)	9.40		9.46				
WHO-2005 TEQ (ND=½)	9.60		9.56				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-11		Weight / Volume:	11.58 g
			Solids / Lipids:	88.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-11B		Filename:	a30jul07a_7-4
Collection Date/Time:	07/23/07	16:30	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	5:12	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-11
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.51	75.5	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.44	71.8	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.60	79.9	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.61	80.7	40:37	1.06	
13C12-OCDD	4.0	3.71	92.8	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.68	84.0	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.34	67.2	33:36	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.44	71.9	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.44	72.0	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.333	83.2	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.251	62.7	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.263	65.7	37:04	1.30	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.286	71.5	36:21	0.53	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.256	64.0	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-11		Weight / Volume:	11.58 g
			Solids / Lipids:	88.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-11B		Filename:	a30jul07a_7-4
Collection Date/Time:	07/23/07	16:30	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	5:12	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: _____

Reviewed by: _____
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-12
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.148					
1,2,3,7,8-PeCDD	ND	0.502					
1,2,3,4,7,8-HxCDD	ND	0.693					
1,2,3,6,7,8-HxCDD	ND	0.705					
1,2,3,7,8,9-HxCDD	ND	0.715					
1,2,3,4,6,7,8-HpCDD	35.4			40:37	1.02		
OCDD	6300 J			45:07	0.90		E
2,3,7,8-TCDF	0.141 B			31:06	0.69		A
1,2,3,7,8-PeCDF	ND	0.502					
2,3,4,7,8-PeCDF	ND	0.502					
1,2,3,4,7,8-HxCDF	0.914 J			36:22	1.34		A
1,2,3,6,7,8-HxCDF	EMPC	~~0.502~~	0.183 J	36:28	1.66	*	A
2,3,4,6,7,8-HxCDF	ND	0.502					
1,2,3,7,8,9-HxCDF	ND	0.502					
1,2,3,4,6,7,8-HpCDF	4.01 B			39:19	1.15		A
1,2,3,4,7,8,9-HpCDF	ND	0.502					
OCDF	3.35 B			45:25	0.82		A
Total TCDDs	ND	0.148					
Total PeCDDs	ND	0.502					
Total HxCDDs	1.56						
Total HpCDDs	82.0						
Total TCDFs	0.141 B						
Total PeCDFs	~~ND~~	~~0.502~~	0.147 B				
Total HxCDFs	~~1.25~~		1.73 J				
Total HpCDFs	~~4.01~~		4.35 B				
WHO-2005 TEQ (ND=0)	2.39		2.41				
WHO-2005 TEQ (ND=½)	2.98		2.98				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-12		Weight / Volume:	11.57 g
			Solids / Lipids:	86.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-12B		Filename:	a30jul07a_7-5
Collection Date/Time:	07/23/07	16:40	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	6:01	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-12
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.42	71.0	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.39	69.6	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.53	76.7	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.53	76.3	40:37	1.05	
13C12-OCDD	4.0	3.22	80.6	45:06	0.90	
13C12-2,3,7,8-TCDF	2.0	1.58	79.1	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.28	64.2	33:36	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.39	69.6	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.37	68.6	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.312	78.0	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.240	59.9	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.252	62.9	37:04	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.266	66.5	36:21	0.48	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.237	59.2	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-12		Weight / Volume:	11.57 g
			Solids / Lipids:	86.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-12B		Filename:	a30jul07a_7-5
Collection Date/Time:	07/23/07	16:40	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	6:01	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: [signature]
Date: 08/07/07

Reviewed by: [signature]
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-13
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.159				
1,2,3,7,8-PeCDD	1.85 J			34:25	1.68	A
1,2,3,4,7,8-HxCDD	5.48 J			37:04	1.22	A
1,2,3,6,7,8-HxCDD	54.9			37:10	1.28	
1,2,3,7,8,9-HxCDD	18.2			37:25	1.34	
1,2,3,4,6,7,8-HpCDD	2350 J			40:37	1.04	E
OCDD	28300 J			45:07	0.90	E
2,3,7,8-TCDF	0.291 B			31:06	0.82	A
1,2,3,7,8-PeCDF	0.428 J			33:37	1.63	A
2,3,4,7,8-PeCDF	0.721 J			34:13	1.40	A
1,2,3,4,7,8-HxCDF	6.87			36:22	1.34	
1,2,3,6,7,8-HxCDF	4.41 J			36:28	1.22	A
2,3,4,6,7,8-HxCDF	6.16			36:58	1.25	
1,2,3,7,8,9-HxCDF	0.777 J			37:48	1.42	A
1,2,3,4,6,7,8-HpCDF	317			39:19	1.05	
1,2,3,4,7,8,9-HpCDF	18.2			41:19	1.14	
OCDF	1220			45:25	0.89	
Total TCDDs	ND	0.159				
Total PeCDDs	~~5.34~~		6.43 J			
Total HxCDDs	190					
Total HpCDDs	3670					
Total TCDFs	~~1.57~~		1.82 J			
Total PeCDFs	~~22.0~~		22.1 J			
Total HxCDFs	238					
Total HpCDFs	~~1140~~		1140 J			
WHO-2005 TEQ (ND=0)	47.5		47.5			
WHO-2005 TEQ (ND=½)	47.6		47.6			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-13		Weight / Volume:	10.63 g
			Solids / Lipids:	84.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-13B		Filename:	a30jul07a_7-6
Collection Date/Time:	07/23/07	12:25	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	6:49	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-13
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.42	70.8	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.40	69.8	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.52	76.2	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.65	82.5	40:37	1.07	
13C12-OCDD	4.0	3.67	91.8	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.60	80.0	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.32	65.8	33:36	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.43	71.6	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.45	72.3	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.314	78.5	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.242	60.4	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.288	72.0	37:04	1.31	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.271	67.7	36:21	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.248	61.9	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-13		Weight / Volume:	10.63 g
			Solids / Lipids:	84.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-13B		Filename:	a30jul07a_7-6
Collection Date/Time:	07/23/07	12:25	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	6:49	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: JW
Date: 08/10/07

Reviewed by: [illegible]
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-14
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.505 J			31:39	0.77	A
1,2,3,7,8-PeCDD	2.56 J			34:25	1.41	A
1,2,3,4,7,8-HxCDD	5.34 J			37:04	1.13	A
1,2,3,6,7,8-HxCDD	24.9			37:10	1.28	
1,2,3,7,8,9-HxCDD	15.4			37:25	1.25	
1,2,3,4,6,7,8-HpCDD	957			40:37	1.04	
OCDD	8430 J			45:07	0.89	E
2,3,7,8-TCDF	2.00			31:06	0.78	
1,2,3,7,8-PeCDF	1.35 J			33:36	1.52	A
2,3,4,7,8-PeCDF	8.49			34:13	1.60	
1,2,3,4,7,8-HxCDF	46.0			36:22	1.28	
1,2,3,6,7,8-HxCDF	18.7			36:28	1.32	
2,3,4,6,7,8-HxCDF	10.6			36:58	1.28	
1,2,3,7,8,9-HxCDF	5.74 J			37:48	1.42	A
1,2,3,4,6,7,8-HpCDF	196			39:19	1.03	
1,2,3,4,7,8,9-HpCDF	18.5			41:19	1.03	
OCDF	628			45:25	0.89	
Total TCDDs	~~9.71~~		10.0 J			
Total PeCDDs	~~8.53~~		8.86 J			
Total HxCDDs	113					
Total HpCDDs	1520					
Total TCDFs	~~15.9~~		20.2 J			
Total PeCDFs	~~66.2~~		68.0 J			
Total HxCDFs	261					
Total HpCDFs	~~625~~		630 J			
WHO-2005 TEQ (ND=0)	33.0		33.0			
WHO-2005 TEQ (ND=½)	33.0		33.0			

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-14		Weight / Volume:	10.41 g
			Solids / Lipids:	69.2 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-14B		Filename:	a30jul07a_7-7
Collection Date/Time:	07/23/07	12:35	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	7:37	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-14
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.43	71.7	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.40	70.1	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.56	78.2	37:10	1.27	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.60	79.8	40:37	1.07	
13C12-OCDD	4.0	3.32	82.9	45:06	0.89	
13C12-2,3,7,8-TCDF	2.0	1.62	80.8	31:04	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.32	66.1	33:36	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.42	70.8	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.43	71.6	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.319	79.9	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.243	60.8	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.258	64.4	37:04	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.273	68.2	36:21	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.247	61.7	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-14		Weight / Volume:	10.41 g
			Solids / Lipids:	69.2 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-14B		Filename:	a30jul07a_7-7
Collection Date/Time:	07/23/07	12:35	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	7:37	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/10/07

Reviewed by: _____
Date: 8/10/07

Form I Copy

TCDF Confirmation - Method 8290
F51247-14
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	3.19	0.280		20.82	0.77	

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
$^{13}C_{12}$-2,3,7,8-TCDF	2.00	20.80	0.79	

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-14		Weight / Volume:	10.41	g
			Solids / Lipids:	69.22	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-584		Instrument:	hrms3	
Sample ID:	G383-584-14B		Filename:	c11aug07a-13	
Collection Date/Time:	07/23/07	12:35	Retchk:	c11aug07a-2	
Receipt Date:	07/25/07	10:15	Begin ConCal:	c11aug07a-1	
Extraction Date:	07/31/07		End ConCal:	c11aug07a-25	
Analysis Date/Time:	08/11/07	15:06	Initial Cal:	mcf-c041807a	

Analyzed by: _____
Date: 081307

Reviewed by: _____
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-15
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.175					
1,2,3,7,8-PeCDD	EMPC	~~0.586~~	0.279 J	34:25	2.18	*	A
1,2,3,4,7,8-HxCDD	0.457 J			37:06	1.31		A
1,2,3,6,7,8-HxCDD	1.40 J			37:10	1.07		A
1,2,3,7,8,9-HxCDD	1.55 J			37:25	1.16		A
1,2,3,4,6,7,8-HpCDD	97.4			40:37	1.06		
OCDD	5960 J			45:07	0.89		E
2,3,7,8-TCDF	0.394 B			31:06	0.84		A
1,2,3,7,8-PeCDF	ND	0.586					
2,3,4,7,8-PeCDF	0.199 B			34:13	1.46		A
1,2,3,4,7,8-HxCDF	0.570 J			36:22	1.19		A
1,2,3,6,7,8-HxCDF	0.368 J			36:28	1.07		A
2,3,4,6,7,8-HxCDF	0.443 J			36:58	1.31		A
1,2,3,7,8,9-HxCDF	ND	0.586					
1,2,3,4,6,7,8-HpCDF	9.77			39:19	1.05		
1,2,3,4,7,8,9-HpCDF	0.588 J			41:19	1.01		A
OCDF	23.2			45:25	0.89		
Total TCDDs	ND	0.175					
Total PeCDDs	~~0.279~~		0.788 J				
Total HxCDDs	13.1						
Total HpCDDs	201						
Total TCDFs	~~1.42~~		1.57 J				
Total PeCDFs	~~2.77~~		2.98 J				
Total HxCDFs	8.92						
Total HpCDFs	25.5						
WHO-2005 TEQ (ND=0)	3.45		3.73				
WHO-2005 TEQ (ND=½)	3.87		3.86				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-15		Weight / Volume:	10.16 g
			Solids / Lipids:	84.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-15B		Filename:	a30jul07a_7-8
Collection Date/Time:	07/23/07	11:55	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	8:26	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-15
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.40	69.9	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.33	66.7	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.42	71.2	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.42	70.8	40:37	1.04	
13C12-OCDD	4.0	2.92	73.1	45:06	0.89	
13C12-2,3,7,8-TCDF	2.0	1.53	76.5	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.25	62.5	33:36	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.31	65.6	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.27	63.6	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.310	77.5	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.230	57.5	34:13	1.65	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.239	59.8	37:04	1.30	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.254	63.5	36:21	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.227	56.8	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-15		Weight / Volume:	10.16 g
			Solids / Lipids:	84.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-15B		Filename:	a30jul07a_7-8
Collection Date/Time:	07/23/07	11:55	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	8:26	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/10/07

Reviewed by: _____
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-16
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.435					
1,2,3,7,8-PeCDD	EMPC	~~0.695~~	1.08 J	34:25	1.81	*	A
1,2,3,4,7,8-HxCDD	EMPC	~~0.695~~	1.07 J	37:07	1.02	*	A
1,2,3,6,7,8-HxCDD	2.65 J			37:10	1.20		A
1,2,3,7,8,9-HxCDD	1.81 J			37:27	1.35		A
1,2,3,4,6,7,8-HpCDD	66.8			40:39	1.05		
OCDD	999			45:07	0.89		
2,3,7,8-TCDF	0.762 B			31:07	0.87		A
1,2,3,7,8-PeCDF	EMPC	~~0.695~~	1.99 J	33:37	1.84	*	A
2,3,4,7,8-PeCDF	8.02			34:13	1.55		
1,2,3,4,7,8-HxCDF	120			36:22	1.23		
1,2,3,6,7,8-HxCDF	18.7			36:28	1.26		
2,3,4,6,7,8-HxCDF	6.61 J			36:58	1.15		A
1,2,3,7,8,9-HxCDF	2.09 J			37:48	1.13		A
1,2,3,4,6,7,8-HpCDF	559			39:21	1.02		
1,2,3,4,7,8,9-HpCDF	11.1			41:19	1.03		
OCDF	1110			45:25	0.87		
Total TCDDs	~~3.65~~		4.22 J				
Total PeCDDs	~~8.09~~		10.2 J				
Total HxCDDs	~~25.9~~		27.6 J				
Total HpCDDs	125						
Total TCDFs	~~10.2~~		15.1 J				
Total PeCDFs	~~60.7~~		62.7 J				
Total HxCDFs	~~249~~		250 J				
Total HpCDFs	621						
WHO-2005 TEQ (ND=0)	24.7		25.9				
WHO-2005 TEQ (ND=½)	25.3		26.1				

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-16		Weight / Volume:	10.10 g	
			Solids / Lipids:	71.2	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-584		Instrument:	HRMS1	
Sample ID:	G383-584-16B		Filename:	a30jul07a_7-9	
Collection Date/Time:	07/23/07	12:05	Retchk:	a30jul07a_6-14	
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14	
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13	
Analysis Date/Time:	08/02/07	9:14	Initial Cal:	m8290-071007a	

Form I Copy

SGS Environmental Services

Method 8290
F51247-16
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.50	74.9	31:39	0.79	
13C12-1,2,3,7,8-PeCDD	2.0	1.39	69.7	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.53	76.6	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.60	80.1	40:37	1.06	
13C12-OCDD	4.0	3.19	79.8	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.63	81.6	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.33	66.4	33:36	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.43	71.3	36:28	0.53	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.49	74.3	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.337	84.3	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.253	63.3	34:13	1.59	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.278	69.6	37:04	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.293	73.3	36:22	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.261	65.2	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-16		Weight / Volume:	10.10 g
			Solids / Lipids:	71.2 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-16B		Filename:	a30jul07a_7-9
Collection Date/Time:	07/23/07	12:05	Retchk:	a30jul07a_6-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_6-14
Extraction Date:	07/31/07		End ConCal:	a30jul07a_7-13
Analysis Date/Time:	08/02/07	9:14	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/2/07

Reviewed by: _____
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-17
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.497					
1,2,3,7,8-PeCDD	ND	0.575					
1,2,3,4,7,8-HxCDD	EMPC	~~0.842~~	0.890 J	37:04	1.05	*	A
1,2,3,6,7,8-HxCDD	3.38 J			37:10	1.25		A
1,2,3,7,8,9-HxCDD	1.72 J			37:25	1.26		A
1,2,3,4,6,7,8-HpCDD	159			40:37	1.04		
OCDD	9060 J			45:07	0.89		E
2,3,7,8-TCDF	ND	0.393					
1,2,3,7,8-PeCDF	0.387 J			33:37	1.40		A
2,3,4,7,8-PeCDF	0.357 J			34:13	1.76		A
1,2,3,4,7,8-HxCDF	1.16 J			36:22	1.24		A
1,2,3,6,7,8-HxCDF	0.743 J			36:28	1.27		A
2,3,4,6,7,8-HxCDF	0.865 J			36:58	1.28		A
1,2,3,7,8,9-HxCDF	ND	0.682					
1,2,3,4,6,7,8-HpCDF	20.6			39:19	1.07		
1,2,3,4,7,8,9-HpCDF	1.11 J			41:19	1.00		A
OCDF	55.0			45:25	0.88		
Total TCDDs	ND	0.497					
Total PeCDDs	ND	0.575					
Total HxCDDs	~~15.8~~		16.7 J				
Total HpCDDs	294						
Total TCDFs	ND	0.393					
Total PeCDFs	4.56						
Total HxCDFs	17.4						
Total HpCDFs	55.3						
WHO-2005 TEQ (ND=0)	5.45		5.54				
WHO-2005 TEQ (ND=½)	6.08		6.13				

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-17		Weight / Volume:	10.27 g	
			Solids / Lipids:	84.6	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14391	
Project ID:	G383-584		Instrument:	HRMS1	
Sample ID:	G383-584-17B		Filename:	a30jul07a_9-13	
Collection Date/Time:	07/23/07	11:30	Retchk:	a30jul07a_7-13	
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_7-13	
Extraction Date:	08/01/07		End ConCal:	a30jul07a_9-14	
Analysis Date/Time:	08/03/07	2:36	Initial Cal:	m8290-071007a	

Form I Copy

SGS Environmental Services

Method 8290
F51247-17
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.61	80.5	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.51	75.5	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.69	84.7	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.74	86.9	40:37	1.07	
13C12-OCDD	4.0	3.76	93.9	45:06	0.90	
13C12-2,3,7,8-TCDF	2.0	1.76	88.2	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.44	72.1	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.56	77.9	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.56	78.2	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.357	89.3	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.280	70.1	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.292	73.1	37:04	1.30	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.300	75.1	36:21	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.278	69.4	41:19	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.27	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-17		Weight / Volume:	10.27 g
			Solids / Lipids:	84.6 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14391
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-17B		Filename:	a30jul07a_9-13
Collection Date/Time:	07/23/07	11:30	Retchk:	a30jul07a_7-13
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_7-13
Extraction Date:	08/01/07		End ConCal:	a30jul07a_9-14
Analysis Date/Time:	08/03/07	2:36	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 08.14.07

Reviewed by: _____
Date: 8/14/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-18
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.679					
1,2,3,7,8-PeCDD	ND	0.834					
1,2,3,4,7,8-HxCDD	ND	0.816					
1,2,3,6,7,8-HxCDD	ND	0.830					
1,2,3,7,8,9-HxCDD	ND	0.842					
1,2,3,4,6,7,8-HpCDD	12.5			40:39	0.96		
OCDD	2660			45:07	0.89		
2,3,7,8-TCDF	EMPC	~~0.430~~	0.410 J	31:07	0.96	*	A
1,2,3,7,8-PeCDF	ND	0.599					
2,3,4,7,8-PeCDF	ND	0.599					
1,2,3,4,7,8-HxCDF	ND	0.669					
1,2,3,6,7,8-HxCDF	ND	0.630					
2,3,4,6,7,8-HxCDF	ND	0.665					
1,2,3,7,8,9-HxCDF	ND	0.774					
1,2,3,4,6,7,8-HpCDF	1.56 B			39:19	1.19		A
1,2,3,4,7,8,9-HpCDF	ND	1.02					
OCDF	2.80 B			45:25	0.94		A
Total TCDDs	1.24						
Total PeCDDs	ND	0.834					
Total HxCDDs	5.32						
Total HpCDDs	35.1						
Total TCDFs	~~ND~~	~~0.430~~	0.410 J				
Total PeCDFs	ND	0.599					
Total HxCDFs	ND	0.774					
Total HpCDFs	1.56 B						
WHO-2005 TEQ (ND=0)	0.939		0.980				
WHO-2005 TEQ (ND=½)	2.08		2.10				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-18		Weight / Volume:	10.46 g
			Solids / Lipids:	79.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14391
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-18B		Filename:	a30jul07a_10-13
Collection Date/Time:	07/23/07	11:35	Retchk:	a30jul07a_9-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_9-14
Extraction Date:	08/01/07		End ConCal:	a30jul07a_10-14
Analysis Date/Time:	08/03/07	13:58	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-18
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.54	77.2	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.42	70.8	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.67	83.7	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.78	88.9	40:37	1.07	
13C12-OCDD	4.0	3.58	89.5	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.74	86.9	31:06	0.80	
13C12-1,2,3,7,8-PeCDF	2.0	1.37	68.4	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.50	75.0	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.55	77.7	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.332	83.1	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.250	62.5	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.300	75.1	37:04	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.304	76.1	36:22	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.283	70.7	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.24	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-18		Weight / Volume:	10.46 g
			Solids / Lipids:	79.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14391
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-18B		Filename:	a30jul07a_10-13
Collection Date/Time:	07/23/07	11:35	Retchk:	a30jul07a_9-14
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a30jul07a_9-14
Extraction Date:	08/01/07		End ConCal:	a30jul07a_10-14
Analysis Date/Time:	08/03/07	13:58	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 08-Aug-07

Reviewed by: _____
Date: 8/14/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-19
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.192					
1,2,3,7,8-PeCDD	ND	0.554					
1,2,3,4,7,8-HxCDD	EMPC	~~0.554~~	0.202 J	37:06	1.57	*	A
1,2,3,6,7,8-HxCDD	EMPC	~~0.554~~	0.334 J	37:10	0.94	*	A
1,2,3,7,8,9-HxCDD	EMPC	~~0.554~~	0.357 J	37:25	0.93	*	A
1,2,3,4,6,7,8-HpCDD	58.1			40:37	1.03		
OCDD	11400 J			45:07	0.90		E
2,3,7,8-TCDF	0.239 J			31:06	0.79		A
1,2,3,7,8-PeCDF	ND	0.554					
2,3,4,7,8-PeCDF	ND	0.554					
1,2,3,4,7,8-HxCDF	ND	0.554					
1,2,3,6,7,8-HxCDF	ND	0.554					
2,3,4,6,7,8-HxCDF	ND	0.554					
1,2,3,7,8,9-HxCDF	ND	0.554					
1,2,3,4,6,7,8-HpCDF	1.01 B			39:19	1.00		A
1,2,3,4,7,8,9-HpCDF	ND	0.554					
OCDF	1.70 B			45:24	0.88		A
Total TCDDs	ND	0.192					
Total PeCDDs	ND	0.554					
Total HxCDDs	~~2.15~~		3.11 J				
Total HpCDDs	134						
Total TCDFs	0.516						
Total PeCDFs	ND	0.554					
Total HxCDFs	ND	0.554					
Total HpCDFs	1.55 B						
WHO-2005 TEQ (ND=0)	4.04		4.12				
WHO-2005 TEQ (ND=½)	4.70		4.70				

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-19		Weight / Volume:	11.38 g
			Solids / Lipids:	79.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14391
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-19B		Filename:	a04aug07a-5
Collection Date/Time:	07/23/07	15:50	Retchk:	a04aug07a-1
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a04aug07a-1
Extraction Date:	08/01/07		End ConCal:	a04aug07a-15
Analysis Date/Time:	08/04/07	17:00	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51247-19
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.64	82.2	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.60	79.8	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.79	89.3	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.75	87.6	40:37	1.05	
13C12-OCDD	4.0	3.83	95.7	45:06	0.90	
13C12-2,3,7,8-TCDF	2.0	1.83	91.7	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.47	73.7	33:37	1.57	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.63	81.6	36:27	0.53	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.59	79.5	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.360	89.9	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.297	74.2	34:13	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.292	72.9	37:04	1.24	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.309	77.3	36:21	0.52	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.277	69.3	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.77	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-19		Weight / Volume:	11.38 g
			Solids / Lipids:	79.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14391
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-19B		Filename:	a04aug07a-5
Collection Date/Time:	07/23/07	15:50	Retchk:	a04aug07a-1
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a04aug07a-1
Extraction Date:	08/01/07		End ConCal:	a04aug07a-15
Analysis Date/Time:	08/04/07	17:00	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 080807

Reviewed by: _____
Date: 8/10/07

Form I Copy

SGS Environmental Services

Method 8290
F51247-20
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.203				
1,2,3,7,8-PeCDD	ND	0.539				
1,2,3,4,7,8-HxCDD	ND	0.539				
1,2,3,6,7,8-HxCDD	ND	0.539				
1,2,3,7,8,9-HxCDD	ND	0.539				
1,2,3,4,6,7,8-HpCDD	33.6			40:37	1.05	
OCDD	4630 J			45:07	0.90	E
2,3,7,8-TCDF	0.274 J			31:04	0.74	A
1,2,3,7,8-PeCDF	ND	0.539				
2,3,4,7,8-PeCDF	ND	0.539				
1,2,3,4,7,8-HxCDF	ND	0.539				
1,2,3,6,7,8-HxCDF	ND	0.539				
2,3,4,6,7,8-HxCDF	ND	0.539				
1,2,3,7,8,9-HxCDF	ND	0.539				
1,2,3,4,6,7,8-HpCDF	0.891 B			39:21	1.03	A
1,2,3,4,7,8,9-HpCDF	ND	0.539				
OCDF	1.28 B			45:25	0.94	A
Total TCDDs	ND	0.203				
Total PeCDDs	ND	0.539				
Total HxCDDs	0.630					
Total HpCDDs	71.7					
Total TCDFs	0.403					
Total PeCDFs	ND	0.539				
Total HxCDFs	0.345					
Total HpCDFs	0.891 B					
WHO-2005 TEQ (ND=0)	1.76		1.76			
WHO-2005 TEQ (ND=½)	2.41		2.41			

Client Information			**Sample Information**		
Project Name:	F51247		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51247-20		Weight / Volume:	10.66 g	
			Solids / Lipids:	87.0	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14391	
Project ID:	G383-584		Instrument:	HRMS1	
Sample ID:	G383-584-20B		Filename:	a04aug07a-6	
Collection Date/Time:	07/23/07	16:00	Retchk:	a04aug07a-1	
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a04aug07a-1	
Extraction Date:	08/01/07		End ConCal:	a04aug07a-15	
Analysis Date/Time:	08/04/07	17:48	Initial Cal:	m8290-071007a	

Form I Copy

SGS Environmental Services

Method 8290
F51247-20
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.55	77.3	31:37	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.49	74.6	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.64	81.9	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.60	80.1	40:37	1.06	
13C12-OCDD	4.0	3.24	81.0	45:06	0.89	
13C12-2,3,7,8-TCDF	2.0	1.72	85.9	31:04	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.36	68.1	33:36	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.50	74.8	36:27	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.43	71.6	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.334	83.5	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.282	70.5	34:13	1.59	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.266	66.4	37:04	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.290	72.6	36:21	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.250	62.6	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.26	

Client Information			**Sample Information**	
Project Name:	F51247		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51247-20		Weight / Volume:	10.66 g
			Solids / Lipids:	87.0 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14391
Project ID:	G383-584		Instrument:	HRMS1
Sample ID:	G383-584-20B		Filename:	a04aug07a-6
Collection Date/Time:	07/23/07	16:00	Retchk:	a04aug07a-1
Receipt Date/Time:	07/25/07	10:15	Begin ConCal:	a04aug07a-1
Extraction Date:	08/01/07		End ConCal:	a04aug07a-15
Analysis Date/Time:	08/04/07	17:48	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 080807

Reviewed by: _____
Date: 8/10/07

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F51154

DATE: September 25, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B for aqueous matrices and USEPA SW846 Method 5035/8260B for solid matrices. A total of seven aqueous samples and eighteen solid samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
AOSW01	F51154-1	APSD01	F51154-18
AOSW02	F51154-2	41SD11	F51154-22
TMSW01	F51154-3	49SS02	F51154-23
AOSD01	F51154-4	49SS03	F51154-24
AOSD02	F51154-5	49SS04	F51154-25
41SW08	F51154-6	49SS05	F51154-26
41SW09	F51154-7	59SS06	F51154-27
41SW10	F51154-8	59SS07	F51154-28
41SD08	F51154-9	59SS08	F51154-29
41SD09	F51154-10	59SS09	F51154-30
41SD10	F51154-11	59SS10	F51154-31
LFSD01	F51154-15	TMSS05	F51154-32
LFSW01	F51154-17		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
X		Laboratory Control Sample
X		Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/25/07
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F51154

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples cooled @ 4°C±2°C; pH<2 HCl, the maximum holding time is 14 days (7 days if no HCl added) from sample collection to analysis. For soil samples cooled @ 4°C±2°C; the maximum holding time is 14 days from sample collection to analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected for TCL VOCs on 07/18/07 and 07/19/07. For the aqueous samples collected 07/18/07, the VOCs were prepped and analyzed on 07/26/07 and 07/31/07 (LFSW01). For the solid samples collected 07/18/07 and 07/19/07, the VOCs were prepped and analyzed on 07/26/07, 07/27/07, and 07/28/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For initial calibration performed on 07/25/07 on instrument MSVOA9, target compounds methylene chloride (49.2%; grossly exceeding) and acetone (21.3%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds methylene chloride (r=0.9984) and acetone (r=0.9995) were quantified using linear or second order regression with correlation coefficients >0.995; therefore, no qualifiers were applied based upon these outliers. Samples 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For initial calibration performed on 07/16/07 on instrument MSVOA3, target compounds acetone (18.5%), methylene chloride (32.0%; grossly exceeding), ethylbenzene (15.1%), m,p-xylene (16.6%), and o-xylene (15.4%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds acetone (r=0.9962), methylene chloride (r=1.0000), ethylbenzene (r=0.9985), m,p-xylene (r=0.9988), and o-xylene (r=0.9990) were quantified using linear or second order regression with correlation coefficients >0.995; therefore, no qualifiers were applied based upon these outliers. Samples AOSD01 (F51154-4), AOSD02 (F51154-5), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), and 49SS05 (F51154-26) as well as the sample confirmations for samples 41SD08 (F51154-9), 41SD10 (F51154-11), 49SS02 (F51154-23), 49SS03 (F51154-24), and 49SS05 (F51154-26) were analyzed using this initial calibration.

- For initial calibration performed on 07/18/07 on instrument MSVOA6, target compounds bromomethane (24.2%), chloroethane (30.7%; grossly exceeding), carbon disulfide (17.4%), methylene chloride (39.6%; grossly exceeding), acetone (22.6%), trans-1,2-dichloroethene (18.2%), and benzene (16.8%) were outside %RSD/RRF criteria. All RSDs/RRFs (RRF≥0.05) were within criteria for all other target compounds. Compounds bromomethane (r=0.9982), chloroethane (r=0.9974), carbon disulfide (r=0.9994), methylene chloride (r=0.9995), acetone (r=0.9989), trans-1,2-dichloroethene (r=1.0000), and benzene (r=1.0000) were quantified using linear or higher order with correlations >0.995; therefore, no qualifiers were applied based upon these outliers. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) were analyzed using this initial calibration.

- For initial calibration performed on 07/31/07 on instrument MSVOA6, target compounds bromomethane (22.0%), chloroethane (21.9%), methylene chloride (123%; grossly exceeding), and trans-1,3-dichloropropene (21.2%) were outside %RSD/RRF criteria. All RSDs/RRFs (RRF≥0.05) were within criteria for all other target compounds. Compounds bromomethane (r=0.9954), chloroethane (r=0.9957), methylene chloride (r=0.9962), and trans-1,3-dichloropropene (r=0.9998) were quantified using linear or higher order with correlations >0.995; therefore, no qualifiers were applied based upon these outliers. Sample LFSW01 (F51154-17) was analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For initial calibration verification performed on 07/25/07 @15:34 on instrument MSVOA9, bromomethane (28.8%) was outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Bromomethane was non-detect for all samples; therefore, no qualifiers were applied based upon the high %D. No samples reported apply to this initial calibration verification. No qualifiers were applied based upon this outlier.

- For continuing calibration performed on 07/27/07 @11:30 on instrument MSVOA9, target compounds bromomethane (20.8%) and acetone (59.9%; grossly exceeding) were outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Acetone was qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Drift. Bromomethane was non-detect for all associated samples; therefore no qualifiers were applied based upon this outlier. Samples 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) apply to this continuing calibration.

- For continuing calibration performed on 07/28/07 @12:33 on instrument MSVOA9, all criteria were met. No qualifiers were applied. Sample TMSS05 (F51154-32) applies to this continuing calibration.

- For initial calibration verification performed on 07/16/07 @18:20 on instrument MSVOA3, bromomethane (36.1%) was outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Bromomethane was non-detect for all samples; therefore, no qualifiers were applied based upon the high %D. No samples reported apply to this initial calibration verification. No qualifiers were applied based upon this outlier.

- For continuing calibration performed on 07/26/07 @10:18 on instrument MSVOA3, target compounds acetone (77.6%; grossly exceeding) and 2-butanone (23.6%) were outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Acetone was qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Drift. 2-Butanone (MEK) was qualified estimated "J" for detects and no qualifier for non-detects based upon the high %Drift. Samples AOSD01 (F51154-4), AOSD02 (F51154-5), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), and 49SS05 (F51154-26) apply to this continuing calibration.

- For continuing calibration performed on 07/27/07 @11:02 on instrument MSVOA3, target compounds acetone (55.4%; grossly exceeding), 1,1,1-trichloroethane (25.9%) and carbon tetrachloride (30.4%) were outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Acetone was qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Drift. 1,1,1-Trichloroethane and carbon tetrachloride were non-detect for all associated confirmation samples; therefore, no qualifiers were applied based upon these outliers. Sample confirmations 41SD08 (F51154-9), 41SD10 (F51154-11), 49SS02 (F51154-23), 49SS03 (F51154-24), and 49SS05 (F51154-26) apply to this continuing calibration.

- For initial calibration verification performed on 07/18/07 @12:59 on instrument MSVOA6, target compound bromomethane (31.1%) was outside criteria. All criteria (%D≤20%; %Drift≤20%; RRF≥0.05) were met for all other target compounds. No samples reported apply to this initial calibration verification. No qualifiers were applied based upon this outlier.

- For continuing calibration performed on 07/26/07 @10:10 on instrument MSVOA6, target compound chloroethane (27.8%) was outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Chloroethane was non-detect for all associated samples; therefore no qualifiers were applied based upon the high %D. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this continuing calibration.

- For initial calibration verification performed on 07/31/07 @13:39 on instrument MSVOA6, target compound bromomethane (21.8%), acetone (22.5%), and trans-1,3-dichloropropene (20.5%) were outside criteria. All criteria (%D≤20%; %Drift≤20%; RRF≥0.05) were met for all other target compounds. No samples reported apply to this initial calibration verification. No qualifiers were applied based upon these outliers.

- For continuing calibration performed on 07/31/07 @14:27 on instrument MSVOA6, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. Sample LFSW01 (F51154-17) applies to this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 1) as needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG. The trip blanks 071807TW (F51154-13) and TB071907W (F51154-21) apply to the aqueous samples collected 07/18/07 and 07/19/07, respectively. The trip blanks 071807TS (F51154-14) and TB071907S (F51154-19) apply to the solid samples collected 07/18/07 and 07/19/07, respectively.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
07/26/07	VJ2187-MB	All target <½MRL	NA	NA	None
07/31/07	VJ2191-MB	All target <½MRL	NA	NA	None
09/13/07	RB083007	All target <½MRL	NA	NA	None
07/26/07	071807TW	All target <½MRL	NA	NA	None
07/26/07	071907TW	Chloroform	1.3	6.5	None
Analysis Date	**QC Blank ID**	**Compound**	**Max Conc. µg/kg**	**Action Level µg/kg**	**B qualified samples**
07/26/07	VH1662-MB	All target <½MRL	NA	NA	None
07/27/07	VF413-MB	All target <½MRL	NA	NA	None
07/28/07	VF414-MB	All target <½MRL	NA	NA	None
07/31/07	072407R	All target <½MRL	NA	NA	None
08/02/07	072507R	All target <½MRL	NA	NA	None
07/26/07	RB071807	Methylene chloride	2.7J	27	None
07/26/07	071807TS	All target <½MRL	NA	NA	None
07/26/07	071907TS	All target <½MRL	NA	NA	None

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample

Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. The DoD aqueous LCS recovery limits are specified in Table D-4 of the DoD QSM (DoD, 2006). DoD LCS soil recovery limits are specified in Table D-5 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample VJ2187-BS was used as the aqueous LCS for the VOC analysis on 07/26/07. Trans-1,3-dichloropropene (83%) was below lab limits and within DoD QSM criteria. Trans-1,3-dichloropropene was non-detect for all associated samples; therefore, the samples were qualified bias low "UL" for these compounds based upon this outlier. All other percent recoveries were within criteria for all target compounds. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this LCS.

- Sample VJ2191-BS was used as the aqueous LCS for the VOC analysis on 07/31/07. All criteria were met. No qualifiers were applied. Sample LFSW01 (F51154-17) applies to this LCS.

- Sample VH1662-BS was used as the solid LCS for the VOC analysis on 07/26/07. Chloromethane (56%) was below the lab limits and within DoD QSM criteria and vinyl chloride (58%) was below both the DoD QSM and lab limits. Chloromethane and vinyl chloride were non-detect for all associated samples; therefore, the samples were qualified bias low "UL" for these compounds based upon these outliers. All other percent recoveries were within criteria for all target compounds. Samples AOSD01 (F51154-4), AOSD02 (F51154-5), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), and 49SS05 (F51154-26) apply to this LCS.

- Sample VF413-BS was used as the solid LCS for the VOC analysis on 07/27/07. All criteria were met. No qualifiers were applied. Samples 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) apply to this LCS.

- Sample VF414-BS was used as the solid LCS for the VOC analysis on 07/28/07. All criteria were met. No qualifiers were applied. Sample TMSS05 (F51154-32) applies to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table D-4 of the DoD QSM (DoD, 2006). The DoD MS/MSD solid recovery limits follow the LCS criteria and are specified in Table D-5 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample AOSW02 (F51154-2) was used for the aqueous MS/MSD analysis on 07/26/07. Cis-1,3-dichloropropene (81%) and trans-1,3-dichloropropene (80%, 82%) were outside lab criteria and within DoD QSM criteria for the MS/MSD sample. The associated LCS was within criteria for these compounds (See Section VI). The associated samples were non-detect for these compounds; therefore, the spiked sample was qualified bias low "UL" for these compounds based upon these outliers. All other percent recoveries were within criteria for all target compounds. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used for the aqueous MS/MSD analysis on 07/31/07. Bromomethane (146%, 148%) was outside DoD QSM criteria and within lab criteria for the MS/MSD sample. The associated LCS was within criteria for these compounds (See Section VI). The associated sample was non-detect for this compound; therefore, no qualifiers were applied based upon this outlier. All other percent recoveries were within criteria for all target compounds. Sample LFSW01 (F51154-17) applies to this MS/MSD.

- Sample AOSD02 (F51154-5) was used for the solid MS/MSD analysis on 07/26/07. Acetone (51%, 48%), bromoform (52%, 47%), chloroethane (56%, 60%), carbon tetrachloride (71%, 56%), dibromochloromethane (70%, 66%), trans-1,3-dichloropropene (82%), 2-hexanone (58%), 4-methyl-2-pentanone (65%), methyl bromide (52%, 56%), methyl chloride (39%, 46%), methylene chloride (202%, 171%), methyl ethyl ketone (48%, 55%), toluene (125%), and vinyl chloride (43%, 46%) were outside lab criteria and/or DoD QSM criteria for the MS/MSD sample. The associated LCS was within criteria for these compounds (See Section VI) except for methyl chloride and vinyl chloride. The associated samples were non-detect for all of these compounds. All associated samples were qualified bias low "UL" for methyl chloride and vinyl chloride based upon these outliers. The spiked sample was qualified bias low "L" for detects and "UL" for non-detects for acetone, bromoform, chloroethane, carbon tetrachloride, dibromochloromethane, trans-1,3-dichloropropene, 2-hexanone, 4-methyl-2-pentanone, methyl bromide, and methyl ethyl ketone based upon these outliers. No qualifiers were applied for methylene chloride and toluene based upon the high recoveries (spiked sample was non-detect for these compounds). All other percent recoveries were within criteria for all target compounds. Samples AOSD01 (F51154-4), AOSD02 (F51154-5), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), and 49SS05 (F51154-26) apply to this MS/MSD.

- Sample F51158-1 was used for the solid MS/MSD analysis for analysis on 07/27/07. Since this sample is not a RFAAP site sample, it was not evaluated. No qualifiers were applied. Samples 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) apply to this MS/MSD.

- Sample F51333-1 was used for the solid MS/MSD analysis for analysis on 07/28/07. Since this sample is not a RFAAP site sample, it was not evaluated. No qualifiers were applied. Sample TMSS05 (F51154-32) applies to this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Dibromofluoromethane (87-116%) (DoD QSM = 85-115%) 1,2-Dichloroethane-d4 (76-127%) (DoD QSM = 70-120%) Toluene-d8 (86-112%) (DoD QSM = 85-120%) 4-Bromofluorobenzene (84-120%) (DoD QSM = 75-120%)
Solid Criteria:	Dibromofluoromethane (80-121%) (DoD QSM = None Listed) 1,2-Dichloroethane-d4 (77-123%) (DoD QSM = None Listed) Toluene-d8 (71-130%) (DoD QSM = 85-115%) 4-Bromofluorobenzene (59-148%) (DoD QSM = 85-120%)

- For sample AOSD02 (F51154-5), 4-bromofluorobenzene (125%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample AOSD02 (F51154-5), 4-bromofluorobenzene (125%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 41SD08 (F51154-9), 4-bromofluorobenzene (134%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 129% recovery.

- For sample 41SD09 (F51154-10), 4-bromofluorobenzene (131%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 41SD10 (F51154-11), 4-bromofluorobenzene (145%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 134% recovery.

- For sample LFSD01 (F51154-15), 4-bromofluorobenzene (126%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 41SD11 (F51154-22), 4-bromofluorobenzene (135%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 49SS02 (F51154-23), 4-bromofluorobenzene (146%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 134% recovery.

- For sample 49SS03 (F51154-24), 4-bromofluorobenzene (162%) was outside DoD QSM criteria and outside lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 133% recovery.

- For sample 49SS04 (F51154-25), 4-bromofluorobenzene (125%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample 49SS05 (F51154-26), 4-bromofluorobenzene (130%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 138% recovery.

- For sample 59SS09 (F51154-30), 4-bromofluorobenzene (132%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For sample TMSS05 (F51154-32), 4-bromofluorobenzene (121%) was outside DoD QSM criteria and within lab criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier.

- For all other samples, all criteria were met. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- For sample AOSD01 (F51154-4), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample AOSD02 (F51154-5), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 41SD08 (F51154-9), internal standard 3 1,4-dichlorobenzene-d4 and internal standard 4 tert-butyl-alcohol-d10 were below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4 or tert-butyl-alcohol-d10; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For sample 41SD10 (F51154-11), internal standard 3 1,4-dichlorobenzene-d4 and internal standard 4 tert-butyl-alcohol-d10 were below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4 or tert-butyl-alcohol-d10; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For sample LFSD01 (F51154-15), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 41SD11 (F51154-22), internal standard 4 tert-butyl-alcohol-d10 was below criteria limits. No target analytes were quantified using this internal standard; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria.

- For sample 49SS02 (F51154-23), internal standard 3 1,4-dichlorobenzene-d4 and internal standard 4 tert-butyl-alcohol-d10 were below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4 or tert-butyl-alcohol-d10; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For sample 49SS03 (F51154-24), internal standard 3 1,4-dichlorobenzene-d4 and internal standard 4 tert-butyl-alcohol-d10 were below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4 or tert-butyl-alcohol-d10; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For sample 49SS05 (F51154-26), internal standard 3 1,4-dichlorobenzene-d4 and internal standard 4 tert-butyl-alcohol-d10 were below criteria limits. No target analytes were quantified using 1,4-dichlorobenzene-d4 or tert-butyl-alcohol-d10; therefore, no qualifiers were applied based upon this outlier. All other internal standards were within criteria. The sample was rerun for confirmation.

- For all other samples, all criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair AOSW01 (F51154-1) and TMSW01 (F51154-3) was collected for TCL VOCs. All TCL VOCs target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for TCL VOCs. Acetone was non-detect in the original sample and detected at a concentration below the MRL at 78.2J ug/kg in the duplicate pair. All other TCL VOCs target compounds were non-detect. All criteria were met. No qualifiers were applied.

XI-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: TB071907W (F51154-21), chloroform

Conc. (µg/L) = (Ax)*(Is) *(DF)/(Ais)*(RRF)

where: Ax is the compound area
Ais is the corresponding internal standard area
Is is the corresponding internal standard concentration (µg/L)
DF is the dilution factor
RRF is the relative response factor.

Conc. µg/L = (27317 * 50 µg/L * 1) / (2460609 * 0.423) = 1.3 µg/L

Reported Conc. = 1.3 µg/L
%D = 0.0%
Values were within 10% difference.

Sample: 41SD08 (F51154-9), methyl ethyl ketone

Conc. (µg/kg) = {(Ax)*(Is)*(DF)*(Vp)} / {(Ais)*(RRF)*(Ws)*Fs)}
where:
Ax is the compound area
Is is the corresponding internal standard concentration (ng/mL)
DF is the dilution factor
Vp is the volume purged (mL)
Ais is the corresponding internal standard area
RRF is the relative response factor
Ws is the weight of the sample (g)
Fs is the fraction solids for the sample

Conc. µg/kg = (73706 * 50 ng/mL * 1 * 5mL) / (919966 * 0.284 * 3.92g * 0.369) =
= 48.8 µg/kg

Reported Conc. = 48.8 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: J031452.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW01		
Lab Sample ID:	F51154-1	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031452.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I COPY

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW01		
Lab Sample ID:	F51154-1	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		87-116%
17060-07-0	1,2-Dichloroethane-D4	95%		76-127%
2037-26-5	Toluene-D8	100%		86-112%
460-00-4	4-Bromofluorobenzene	109%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031449.D

Form I COPY

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW02		
Lab Sample ID:	F51154-2	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031449.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	7.0 J	25	5.0	ug/l	J
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW02		
Lab Sample ID:	F51154-2	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	93%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	108%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-3	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031453.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-3		
Matrix:	AQ - Surface Water	Date Sampled:	07/18/07
Method:	SW846 8260B	Date Received:	07/19/07
Project:	WPA 019 Field Investigation; Radford AAP, VA	Percent Solids:	n/a

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		87-116%
17060-07-0	1,2-Dichloroethane-D4	97%		76-127%
2037-26-5	Toluene-D8	100%		86-112%
460-00-4	4-Bromofluorobenzene	106%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044667.D

For I Only

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD01		
Lab Sample ID:	F51154-4	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	66.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044667.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	3.53 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	110	53	ug/kg	
71-43-2	Benzene	ND	11	4.3	ug/kg	
75-27-4	Bromodichloromethane	ND	11	4.3	ug/kg	
75-25-2	Bromoform	ND	11	4.3	ug/kg	
108-90-7	Chlorobenzene	ND	11	4.3	ug/kg	
75-00-3	Chloroethane	ND	11	6.4	ug/kg	
67-66-3	Chloroform	ND	11	4.3	ug/kg	
75-15-0	Carbon disulfide	ND	11	4.3	ug/kg	
56-23-5	Carbon tetrachloride	ND	11	4.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	11	4.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	11	4.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	11	4.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	11	4.3	ug/kg	
124-48-1	Dibromochloromethane	ND	11	4.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	11	4.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	11	4.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	11	4.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	11	4.3	ug/kg	
100-41-4	Ethylbenzene	ND	11	4.3	ug/kg	
591-78-6	2-Hexanone	ND	53	21	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	53	21	ug/kg	
74-83-9	Methyl bromide	ND	11	4.3	ug/kg	
74-87-3	Methyl chloride	ND UL	11	4.3	ug/kg	
75-09-2	Methylene chloride	ND	21	11	ug/kg	
78-93-3	Methyl ethyl ketone	ND	53	21	ug/kg	
100-42-5	Styrene	ND	11	4.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	11	4.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	11	4.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	11	4.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	11	4.3	ug/kg	
108-88-3	Toluene	ND	11	4.3	ug/kg	
79-01-6	Trichloroethylene	ND	11	4.3	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I COM

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD01		
Lab Sample ID:	F51154-4	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	66.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	11	4.3	ug/kg	
	m,p-Xylene	ND	21	6.4	ug/kg	
95-47-6	o-Xylene	ND	11	4.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-121%
2037-26-5	Toluene-D8	99%		71-130%
460-00-4	4-Bromofluorobenzene	109%		59-148%
17060-07-0	1,2-Dichloroethane-D4	105%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044668.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD02		
Lab Sample ID:	F51154-5	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044668.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	4.36 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone [a]	87.7 J	97	48	ug/kg	J
71-43-2	Benzene	ND	9.7	3.9	ug/kg	
75-27-4	Bromodichloromethane	ND	9.7	3.9	ug/kg	
75-25-2	Bromoform	ND VL	9.7	3.9	ug/kg	
108-90-7	Chlorobenzene	ND	9.7	3.9	ug/kg	
75-00-3	Chloroethane	ND VL	9.7	5.8	ug/kg	
67-66-3	Chloroform	ND	9.7	3.9	ug/kg	
75-15-0	Carbon disulfide	ND	9.7	3.9	ug/kg	
56-23-5	Carbon tetrachloride	ND VL	9.7	3.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	9.7	3.9	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	9.7	3.9	ug/kg	
107-06-2	1,2-Dichloroethane	ND	9.7	3.9	ug/kg	
78-87-5	1,2-Dichloropropane	ND	9.7	3.9	ug/kg	
124-48-1	Dibromochloromethane	ND VL	9.7	3.9	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	9.7	3.9	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	9.7	3.9	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	9.7	3.9	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND VL	9.7	3.9	ug/kg	
100-41-4	Ethylbenzene	ND	9.7	3.9	ug/kg	
591-78-6	2-Hexanone	ND VL	48	19	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND VL	48	19	ug/kg	
74-83-9	Methyl bromide	ND VL	9.7	3.9	ug/kg	
74-87-3	Methyl chloride	ND VL	9.7	3.9	ug/kg	
75-09-2	Methylene chloride	ND	19	9.7	ug/kg	
78-93-3	Methyl ethyl ketone	ND VL	48	19	ug/kg	
100-42-5	Styrene	ND	9.7	3.9	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	9.7	3.9	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.7	3.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	9.7	3.9	ug/kg	
127-18-4	Tetrachloroethylene	ND	9.7	3.9	ug/kg	
108-88-3	Toluene	ND	9.7	3.9	ug/kg	
79-01-6	Trichloroethylene	ND	9.7	3.9	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD02		
Lab Sample ID:	F51154-5	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	9.7	3.9	ug/kg	
	m,p-Xylene	ND	19	5.8	ug/kg	
95-47-6	o-Xylene	ND	9.7	3.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-121%
2037-26-5	Toluene-D8	101%		71-130%
460-00-4	4-Bromofluorobenzene	125%		59-148%
17060-07-0	1,2-Dichloroethane-D4	104%		77-123%

(a) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031454.D

Form 1 Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031454.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA1

Accutest Laboratories

Report of Analysis

3.3
3

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		87-116%
17060-07-0	1,2-Dichloroethane-D4	97%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	107%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031455.D

Form I COA

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031455.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

For I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		87-116%
17060-07-0	1,2-Dichloroethane-D4	97%		76-127%
2037-26-5	Toluene-D8	100%		86-112%
460-00-4	4-Bromofluorobenzene	109%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031456.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031456.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND VL	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I only

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	95%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	109%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044671.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2 [a]	H044689.D	1	07/27/07	SH	n/a	n/a	VH1663

	Initial Weight
Run #1	3.92 g
Run #2	4.24 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone [b]	253 J	170	86	ug/kg	
71-43-2	Benzene	ND	17	6.9	ug/kg	
75-27-4	Bromodichloromethane	ND	17	6.9	ug/kg	
75-25-2	Bromoform	ND	17	6.9	ug/kg	
108-90-7	Chlorobenzene	ND	17	6.9	ug/kg	
75-00-3	Chloroethane	ND	17	10	ug/kg	
67-66-3	Chloroform	ND	17	6.9	ug/kg	
75-15-0	Carbon disulfide	ND	17	6.9	ug/kg	
56-23-5	Carbon tetrachloride	ND	17	6.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	17	6.9	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	17	6.9	ug/kg	
107-06-2	1,2-Dichloroethane	ND	17	6.9	ug/kg	
78-87-5	1,2-Dichloropropane	ND	17	6.9	ug/kg	
124-48-1	Dibromochloromethane	ND	17	6.9	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	17	6.9	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	17	6.9	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	17	6.9	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	17	6.9	ug/kg	
100-41-4	Ethylbenzene	ND	17	6.9	ug/kg	
591-78-6	2-Hexanone	ND	86	35	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	86	35	ug/kg	
74-83-9	Methyl bromide	ND	17	6.9	ug/kg	
74-87-3	Methyl chloride	ND VL	17	6.9	ug/kg	
75-09-2	Methylene chloride	ND	35	17	ug/kg	
78-93-3	Methyl ethyl ketone	48.8 J	86	35	ug/kg	J
100-42-5	Styrene	ND	17	6.9	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	17	6.9	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	17	6.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	17	6.9	ug/kg	
127-18-4	Tetrachloroethylene	ND	17	6.9	ug/kg	
108-88-3	Toluene	ND	17	6.9	ug/kg	
79-01-6	Trichloroethylene	ND	17	6.9	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

For I Corr

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	17	6.9	ug/kg	
	m,p-Xylene	ND	35	10	ug/kg	
95-47-6	o-Xylene	ND	17	6.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%	101%	80-121%
2037-26-5	Toluene-D8	110%	105%	71-130%
460-00-4	4-Bromofluorobenzene	129%	134%	59-148%
17060-07-0	1,2-Dichloroethane-D4	98%	100%	77-123%

(a) Confirmation run.
(b) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044672.D

Form I OV

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044672.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	5.48 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	55	28	ug/kg	
71-43-2	Benzene	ND	5.5	2.2	ug/kg	
75-27-4	Bromodichloromethane	ND	5.5	2.2	ug/kg	
75-25-2	Bromoform	ND	5.5	2.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.5	2.2	ug/kg	
75-00-3	Chloroethane	ND	5.5	3.3	ug/kg	
67-66-3	Chloroform	ND	5.5	2.2	ug/kg	
75-15-0	Carbon disulfide	ND	5.5	2.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.5	2.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.5	2.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.5	2.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.5	2.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.5	2.2	ug/kg	
124-48-1	Dibromochloromethane	ND	5.5	2.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.5	2.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.5	2.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.5	2.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.5	2.2	ug/kg	
100-41-4	Ethylbenzene	ND	5.5	2.2	ug/kg	
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.5	2.2	ug/kg	
74-87-3	Methyl chloride	ND UL	5.5	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.5	2.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.5	2.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.5	2.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.5	2.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.5	2.2	ug/kg	
108-88-3	Toluene	ND	5.5	2.2	ug/kg	
79-01-6	Trichloroethylene	ND	5.5	2.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

For I Only

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	5.5	2.2	ug/kg	
	m,p-Xylene	ND	11	3.3	ug/kg	
95-47-6	o-Xylene	ND	5.5	2.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-121%
2037-26-5	Toluene-D8	104%		71-130%
460-00-4	4-Bromofluorobenzene	131%		59-148%
17060-07-0	1,2-Dichloroethane-D4	108%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044673.D H044690.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044673.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2 [a]	H044690.D	1	07/27/07	SH	n/a	n/a	VH1663

	Initial Weight
Run #1	4.31 g
Run #2	4.39 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	73	37	ug/kg	
71-43-2	Benzene	ND	7.3	2.9	ug/kg	
75-27-4	Bromodichloromethane	ND	7.3	2.9	ug/kg	
75-25-2	Bromoform	ND	7.3	2.9	ug/kg	
108-90-7	Chlorobenzene	ND	7.3	2.9	ug/kg	
75-00-3	Chloroethane	ND	7.3	4.4	ug/kg	
67-66-3	Chloroform	ND	7.3	2.9	ug/kg	
75-15-0	Carbon disulfide	ND	7.3	2.9	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.3	2.9	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.3	2.9	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.3	2.9	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.3	2.9	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.3	2.9	ug/kg	
124-48-1	Dibromochloromethane	ND	7.3	2.9	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.3	2.9	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.3	2.9	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.3	2.9	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.3	2.9	ug/kg	
100-41-4	Ethylbenzene	ND	7.3	2.9	ug/kg	
591-78-6	2-Hexanone	ND	37	15	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	37	15	ug/kg	
74-83-9	Methyl bromide	ND	7.3	2.9	ug/kg	
74-87-3	Methyl chloride	ND VL	7.3	2.9	ug/kg	
75-09-2	Methylene chloride	ND	15	7.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND	37	15	ug/kg	
100-42-5	Styrene	ND	7.3	2.9	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.3	2.9	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.3	2.9	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.3	2.9	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.3	2.9	ug/kg	
108-88-3	Toluene	ND	7.3	2.9	ug/kg	
79-01-6	Trichloroethylene	ND	7.3	2.9	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA7

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	7.3	2.9	ug/kg	
	m,p-Xylene	ND	15	4.4	ug/kg	
95-47-6	o-Xylene	ND	7.3	2.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%	104%	80-121%
2037-26-5	Toluene-D8	106%	110%	71-130%
460-00-4	4-Bromofluorobenzene	134%	145%	59-148%
17060-07-0	1,2-Dichloroethane-D4	108%	102%	77-123%

(a) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044674.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044674.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	5.78 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	75	37	ug/kg	
71-43-2	Benzene	ND	7.5	3.0	ug/kg	
75-27-4	Bromodichloromethane	ND	7.5	3.0	ug/kg	
75-25-2	Bromoform	ND	7.5	3.0	ug/kg	
108-90-7	Chlorobenzene	ND	7.5	3.0	ug/kg	
75-00-3	Chloroethane	ND	7.5	4.5	ug/kg	
67-66-3	Chloroform	ND	7.5	3.0	ug/kg	
75-15-0	Carbon disulfide	ND	7.5	3.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.5	3.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.5	3.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.5	3.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.5	3.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.5	3.0	ug/kg	
124-48-1	Dibromochloromethane	ND	7.5	3.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.5	3.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.5	3.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.5	3.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.5	3.0	ug/kg	
100-41-4	Ethylbenzene	ND	7.5	3.0	ug/kg	
591-78-6	2-Hexanone	ND	37	15	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	37	15	ug/kg	
74-83-9	Methyl bromide	ND	7.5	3.0	ug/kg	
74-87-3	Methyl chloride	ND VL	7.5	3.0	ug/kg	
75-09-2	Methylene chloride	ND	15	7.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	37	15	ug/kg	
100-42-5	Styrene	ND	7.5	3.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.5	3.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.5	3.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.5	3.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.5	3.0	ug/kg	
108-88-3	Toluene	ND	7.5	3.0	ug/kg	
79-01-6	Trichloroethylene	ND	7.5	3.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

For I Corp

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	7.5	3.0	ug/kg	
	m,p-Xylene	ND	15	4.5	ug/kg	
95-47-6	o-Xylene	ND	7.5	3.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	126%		59-148%
17060-07-0	1,2-Dichloroethane-D4	112%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031542.D

Form I COA

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031542.D	1	07/31/07	JG	n/a	n/a	VJ2191
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		87-116%
17060-07-0	1,2-Dichloroethane-D4	104%		76-127%
2037-26-5	Toluene-D8	94%		86-112%
460-00-4	4-Bromofluorobenzene	98%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044675.D

Form I VOA

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044675.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	3.46 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	83	42	ug/kg	
71-43-2	Benzene	ND	8.3	3.3	ug/kg	
75-27-4	Bromodichloromethane	ND	8.3	3.3	ug/kg	
75-25-2	Bromoform	ND	8.3	3.3	ug/kg	
108-90-7	Chlorobenzene	ND	8.3	3.3	ug/kg	
75-00-3	Chloroethane	ND	8.3	5.0	ug/kg	
67-66-3	Chloroform	ND	8.3	3.3	ug/kg	
75-15-0	Carbon disulfide	ND	8.3	3.3	ug/kg	
56-23-5	Carbon tetrachloride	ND	8.3	3.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	8.3	3.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	8.3	3.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	8.3	3.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	8.3	3.3	ug/kg	
124-48-1	Dibromochloromethane	ND	8.3	3.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	8.3	3.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	8.3	3.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	8.3	3.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	8.3	3.3	ug/kg	
100-41-4	Ethylbenzene	ND	8.3	3.3	ug/kg	
591-78-6	2-Hexanone	ND	42	17	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	42	17	ug/kg	
74-83-9	Methyl bromide	ND	8.3	3.3	ug/kg	
74-87-3	Methyl chloride	ND UL	8.3	3.3	ug/kg	
75-09-2	Methylene chloride	ND	17	8.3	ug/kg	
78-93-3	Methyl ethyl ketone	ND	42	17	ug/kg	
100-42-5	Styrene	ND	8.3	3.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	8.3	3.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	8.3	3.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	8.3	3.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	8.3	3.3	ug/kg	
108-88-3	Toluene	ND	8.3	3.3	ug/kg	
79-01-6	Trichloroethylene	ND	8.3	3.3	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	8.3	3.3	ug/kg	
	m,p-Xylene	ND	17	5.0	ug/kg	
95-47-6	o-Xylene	ND	8.3	3.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	100%		71-130%
460-00-4	4-Bromofluorobenzene	118%		59-148%
17060-07-0	1,2-Dichloroethane-D4	116%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044676.D

Anal Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044676.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	5.17 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	56	28	ug/kg	
71-43-2	Benzene	ND	5.6	2.2	ug/kg	
75-27-4	Bromodichloromethane	ND	5.6	2.2	ug/kg	
75-25-2	Bromoform	ND	5.6	2.2	ug/kg	
108-90-7	Chlorobenzene	ND	5.6	2.2	ug/kg	
75-00-3	Chloroethane	ND	5.6	3.3	ug/kg	
67-66-3	Chloroform	ND	5.6	2.2	ug/kg	
75-15-0	Carbon disulfide	ND	5.6	2.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.6	2.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.6	2.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.6	2.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.6	2.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.6	2.2	ug/kg	
124-48-1	Dibromochloromethane	ND	5.6	2.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.6	2.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.6	2.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.6	2.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.6	2.2	ug/kg	
100-41-4	Ethylbenzene	ND	5.6	2.2	ug/kg	
591-78-6	2-Hexanone	ND	28	11	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	28	11	ug/kg	
74-83-9	Methyl bromide	ND	5.6	2.2	ug/kg	
74-87-3	Methyl chloride	ND VL	5.6	2.2	ug/kg	
75-09-2	Methylene chloride	ND	11	5.6	ug/kg	
78-93-3	Methyl ethyl ketone	ND	28	11	ug/kg	
100-42-5	Styrene	ND	5.6	2.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.6	2.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.6	2.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.6	2.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.6	2.2	ug/kg	
108-88-3	Toluene	ND	5.6	2.2	ug/kg	
79-01-6	Trichloroethylene	ND	5.6	2.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	5.6	2.2	ug/kg	
	m,p-Xylene	ND	11	3.3	ug/kg	
95-47-6	o-Xylene	ND	5.6	2.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	106%		71-130%
460-00-4	4-Bromofluorobenzene	135%		59-148%
17060-07-0	1,2-Dichloroethane-D4	115%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044677.D H044691.D

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044677.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2 [a]	H044691.D	1	07/27/07	SH	n/a	n/a	VH1663

	Initial Weight
Run #1	3.74 g
Run #2	2.36 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone [b]	70.7 J	75	37	ug/kg	J
71-43-2	Benzene	ND	7.5	3.0	ug/kg	
75-27-4	Bromodichloromethane	ND	7.5	3.0	ug/kg	
75-25-2	Bromoform	ND	7.5	3.0	ug/kg	
108-90-7	Chlorobenzene	ND	7.5	3.0	ug/kg	
75-00-3	Chloroethane	ND	7.5	4.5	ug/kg	
67-66-3	Chloroform	ND	7.5	3.0	ug/kg	
75-15-0	Carbon disulfide	ND	7.5	3.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.5	3.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.5	3.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.5	3.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.5	3.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.5	3.0	ug/kg	
124-48-1	Dibromochloromethane	ND	7.5	3.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.5	3.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.5	3.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.5	3.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.5	3.0	ug/kg	
100-41-4	Ethylbenzene	ND	7.5	3.0	ug/kg	
591-78-6	2-Hexanone	ND	37	15	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	37	15	ug/kg	
74-83-9	Methyl bromide	ND	7.5	3.0	ug/kg	
74-87-3	Methyl chloride	ND VL	7.5	3.0	ug/kg	
75-09-2	Methylene chloride	ND	15	7.5	ug/kg	
78-93-3	Methyl ethyl ketone	ND	37	15	ug/kg	
100-42-5	Styrene	ND	7.5	3.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.5	3.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.5	3.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.5	3.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.5	3.0	ug/kg	
108-88-3	Toluene	ND	7.5	3.0	ug/kg	
79-01-6	Trichloroethylene	ND	7.5	3.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	7.5	3.0	ug/kg	
	m,p-Xylene	ND	15	4.5	ug/kg	
95-47-6	o-Xylene	ND	7.5	3.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%	108%	80-121%
2037-26-5	Toluene-D8	105%	107%	71-130%
460-00-4	4-Bromofluorobenzene	134%	146%	59-148%
17060-07-0	1,2-Dichloroethane-D4	119%	112%	77-123%

(a) Confirmation run.
(b) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044678.D H044692.D

Kim Icm

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044678.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2 [a]	H044692.D	1	07/27/07	SH	n/a	n/a	VH1663

	Initial Weight
Run #1	2.95 g
Run #2	3.02 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	92	46	ug/kg	
71-43-2	Benzene	ND	9.2	3.7	ug/kg	
75-27-4	Bromodichloromethane	ND	9.2	3.7	ug/kg	
75-25-2	Bromoform	ND	9.2	3.7	ug/kg	
108-90-7	Chlorobenzene	ND	9.2	3.7	ug/kg	
75-00-3	Chloroethane	ND	9.2	5.5	ug/kg	
67-66-3	Chloroform	ND	9.2	3.7	ug/kg	
75-15-0	Carbon disulfide	ND	9.2	3.7	ug/kg	
56-23-5	Carbon tetrachloride	ND	9.2	3.7	ug/kg	
75-34-3	1,1-Dichloroethane	ND	9.2	3.7	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	9.2	3.7	ug/kg	
107-06-2	1,2-Dichloroethane	ND	9.2	3.7	ug/kg	
78-87-5	1,2-Dichloropropane	ND	9.2	3.7	ug/kg	
124-48-1	Dibromochloromethane	ND	9.2	3.7	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	9.2	3.7	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	9.2	3.7	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	9.2	3.7	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	9.2	3.7	ug/kg	
100-41-4	Ethylbenzene	ND	9.2	3.7	ug/kg	
591-78-6	2-Hexanone	ND	46	18	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	46	18	ug/kg	
74-83-9	Methyl bromide	ND	9.2	3.7	ug/kg	
74-87-3	Methyl chloride	ND VL	9.2	3.7	ug/kg	
75-09-2	Methylene chloride	ND	18	9.2	ug/kg	
78-93-3	Methyl ethyl ketone	ND	46	18	ug/kg	
100-42-5	Styrene	ND	9.2	3.7	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	9.2	3.7	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.2	3.7	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	9.2	3.7	ug/kg	
127-18-4	Tetrachloroethylene	ND	9.2	3.7	ug/kg	
108-88-3	Toluene	ND	9.2	3.7	ug/kg	
79-01-6	Trichloroethylene	ND	9.2	3.7	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA7

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	9.2	3.7	ug/kg	
	m,p-Xylene	ND	18	5.5	ug/kg	
95-47-6	o-Xylene	ND	9.2	3.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%	110%	80-121%
2037-26-5	Toluene-D8	108%	110%	71-130%
460-00-4	4-Bromofluorobenzene	133%	162%	59-148%
17060-07-0	1,2-Dichloroethane-D4	116%	117%	77-123%

(a) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044680.D

Am I Ok

Accutest Laboratories

Report of Analysis

3-25
3

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044680.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	4.08 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	70	35	ug/kg	
71-43-2	Benzene	ND	7.0	2.8	ug/kg	
75-27-4	Bromodichloromethane	ND	7.0	2.8	ug/kg	
75-25-2	Bromoform	ND	7.0	2.8	ug/kg	
108-90-7	Chlorobenzene	ND	7.0	2.8	ug/kg	
75-00-3	Chloroethane	ND	7.0	4.2	ug/kg	
67-66-3	Chloroform	ND	7.0	2.8	ug/kg	
75-15-0	Carbon disulfide	ND	7.0	2.8	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.0	2.8	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.0	2.8	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.0	2.8	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.0	2.8	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.0	2.8	ug/kg	
124-48-1	Dibromochloromethane	ND	7.0	2.8	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.0	2.8	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.0	2.8	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.0	2.8	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.0	2.8	ug/kg	
100-41-4	Ethylbenzene	ND	7.0	2.8	ug/kg	
591-78-6	2-Hexanone	ND	35	14	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	35	14	ug/kg	
74-83-9	Methyl bromide	ND	7.0	2.8	ug/kg	
74-87-3	Methyl chloride	ND VL	7.0	2.8	ug/kg	
75-09-2	Methylene chloride	ND	14	7.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	35	14	ug/kg	
100-42-5	Styrene	ND	7.0	2.8	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.0	2.8	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.0	2.8	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.0	2.8	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.0	2.8	ug/kg	
108-88-3	Toluene	ND	7.0	2.8	ug/kg	
79-01-6	Trichloroethylene	ND	7.0	2.8	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	7.0	2.8	ug/kg	
	m,p-Xylene	ND	14	4.2	ug/kg	
95-47-6	o-Xylene	ND	7.0	2.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		80-121%
2037-26-5	Toluene-D8	102%		71-130%
460-00-4	4-Bromofluorobenzene	125%		59-148%
17060-07-0	1,2-Dichloroethane-D4	117%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044681.D H044693.D

Form I com

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044681.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2 [a]	H044693.D	1	07/27/07	SH	n/a	n/a	VH1663

	Initial Weight
Run #1	3.67 g
Run #2	2.93 g

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	79	40	ug/kg	
71-43-2	Benzene	ND	7.9	3.2	ug/kg	
75-27-4	Bromodichloromethane	ND	7.9	3.2	ug/kg	
75-25-2	Bromoform	ND	7.9	3.2	ug/kg	
108-90-7	Chlorobenzene	ND	7.9	3.2	ug/kg	
75-00-3	Chloroethane	ND	7.9	4.8	ug/kg	
67-66-3	Chloroform	ND	7.9	3.2	ug/kg	
75-15-0	Carbon disulfide	ND	7.9	3.2	ug/kg	
56-23-5	Carbon tetrachloride	ND	7.9	3.2	ug/kg	
75-34-3	1,1-Dichloroethane	ND	7.9	3.2	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	7.9	3.2	ug/kg	
107-06-2	1,2-Dichloroethane	ND	7.9	3.2	ug/kg	
78-87-5	1,2-Dichloropropane	ND	7.9	3.2	ug/kg	
124-48-1	Dibromochloromethane	ND	7.9	3.2	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	7.9	3.2	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	7.9	3.2	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	7.9	3.2	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	7.9	3.2	ug/kg	
100-41-4	Ethylbenzene	ND	7.9	3.2	ug/kg	
591-78-6	2-Hexanone	ND	40	16	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	40	16	ug/kg	
74-83-9	Methyl bromide	ND	7.9	3.2	ug/kg	
74-87-3	Methyl chloride	ND VL	7.9	3.2	ug/kg	
75-09-2	Methylene chloride	ND	16	7.9	ug/kg	
78-93-3	Methyl ethyl ketone	ND	40	16	ug/kg	
100-42-5	Styrene	ND	7.9	3.2	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	7.9	3.2	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	7.9	3.2	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	7.9	3.2	ug/kg	
127-18-4	Tetrachloroethylene	ND	7.9	3.2	ug/kg	
108-88-3	Toluene	ND	7.9	3.2	ug/kg	
79-01-6	Trichloroethylene	ND	7.9	3.2	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Corg

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND VL	7.9	3.2	ug/kg	
	m,p-Xylene	ND	16	4.8	ug/kg	
95-47-6	o-Xylene	ND	7.9	3.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%	107%	80-121%
2037-26-5	Toluene-D8	107%	113%	71-130%
460-00-4	4-Bromofluorobenzene	138%	130%	59-148%
17060-07-0	1,2-Dichloroethane-D4	115%	115%	77-123%

(a) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: F022458.D

For I only

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022458.D	1	07/27/07	WJ	n/a	n/a	VF413
Run #2							

	Initial Weight
Run #1	4.45 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VT	61	31	ug/kg	
71-43-2	Benzene	ND	6.1	2.4	ug/kg	
75-27-4	Bromodichloromethane	ND	6.1	2.4	ug/kg	
75-25-2	Bromoform	ND	6.1	2.4	ug/kg	
108-90-7	Chlorobenzene	ND	6.1	2.4	ug/kg	
75-00-3	Chloroethane	ND	6.1	3.7	ug/kg	
67-66-3	Chloroform	ND	6.1	2.4	ug/kg	
75-15-0	Carbon disulfide	ND	6.1	2.4	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.1	2.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.1	2.4	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.1	2.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.1	2.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.1	2.4	ug/kg	
124-48-1	Dibromochloromethane	ND	6.1	2.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.1	2.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.1	2.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.1	2.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.1	2.4	ug/kg	
100-41-4	Ethylbenzene	ND	6.1	2.4	ug/kg	
591-78-6	2-Hexanone	ND	31	12	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	31	12	ug/kg	
74-83-9	Methyl bromide	ND	6.1	2.4	ug/kg	
74-87-3	Methyl chloride	ND	6.1	2.4	ug/kg	
75-09-2	Methylene chloride	ND	12	6.1	ug/kg	
78-93-3	Methyl ethyl ketone	ND	31	12	ug/kg	
100-42-5	Styrene	ND	6.1	2.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.1	2.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.1	2.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.1	2.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.1	2.4	ug/kg	
108-88-3	Toluene	ND	6.1	2.4	ug/kg	
79-01-6	Trichloroethylene	ND	6.1	2.4	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.1	2.4	ug/kg	
	m,p-Xylene	ND	12	3.7	ug/kg	
95-47-6	o-Xylene	ND	6.1	2.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	100%		71-130%
460-00-4	4-Bromofluorobenzene	106%		59-148%
17060-07-0	1,2-Dichloroethane-D4	110%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: F022459.D

Form I COA

Accutest Laboratories

Report of Analysis

3.2.8

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022459.D	1	07/27/07	WJ	n/a	n/a	VF413
Run #2							

	Initial Weight
Run #1	4.16 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	66	33	ug/kg	
71-43-2	Benzene	ND	6.6	2.6	ug/kg	
75-27-4	Bromodichloromethane	ND	6.6	2.6	ug/kg	
75-25-2	Bromoform	ND	6.6	2.6	ug/kg	
108-90-7	Chlorobenzene	ND	6.6	2.6	ug/kg	
75-00-3	Chloroethane	ND	6.6	3.9	ug/kg	
67-66-3	Chloroform	ND	6.6	2.6	ug/kg	
75-15-0	Carbon disulfide	ND	6.6	2.6	ug/kg	
56-23-5	Carbon tetrachloride	ND	6.6	2.6	ug/kg	
75-34-3	1,1-Dichloroethane	ND	6.6	2.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	6.6	2.6	ug/kg	
107-06-2	1,2-Dichloroethane	ND	6.6	2.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	6.6	2.6	ug/kg	
124-48-1	Dibromochloromethane	ND	6.6	2.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	6.6	2.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	6.6	2.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	6.6	2.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	6.6	2.6	ug/kg	
100-41-4	Ethylbenzene	ND	6.6	2.6	ug/kg	
591-78-6	2-Hexanone	ND	33	13	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	33	13	ug/kg	
74-83-9	Methyl bromide	ND	6.6	2.6	ug/kg	
74-87-3	Methyl chloride	ND	6.6	2.6	ug/kg	
75-09-2	Methylene chloride	ND	13	6.6	ug/kg	
78-93-3	Methyl ethyl ketone	ND	33	13	ug/kg	
100-42-5	Styrene	ND	6.6	2.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	6.6	2.6	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.6	2.6	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	6.6	2.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	6.6	2.6	ug/kg	
108-88-3	Toluene	ND	6.6	2.6	ug/kg	
79-01-6	Trichloroethylene	ND	6.6	2.6	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	6.6	2.6	ug/kg	
	m,p-Xylene	ND	13	3.9	ug/kg	
95-47-6	o-Xylene	ND	6.6	2.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-121%
2037-26-5	Toluene-D8	103%		71-130%
460-00-4	4-Bromofluorobenzene	116%		59-148%
17060-07-0	1,2-Dichloroethane-D4	110%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: F022460.D

Form I Cog

Accutest Laboratories

Report of Analysis

3129

3

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022460.D	1	07/27/07	WJ	n/a	n/a	VF413
Run #2							

	Initial Weight
Run #1	2.74 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND VJ	100	51	ug/kg	
71-43-2	Benzene	ND	10	4.1	ug/kg	
75-27-4	Bromodichloromethane	ND	10	4.1	ug/kg	
75-25-2	Bromoform	ND	10	4.1	ug/kg	
108-90-7	Chlorobenzene	ND	10	4.1	ug/kg	
75-00-3	Chloroethane	ND	10	6.2	ug/kg	
67-66-3	Chloroform	ND	10	4.1	ug/kg	
75-15-0	Carbon disulfide	ND	10	4.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	10	4.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	10	4.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	10	4.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	10	4.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	10	4.1	ug/kg	
124-48-1	Dibromochloromethane	ND	10	4.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	10	4.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	10	4.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	10	4.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	10	4.1	ug/kg	
100-41-4	Ethylbenzene	ND	10	4.1	ug/kg	
591-78-6	2-Hexanone	ND	51	21	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	51	21	ug/kg	
74-83-9	Methyl bromide	ND	10	4.1	ug/kg	
74-87-3	Methyl chloride	ND	10	4.1	ug/kg	
75-09-2	Methylene chloride	ND	21	10	ug/kg	
78-93-3	Methyl ethyl ketone	ND	51	21	ug/kg	
100-42-5	Styrene	ND	10	4.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	10	4.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	4.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	10	4.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	10	4.1	ug/kg	
108-88-3	Toluene	ND	10	4.1	ug/kg	
79-01-6	Trichloroethylene	ND	10	4.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	10	4.1	ug/kg	
	m,p-Xylene	ND	21	6.2	ug/kg	
95-47-6	o-Xylene	ND	10	4.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	101%		71-130%
460-00-4	4-Bromofluorobenzene	114%		59-148%
17060-07-0	1,2-Dichloroethane-D4	110%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: F022461.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022461.D	1	07/27/07	WJ	n/a	n/a	VF413
Run #2							

	Initial Weight
Run #1	2.18 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND UJ	120	60	ug/kg	
71-43-2	Benzene	ND	12	4.8	ug/kg	
75-27-4	Bromodichloromethane	ND	12	4.8	ug/kg	
75-25-2	Bromoform	ND	12	4.8	ug/kg	
108-90-7	Chlorobenzene	ND	12	4.8	ug/kg	
75-00-3	Chloroethane	ND	12	7.2	ug/kg	
67-66-3	Chloroform	ND	12	4.8	ug/kg	
75-15-0	Carbon disulfide	ND	12	4.8	ug/kg	
56-23-5	Carbon tetrachloride	ND	12	4.8	ug/kg	
75-34-3	1,1-Dichloroethane	ND	12	4.8	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	12	4.8	ug/kg	
107-06-2	1,2-Dichloroethane	ND	12	4.8	ug/kg	
78-87-5	1,2-Dichloropropane	ND	12	4.8	ug/kg	
124-48-1	Dibromochloromethane	ND	12	4.8	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	12	4.8	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	12	4.8	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	12	4.8	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	12	4.8	ug/kg	
100-41-4	Ethylbenzene	ND	12	4.8	ug/kg	
591-78-6	2-Hexanone	ND	60	24	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	60	24	ug/kg	
74-83-9	Methyl bromide	ND	12	4.8	ug/kg	
74-87-3	Methyl chloride	ND	12	4.8	ug/kg	
75-09-2	Methylene chloride	ND	24	12	ug/kg	
78-93-3	Methyl ethyl ketone	ND	60	24	ug/kg	
100-42-5	Styrene	ND	12	4.8	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	12	4.8	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	12	4.8	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	12	4.8	ug/kg	
127-18-4	Tetrachloroethylene	ND	12	4.8	ug/kg	
108-88-3	Toluene	ND	12	4.8	ug/kg	
79-01-6	Trichloroethylene	ND	12	4.8	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	12	4.8	ug/kg	
	m,p-Xylene	ND	24	7.2	ug/kg	
95-47-6	o-Xylene	ND	12	4.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		80-121%
2037-26-5	Toluene-D8	108%		71-130%
460-00-4	4-Bromofluorobenzene	122%		59-148%
17060-07-0	1,2-Dichloroethane-D4	116%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: F022462.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022462.D	1	07/27/07	WJ	n/a	n/a	VF413
Run #2							

	Initial Weight
Run #1	2.06 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone [a]	65.8 J	130	63	ug/kg	J
71-43-2	Benzene	ND	13	5.1	ug/kg	
75-27-4	Bromodichloromethane	ND	13	5.1	ug/kg	
75-25-2	Bromoform	ND	13	5.1	ug/kg	
108-90-7	Chlorobenzene	ND	13	5.1	ug/kg	
75-00-3	Chloroethane	ND	13	7.6	ug/kg	
67-66-3	Chloroform	ND	13	5.1	ug/kg	
75-15-0	Carbon disulfide	ND	13	5.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	13	5.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	13	5.1	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	13	5.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	13	5.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	13	5.1	ug/kg	
124-48-1	Dibromochloromethane	ND	13	5.1	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	13	5.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	13	5.1	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	13	5.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	13	5.1	ug/kg	
100-41-4	Ethylbenzene	ND	13	5.1	ug/kg	
591-78-6	2-Hexanone	ND	63	25	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	63	25	ug/kg	
74-83-9	Methyl bromide	ND	13	5.1	ug/kg	
74-87-3	Methyl chloride	ND	13	5.1	ug/kg	
75-09-2	Methylene chloride	ND	25	13	ug/kg	
78-93-3	Methyl ethyl ketone	ND	63	25	ug/kg	
100-42-5	Styrene	ND	13	5.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	13	5.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	13	5.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	13	5.1	ug/kg	
127-18-4	Tetrachloroethylene	ND	13	5.1	ug/kg	
108-88-3	Toluene	ND	13	5.1	ug/kg	
79-01-6	Trichloroethylene	ND	13	5.1	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

For I Only

Accutest Laboratories

Report of Analysis

3.31

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	13	5.1	ug/kg	
	m,p-Xylene	ND	25	7.6	ug/kg	
95-47-6	o-Xylene	ND	13	5.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		80-121%
2037-26-5	Toluene-D8	105%		71-130%
460-00-4	4-Bromofluorobenzene	118%		59-148%
17060-07-0	1,2-Dichloroethane-D4	116%		77-123%

(a) CCV outside of control limits; results may be biased high.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: F022479.D

Form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F022479.D	1	07/28/07	WJ	n/a	n/a	VF414
Run #2							

	Initial Weight
Run #1	3.53 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	78.2 J	82	41	ug/kg	J
71-43-2	Benzene	ND	8.2	3.3	ug/kg	
75-27-4	Bromodichloromethane	ND	8.2	3.3	ug/kg	
75-25-2	Bromoform	ND	8.2	3.3	ug/kg	
108-90-7	Chlorobenzene	ND	8.2	3.3	ug/kg	
75-00-3	Chloroethane	ND	8.2	4.9	ug/kg	
67-66-3	Chloroform	ND	8.2	3.3	ug/kg	
75-15-0	Carbon disulfide	ND	8.2	3.3	ug/kg	
56-23-5	Carbon tetrachloride	ND	8.2	3.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	8.2	3.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	8.2	3.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	8.2	3.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	8.2	3.3	ug/kg	
124-48-1	Dibromochloromethane	ND	8.2	3.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	8.2	3.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	8.2	3.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	8.2	3.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	8.2	3.3	ug/kg	
100-41-4	Ethylbenzene	ND	8.2	3.3	ug/kg	
591-78-6	2-Hexanone	ND	41	16	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	41	16	ug/kg	
74-83-9	Methyl bromide	ND	8.2	3.3	ug/kg	
74-87-3	Methyl chloride	ND	8.2	3.3	ug/kg	
75-09-2	Methylene chloride	ND	16	8.2	ug/kg	
78-93-3	Methyl ethyl ketone	ND	41	16	ug/kg	
100-42-5	Styrene	ND	8.2	3.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	8.2	3.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	8.2	3.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	8.2	3.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	8.2	3.3	ug/kg	
108-88-3	Toluene	ND	8.2	3.3	ug/kg	
79-01-6	Trichloroethylene	ND	8.2	3.3	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	8.2	3.3	ug/kg	
	m,p-Xylene	ND	16	4.9	ug/kg	
95-47-6	o-Xylene	ND	8.2	3.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-121%
2037-26-5	Toluene-D8	106%		71-130%
460-00-4	4-Bromofluorobenzene	121%		59-148%
17060-07-0	1,2-Dichloroethane-D4	108%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031457.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031457.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	2.7 J	5.0	1.0	ug/l	J
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		87-116%
17060-07-0	1,2-Dichloroethane-D4	94%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	108%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031458.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	071807TW		
Lab Sample ID:	F51154-13	Date Sampled:	07/18/07
Matrix:	AQ - Trip Blank Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031458.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	5.0	ug/l	
71-43-2	Benzene	ND	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.50	ug/l	
75-25-2	Bromoform	ND	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.50	ug/l	
75-00-3	Chloroethane	ND	2.0	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND	2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND	2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.5	ug/l	
100-42-5	Styrene	ND	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I rev

Accutest Laboratories

Report of Analysis

Client Sample ID:	071807TW		
Lab Sample ID:	F51154-13	Date Sampled:	07/18/07
Matrix:	AQ - Trip Blank Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	93%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	109%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044658.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	071807TS		
Lab Sample ID:	F51154-14	Date Sampled:	07/18/07
Matrix:	SO - Trip Blank Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044658.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	25	ug/kg	
71-43-2	Benzene	ND	5.0	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	2.0	ug/kg	
75-25-2	Bromoform	ND	5.0	2.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	2.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	3.0	ug/kg	
67-66-3	Chloroform	ND	5.0	2.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	2.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	2.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	2.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	2.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	2.0	ug/kg	
591-78-6	2-Hexanone	ND	25	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	10	ug/kg	
74-83-9	Methyl bromide	ND	5.0	2.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
75-09-2	Methylene chloride	ND	10	5.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	10	ug/kg	
100-42-5	Styrene	ND	5.0	2.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	2.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	2.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	2.0	ug/kg	
108-88-3	Toluene	ND	5.0	2.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	2.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Final Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	071807TS		
Lab Sample ID:	F51154-14	Date Sampled:	07/18/07
Matrix:	SO - Trip Blank Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.0	2.0	ug/kg	
	m,p-Xylene	ND	10	3.0	ug/kg	
95-47-6	o-Xylene	ND	5.0	2.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	97%		80-121%
2037-26-5	Toluene-D8	98%		71-130%
460-00-4	4-Bromofluorobenzene	113%		59-148%
17060-07-0	1,2-Dichloroethane-D4	102%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: H044659.D

Form I OV7

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB071907S		
Lab Sample ID:	F51154-19	Date Sampled:	07/19/07
Matrix:	SO - Trip Blank Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H044659.D	1	07/26/07	SH	n/a	n/a	VH1662
Run #2							

	Initial Weight
Run #1	5.00 g
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	50	25	ug/kg	
71-43-2	Benzene	ND	5.0	2.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	2.0	ug/kg	
75-25-2	Bromoform	ND	5.0	2.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	2.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	3.0	ug/kg	
67-66-3	Chloroform	ND	5.0	2.0	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	2.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	2.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	2.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	2.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	2.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	2.0	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	2.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	2.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	2.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	2.0	ug/kg	
591-78-6	2-Hexanone	ND	25	10	ug/kg	
108-10-1	4-Methyl-2-pentanone	ND	25	10	ug/kg	
74-83-9	Methyl bromide	ND	5.0	2.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	2.0	ug/kg	
75-09-2	Methylene chloride	ND	10	5.0	ug/kg	
78-93-3	Methyl ethyl ketone	ND	25	10	ug/kg	
100-42-5	Styrene	ND	5.0	2.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	2.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	2.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	2.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	2.0	ug/kg	
108-88-3	Toluene	ND	5.0	2.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	2.0	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB071907S		
Lab Sample ID:	F51154-19	Date Sampled:	07/19/07
Matrix:	SO - Trip Blank Soil	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	5.0	2.0	ug/kg	
	m,p-Xylene	ND	10	3.0	ug/kg	
95-47-6	o-Xylene	ND	5.0	2.0	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-121%
2037-26-5	Toluene-D8	97%		71-130%
460-00-4	4-Bromofluorobenzene	113%		59-148%
17060-07-0	1,2-Dichloroethane-D4	101%		77-123%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: J031459.D

Form I GC

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB071907W		
Lab Sample ID:	F51154-21	Date Sampled:	07/19/07
Matrix:	AQ - Trip Blank Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031459.D	1	07/26/07	JG	n/a	n/a	VJ2187
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result		RL	MDL	Units	Q
67-64-1	Acetone	ND		25	5.0	ug/l	
71-43-2	Benzene	ND		1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	ND		1.0	0.50	ug/l	
75-25-2	Bromoform	ND		1.0	0.50	ug/l	
108-90-7	Chlorobenzene	ND		1.0	0.50	ug/l	
75-00-3	Chloroethane	ND		2.0	1.0	ug/l	
67-66-3	Chloroform	1.3	J	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	ND		2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND		1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND		1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND		1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	ND		1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND		1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	ND		1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND		1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND		1.0	0.50	ug/l	
591-78-6	2-Hexanone	ND		5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	ND		5.0	2.5	ug/l	
74-83-9	Methyl bromide	ND		2.0	1.0	ug/l	
74-87-3	Methyl chloride	ND		2.0	1.0	ug/l	
75-09-2	Methylene chloride	ND		5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND		5.0	2.5	ug/l	
100-42-5	Styrene	ND		1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	ND		1.0	0.50	ug/l	
108-88-3	Toluene	ND		1.0	0.50	ug/l	
79-01-6	Trichloroethylene	ND		1.0	0.50	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I - OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	TB071907W		
Lab Sample ID:	F51154-21	Date Sampled:	07/19/07
Matrix:	AQ - Trip Blank Water	Date Received:	07/19/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.50	ug/l	
	m,p-Xylene	ND	2.0	0.50	ug/l	
95-47-6	o-Xylene	ND	1.0	0.50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	93%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	110%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Semi-Volatiles & Polynuclear Aromatic Hydrocarbons Accutest Laboratories, Inc., SDG F51154

DATE: September 25, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. Samples were analyzed for semivolatile organic compounds (SVOCs) using USEPA SW846 Methods 3510C/8270C for aqueous matrices and USEPA SW846 Methods 3550B/8270C for solid matrices. The polynuclear aromatic hydrocarbons (PAHs) were analyzed using selective ion monitoring (SIM) techniques. A total of seven aqueous samples and nineteen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
AOSW01	F51154-1	LFSW01	F51154-17
AOSW02	F51154-2	APSD01	F51154-18
TMSW01	F51154-3	41SD11	F51154-22
AOSD01	F51154-4	49SS02	F51154-23
AOSD02	F51154-5	49SS03	F51154-24
41SW08	F51154-6	49SS04	F51154-25
41SW09	F51154-7	49SS05	F51154-26
41SW10	F51154-8	59SS06	F51154-27
41SD08	F51154-9	59SS07	F51154-28
41SD09	F51154-10	59SS08	F51154-29
41SD10	F51154-11	59SS09	F51154-30
LFSD01	F51154-15	59SS10	F51154-31
TMSD01	F51154-16	TMSS05	F51154-32

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Surrogate Spikes
	X	Internal Standards
X		Laboratory Control Sample
X		Matrix Spike/Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications, except for the following. Benzoic acid was qualified rejected "R" for samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) based upon the grossly low (i.e. <10% recovery) found in the associated LCS (see Section VIII).

Eric Malarek, Chemist

9/25/07
Date

RFAAP VALIDATION REPORT
SEMIVOLATILES AND PAH REVIEW
SDG F51154

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For semivolatile (SVOC) and polynuclear aromatic hydrocarbons (PAH) compounds , the samples are cooled @4°C ± 2°C for aqueous samples with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. For solid matrices, the samples are cooled @4°C ± 2°C with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 07/18/07 and 07/19/07. For the surface water samples collected 07/18/07 and 07/19/07, the SVOCs were extracted on 07/24/07 and 07/26/07 and analyzed on 07/31/07. For the surface water samples collected 07/18/07 and 07/19/07, the PAHs by SIM were extracted on 07/24/07 and 07/26/07 and analyzed on 07/30/07 and 07/31/07. For the sediment and soil samples collected 07/18/07 and 07/19/07, the SVOCs were extracted on 07/25/07, 07/27/07, and 08/06/07 (49SS03 (F51154-24) confirmation) and analyzed on 07/26/07, 07/30/07, and 08/06/07 (49SS03 (F51154-24) confirmation). Sample 49SS03 (F51154-24) was re-extracted and re-analyzed for confirmation out of holding time for compound di-n-butylphthalate; however, the original sample was reported. No qualifiers were applied based upon this outlier. For the sediment and soil samples collected 07/18/07 and 07/19/07, the PAHs by SIM were extracted on 07/27/07 and analyzed on 07/27/07, 07/31/07, and 08/01/07. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check

GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, decafluorotriphenylphosphine (DFTPP), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for compounds on the semivolatile target compound list (TCL). Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. The minimum relative response factor (RRF) criteria must be ≥0.05. The DoD QSM specifies that the initial calibration percent relative standard deviation (%RSD) must be ≤15% on the average for all compounds (<30% for CCCs). All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- Initial calibration for the SVOCs was performed on 07/05/07 on instrument MSBNA02. Target compounds 2,4-dinitrophenol (19.7%) and 4,6-dinitro-2-methylphenol (25.9%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9950) and 4,6-dinitro-2-methylphenol (r=0.9975) were quantified using linear or second order regression with correlation coefficients >0.995, therefore, no qualifiers were applied based upon the high %RSDs. Sample LFSW01 (F51154-17) was analyzed using this initial calibration.

- Initial calibration for the SVOCs was performed on 07/23/07 on instrument MSBNA03. Target compounds 2,4-dinitrophenol (49.6%; grossly exceeding) and 4,6-dinitro-2-methylphenol (32.7%; grossly exceeding) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9956) and 4,6-dinitro-2-methylphenol (r=0.9972) were quantified using linear or second order regression with correlation coefficients >0.995, therefore, no qualifiers were applied based upon the high %RSDs. Samples AOSD01 (F51154-4), AOSD02 (F51154-5), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- Initial calibration for the SVOCs was performed on 07/31/07 on instrument MSBNA03. Target compounds 2,4-dinitrophenol (43.8%; grossly exceeding) and 4,6-dinitro-2-methylphenol (22.8%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9962) and 4,6-dinitro-2-methylphenol (r=0.9982) were quantified using linear or second order regression with correlation coefficients >0.995, therefore, no qualifiers were applied based upon the high %RSDs. No samples reported were analyzed using this initial calibration.

- Initial calibration for the SVOCs was performed on 07/13/07 on instrument MSBNA04. Target compounds 2,4-dinitrophenol (42.0%; grossly exceeding) and 4,6-dinitro-2-methylphenol (24.0%) were outside criteria. All other target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Compounds 2,4-dinitrophenol (r=0.9988) and 4,6-dinitro-2-methylphenol (r=0.9995) were quantified using linear or second order regression with correlation coefficients >0.995, therefore, no qualifiers were applied based upon the high %RSDs. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) as well as the confirmation for sample 49SS03 (F51154-24) were analyzed using this initial calibration.

- Initial calibration for the PAHs by SIM was performed on 07/27/07 on instrument MSBNA01, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Samples AOSD01 (F51154-4), AOSD02 (F51154-5), LFSW01 (F51154-17), AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) were analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used was capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration standards containing both target and surrogates compounds are analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of blanks and samples. The minimum relative response factors (RRF) for semivolatile target compounds and surrogates must be ≥0.05. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within ±20% for all target compounds. Grossly exceeding is defined where %D>40%. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- For SVOC initial calibration verification performed on 07/05/07 @15:27 on instrument MSBNA02, 3-nitroaniline (26.0%) was outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 3-nitroaniline. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC initial calibration verification performed on 07/05/07 @15:55 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC continuing calibration performed on 07/31/07 @09:50 on instrument MSBNA02, all criteria were met for all target compounds. No qualifiers were applied. Sample LFSW01 (F51154-17) applies to this continuing calibration.

- For SVOC initial calibration verification performed on 07/23/07 @18:28 on instrument MSBNA03, 4-chloroaniline (44.6%; grossly exceeding) and 3-nitroaniline (27.8%) were outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 4-chloroaniline and 3-nitroaniline. No samples reported apply to this initial calibration verification. No qualifiers were applied.

- For SVOC initial calibration verification performed on 07/23/07 @18:58 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC continuing calibration performed on 07/26/07 @09:59 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. Samples AOSD01 (F51154-4) and AOSD02 (F51154-5) apply to this continuing calibration.

- For SVOC continuing calibration performed on 07/30/07 @09:46 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this continuing calibration.

- For SVOC initial calibration verification performed on 07/31/07 @16:11 on instrument MSBNA03, 4-chloroaniline (43.4%; grossly exceeding) and 3-nitroaniline (35.4%) were outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 4-chloroaniline and 3-nitroaniline. No samples reported apply to this initial calibration verification. No qualifiers were applied.

- For SVOC initial calibration verification performed on 07/31/07 @16:42 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC continuing calibration performed on 08/01/07 @12:32 on instrument MSBNA03, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For SVOC initial calibration verification performed on 07/13/07 @13:48 on instrument MSBNA04, 4-chloroaniline (38.2%) and 3-nitroaniline (39.0%) were outside criteria limits. For all other target compounds, all criteria were met. All samples were non-detect for 4-chloroaniline and 3-nitroaniline. No samples reported apply to this initial calibration verification. No qualifiers were applied.

- For SVOC initial calibration verification performed on 07/13/07 @14:19 on instrument MSBNA04, all criteria were met for all target compounds. No qualifiers were applied. No samples reported apply to this initial calibration verification.

- For SVOC continuing calibration performed on 07/31/07 @11:19 on instrument MSBNA04, all criteria were met for all target compounds. No qualifiers were applied. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this continuing calibration.

- For SVOC continuing calibration performed on 08/06/07 @11:28 on instrument MSBNA04, all criteria were met for all target compounds. No qualifiers were applied. Confirmation for sample 49SS03 (F51154-24) applies to this continuing calibration.

- For PAH by SIM initial calibration verification performed on 07/27/07 @20:02 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples AOSD01 (F51154-4) and AOSD02 (F51154-5) apply to this initial calibration verification.

- For PAH by SIM continuing calibration performed on 07/30/07 @11:52 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples apply to this continuing calibration.

- For PAH by SIM continuing calibration performed on 07/30/07 @23:02 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Sample LFSW01 (F51154-17) applies to this continuing calibration.

- For PAH by SIM continuing calibration performed on 07/30/07 @11:52 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this continuing calibration.

- For PAH by SIM continuing calibration performed on 07/31/07 @09:58 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples 41SD08 (F51154-9) and 41SD09 (F51154-10) apply to this continuing calibration.

- For PAH by SIM continuing calibration performed on 08/01/07 @13:31 on instrument MSBNA01, all criteria were met for all target compounds. No qualifiers were applied. Samples 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of DFTPP. No contaminants should be detected in any of the associated blanks > the MDL. DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants phthalate esters). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants phthalate esters, or 5 times (5X) the maximum amount for other semivolatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
07/31/07	OP21580-MB	All SVOC target <½MRL	NA	NA	None
08/01/07	OP21580-MB	All SVOC target <½MRL	NA	NA	None
07/31/07	OP21610-MB	All SVOC target <½MRL	NA	NA	None
07/30/07	OP21581-MB	All PAH SIM target <½MRL	NA	NA	None
07/30/07	OP21611-MB	All PAH SIM target <½MRL	NA	NA	None
07/05/07	OP21206-MB	All PAH SIM target <½MRL	NA	NA	None
09/15/07	RB083007	All SVOC target <½MRL	NA	NA	None
09/20/07	RB083007	All PAH SIM target <½MRL	NA	NA	None

Table 2 Blank Contamination Analysis Summary, Continued

Analysis Date	QC Blank ID	Compound	Max Conc. µg/kg	Action Level µg/kg	B qualified samples
07/26/07	OP21602-MB	All SVOC target <½MRL	NA	NA	None
07/30/07	OP21634-MB	All SVOC target <½MRL	NA	NA	None
07/27/07	OP21630-MB	All PAH SIM target <½MRL	NA	NA	None
07/31/07	OP21636-MB	All PAH SIM target <½MRL	NA	NA	None
08/01/07	OP21636-MB	All PAH SIM target <½MRL	NA	NA	None
07/31/07	RB071807	All SVOC target <½MRL	NA	NA	None
07/30/07	RB071807	All PAH SIM target <½MRL	NA	NA	None
08/02/07	072407R	All SVOC target <½MRL	NA	NA	None
08/02/07	072407R	All PAH SIM target <½MRL	NA	NA	None
08/02/07	072507R	All SVOC target <½MRL	NA	NA	None
08/02/07	072507R	All PAH SIM target <½MRL	NA	NA	None

NA = Not applicable.
MRL = Method reporting limit.

VI-Surrogate Spikes

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-2 and Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:
2-Fluorophenol (14-62%) – (DoD QSM = 20-110%)
Phenol – d5 (10-40%) – (DoD QSM = 10-115%)
2,4,6-Tribromophenol (33-118%) – (DoD QSM = 40-125%)
Nitrobenzene-d5 (42-108%) – (DoD QSM = 40-110%)
2-Fluorobiphenyl (40-106%) – (DoD QSM = 50-110%)
p-Terphenyl – d14 (39-121%) – (DoD QSM = 50-135%)

Solid Criteria:
2-Fluorophenol (40-102%) – (DoD QSM = 35-105%)
Phenol – d5 (41-100%) – (DoD QSM = 40-100%)
2,4,6-Tribromophenol (42-108%) – (DoD QSM = 35-125%)
Nitrobenzene-d5 (40-105%) – (DoD QSM = 35-100%)
2-Fluorobiphenyl (43-107%) – (DoD QSM = 45-105%)
p-Terphenyl – d14 (45-119%) – (DoD QSM = 30-125%)

- For soil sample 49SS03 (F51154-24), 2,4,6-tribromophenol (41.0%) was outside lab criteria; however within DoD QSM criteria. Since all other surrogates were within criteria, no qualifiers were applied based upon this outlier. The sample was rerun for confirmation with 59.0% recovery.

- For all other field samples, all surrogates were within criteria limits. No qualifiers were applied.

VII-Internal Standards

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the internal standards in samples and blanks must not vary by more than ±30 seconds from the retention time of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Sample

Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table D-2 and Table D-6 of the DoD QSM (DoD, 2006). DoD LCS solid recovery limits are specified in Table D-2 and Table D-7 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21580-BS was used as the aqueous LCS for the SVOC analysis on 07/31/07. Benzoic acid (8%) was grossly below (i.e. <10%R) the laboratory and/or the DoD QSM criteria. Benzoic acid was qualified rejected "R" based upon the very low recovery. All other compounds were within criteria. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this LCS.

- Sample OP21610-BS was used as the aqueous LCS for the SVOC analysis on 07/31/07. All criteria were met. No qualifiers were applied. Sample LFSW01 (F51154-17) applies to this LCS.

- Sample OP21602-BS was used as the solid LCS for the SVOC analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples AOSD01 (F51154-4) and AOSD02 (F51154-5) apply to this LCS.

- Sample OP21634-BS was used as the solid LCS for the SVOC analysis on 07/30/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

- Sample OP21581-BS was used as the aqueous LCS for the PAH SIM analysis on 07/30/07. All criteria were met. No qualifiers were applied. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this LCS.

- Sample OP21611-BS was used as the aqueous LCS for the PAH SIM analysis on 07/30/07. 1-Methylnaphthalene (57%) and 2-methylnaphthalene (55%) were below laboratory criteria. The associated sample was non-detect for these compounds and was qualified bias low "UL" based upon the low recoveries. Sample LFSW01 (F51154-17) applies to this LCS.

- Sample OP21630-BS was used as the solid LCS for the PAH SIM analysis on 07/27/07. All criteria were met. No qualifiers were applied. Samples AOSD01 (F51154-4) and AOSD02 (F51154-5) apply to this LCS.

- Sample OP21636-BS was used as the solid LCS for the PAH SIM analysis on 07/31/07. All criteria were met. No qualifiers were applied. No samples reported were analyzed using this LCS.

- Sample OP21636-BS was used as the solid LCS for the PAH SIM analysis on 08/01/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

IX-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-6 of the DoD QSM (DoD, 2006). DoD solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-7 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample AOSW02 (F51154-2) was used for the aqueous MS/MSD for SVOC analysis on 07/31/07. All criteria were met. No qualifiers were applied. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used for the aqueous MS/MSD for SVOC analysis on 07/31/07. 4-Nitrophenol (56%) and phenol (56%, 56%) were above laboratory accuracy criteria; however, within DoD QSM criteria. All other target compounds were within criteria. The associated aqueous LCS was within criteria and all surface water samples were non-detect for these compounds. No qualifiers were applied for 4-nitrophenol and phenol based upon these outliers. Sample LFSW01 (F51154-17) applies to this MS/MSD.

- Sample F51123-5 was used for the MS/MSD for the solid SVOC analysis on 07/26/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Samples AOSD01 (F51154-4) and AOSD02 (F51154-5) apply to this MS/MSD.

- Sample APSD01 (F51154-18) was used for the solid MS/MSD for SVOC analysis on 07/30/07. Benzoic acid (RPD=37%), 1,3-dichlorobenzene (43%), 1,4-dichlorobenzene (44%), 3,3'-dichlorobenzidine (25%, 24%), hexachlorocyclopentadiene (13%, 10%), and hexachloroethane (41%, 33%) were below laboratory and/or DoD QSM accuracy criteria. All other target compounds were within criteria. The associated solid LCS was within criteria and all solid samples were non-detect for these compounds. 1,3-Dichlorobenzene, 1,4-dichlorobenzene, 3,3'-dichlorobenzidine, hexachlorocyclopentadiene, and hexachloroethane were non-detect for the spiked sample and qualified "UL" based upon the low recoveries. No qualifiers were applied for benzoic acid based upon this outlier. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

- Sample AOSW02 (F51154-2) was used for the aqueous MS/MSD for PAH SIM analysis on 07/03/07. All criteria were met. No qualifiers were applied. Samples AOSW01 (F51154-1), AOSW02 (F51154-2), TMSW01 (F51154-3), 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used for the aqueous MS/MSD for PAH SIM analysis on 07/03/07. All criteria were met. No qualifiers were applied. Sample LFSW01 (F51154-17) applies to this MS/MSD.

- Sample F51296-22 was used for the MS/MSD for the solid PAH SIM analysis on 07/28/07. The spiked sample was not a RFAAP site sample; therefore, it was not evaluated. Samples AOSD01 (F51154-4) and AOSD02 (F51154-5) apply to this MS/MSD.

- Sample 41SD09 (F51154-10) was used for the solid MS/MSD for PAH SIM analysis on 07/31/07. Benzo(g,h,i)perylene (53%), indeno(1,2,3-cd)pyrene (56%), benzo(b)fluoranthene (67%, 65%), benzo(k)fluoranthene (60%), chrysene (57%), benzo(a)pyrene (68%), and benzo(a)anthracene (61%) were below laboratory; however, within DoD QSM accuracy criteria. All other target compounds were within criteria. The associated solid LCS was within criteria. Benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, benzo(a)pyrene, and benzo(a)anthracene were detected for the spiked sample and qualified "L" based upon the low recoveries. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

X-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair AOSW01 (F51154-1) and TMSW01 (F51154-3) was collected for TCL SVOCs and PAHs. All detected TCL SVOCs and PAHs found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other TCL SVOC and PAH target compounds were non-detect. Phenanthrene (58.5%) was above criteria due to low concentration levels detected below the MRL. Phenanthrene was qualified estimated "J" for the original and duplicate pair samples based upon this outlier. For all other compounds, all criteria were met.

Table 3 Field Precision Hits Analysis Summary for TCL SVOCs and PAHs for Duplicate Pair AOSW01 (F51154-1) and TMSW01 (F51154-3)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
Acenaphthene	0.91J	0.75J	19.3
Phenanthrene	0.95J	0.52J	58.5
Fluorene	1.7	1.3	26.7
1-Methylnaphthalene	4.8	3.4	34.2

J = Estimated value <MRL and >MDL.

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for TCL SVOCs and PAHs. All TCL SVOC and PAH target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for TCL SVOCs and PAHs. All detected TCL SVOCs and PAHs found in the sample and its duplicate pair and associated %RPD are noted in **Table 4**. All other TCL SVOC and PAH target compounds were non-detect. All criteria were met. No qualifiers were applied.

Table 4 Field Precision Hits Analysis Summary for TCL SVOCs and PAHs for Duplicate Pair LFSD01 (F51154-15) and TMSD01 (F51154-16)

Compound	Original Sample (µg/kg)	Duplicate Pair (µg/kg)	%RPD
Benzo(g,h,i)perylene	92U	20.8J	NA
Indeno(1,2,3-cd)pyrene	92U	20.2J	NA
Benzo(b)fluoranthene	45.6J	37.5J	19.5
Benzo(k)fluoranthene	31.2J	26.9J	14.8
Chrysene	43.0J	32.8J	26.9
Benzo(a)pyrene	31.9J	27.9J	13.4
Benzo(a)anthracene	29.0J	26.2J	10.1

J = Estimated value <MRL and >MDL.
U = Non-detect as <MRL.
NA = Not Applicable

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. Percent difference (%D) between the calculated and reported values must be ≤10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: AOSW02MS (F51154-2MS), bis(2-ethylhexyl)phthalate

Conc. (µg/L) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_o)*(V_i)}

where:

	$Conc_{sample}$	=	Sample concentration in µg/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (µL).
	DF	=	Dilution Factor

Conc. µg/L = (381474 * 40 * 1000 * 1) / (413841 * 0.892 * 480 * 1) = 86.1 ng/mL
= 86.1 µg/L

Reported Value = 86.2 µg/L
% Difference = 0.1%
Values were within 10% difference.

Sample: AOSW01 (F51154-1), fluorene

Conc. (µg/L) = {(Ax)*(Is)*(Vt)*(DF)}/{(Ais)*(RRF)*(V_o)*(V_i)}

where:	$Conc_{sample}$	=	Sample concentration in µg/L
	A_x	=	Area of characteristic ion for compound being measured.
	I_s	=	Amount of internal standard injected (ng).
	V_t	=	Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 µL.
	A_{is}	=	Area of characteristic ion for the internal standard.
	RRF_A	=	Average relative response factor for compound being measured
	V_o	=	Volume of water extracted (mL).
	V_i	=	Volume of extract injected (µL).
	DF	=	Dilution Factor

Conc. µg/L = (71366 * 4 * 1000 * 1) / (128124 * 1.333 * 980 * 1) = 1.7 ng/mL
= 1.7 µg/L

Reported Value = 1.7 µg/L
% Difference = 0.0%
Values were within 10% difference.

Sample: 49SS02 (F51154-23), di-n-butyl phthalate

Conc. µg/kg = (Ax * Is * Vt * DF) / (Ais * RRF * Vi * Ws * D)

where:	Conc.	= Sample concentration in µg/kg
	Ax	= Area of characteristic ion for compound being measured.
	Is	= Amount of internal standard injected (ng).
	Vt	= Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 uL.
	Ais	= Area of characteristic ion for the internal standard.
	RRF	= Average relative response factor for compound being measured (from ICAL)
	Vi	= Volume of extract injected (uL).
	W(s)	= Weight of sample extracted or diluted in grams.
	D	= Percent dry weight (100 - % moisture in sample)/100
	DF	= Dilution factor

Conc. µg/kg = (47730 * 40 * 1000 * 1) / (452232 * 1.278 * 1 * 30.0 * 0.8960) = 123 µg/kg
Reported Value = 123 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: 49SS02 (F51154-23), chrysene

Conc. µg/kg = (Ax * Is * Vt * DF) / (Ais * RRF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area of characteristic ion for compound being measured.
Is = Amount of internal standard injected (ng).
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10,000 uL.
Ais = Area of characteristic ion for the internal standard.
RRF = Average relative response factor for compound being measured (from ICAL)
Vi = Volume of extract injected (uL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100
DF = Dilution factor

Conc. µg/kg = (3895 * 4.0 * 1000 * 4) / (81063 * 1.670 * 1 * 30.0 * 0.8960) = 17.1 µg/kg
Reported Value = 17.1 µg/kg
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: U003663.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW01		
Lab Sample ID:	F51154-1	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003663.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND R	26	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.1	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.1	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	26	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.1	1.0	ug/l	
	3&4-Methylphenol	ND	5.1	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	26	10	ug/l	
87-86-5	Pentachlorophenol	ND	26	10	ug/l	
108-95-2	Phenol	ND	5.1	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.1	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l	
86-74-8	Carbazole	ND	5.1	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.1	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.1	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW01		
Lab Sample ID:	F51154-1	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.1	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.1	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.1	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.1	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.1	1.9	ug/l	
78-59-1	Isophorone	ND	5.1	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	41%		14-62%
4165-62-2	Phenol-d5	28%		10-40%
118-79-6	2,4,6-Tribromophenol	84%		33-118%
4165-60-0	Nitrobenzene-d5	69%		42-108%
321-60-8	2-Fluorobiphenyl	73%		40-106%
1718-51-0	Terphenyl-d14	81%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035898.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW01		
Lab Sample ID:	F51154-1	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035898.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	0.91 J	1.0	0.51	ug/l	J
208-96-8	Acenaphthylene	ND	1.0	0.51	ug/l	
120-12-7	Anthracene	ND	1.0	0.51	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.051	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.051	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.051	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.26	ug/l	
86-73-7	Fluorene	1.7	1.0	0.26	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.051	ug/l	
90-12-0	1-Methylnaphthalene	4.8	1.0	0.26	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-20-3	Naphthalene	ND	1.0	0.26	ug/l	
85-01-8	Phenanthrene	0.95 J	1.0	0.51	ug/l	J
129-00-0	Pyrene	ND	1.0	0.26	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003664.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW02		
Lab Sample ID:	F51154-2	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003664.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	990 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND R	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.1	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.1	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.1	1.0	ug/l	
	3&4-Methylphenol	ND	5.1	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.1	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.1	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l	
86-74-8	Carbazole	ND	5.1	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.1	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.1	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

From I Orig

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW02		
Lab Sample ID:	F51154-2	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.1	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.1	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.1	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.1	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.1	1.9	ug/l	
78-59-1	Isophorone	ND	5.1	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	42%		14-62%
4165-62-2	Phenol-d5	30%		10-40%
118-79-6	2,4,6-Tribromophenol	73%		33-118%
4165-60-0	Nitrobenzene-d5	71%		42-108%
321-60-8	2-Fluorobiphenyl	71%		40-106%
1718-51-0	Terphenyl-d14	72%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035899.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSW02		
Lab Sample ID:	F51154-2	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035899.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	940 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.53	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.53	ug/l	
120-12-7	Anthracene	ND	1.1	0.53	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.21	0.053	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.21	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.21	0.053	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.21	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.21	0.11	ug/l	
218-01-9	Chrysene	ND	0.21	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.21	0.053	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.27	ug/l	
86-73-7	Fluorene	ND	1.1	0.27	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.21	0.053	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.27	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.27	ug/l	
91-20-3	Naphthalene	ND	1.1	0.27	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.53	ug/l	
129-00-0	Pyrene	ND	1.1	0.27	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003667.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-3	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003667.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND R	26	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.1	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.1	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.1	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.1	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	26	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.1	1.0	ug/l	
	3&4-Methylphenol	ND	5.1	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.1	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	26	10	ug/l	
87-86-5	Pentachlorophenol	ND	26	10	ug/l	
108-95-2	Phenol	ND	5.1	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.1	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.1	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.1	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.1	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.1	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.1	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.1	2.0	ug/l	
86-74-8	Carbazole	ND	5.1	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.1	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.1	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.1	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.1	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.1	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.1	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.1	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.1	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.1	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.1	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-3	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.1	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.1	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.1	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.1	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.1	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.1	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.1	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.1	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.1	1.9	ug/l	
78-59-1	Isophorone	ND	5.1	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.1	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.1	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.1	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.1	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	44%		14-62%
4165-62-2	Phenol-d5	31%		10-40%
118-79-6	2,4,6-Tribromophenol	81%		33-118%
4165-60-0	Nitrobenzene-d5	74%		42-108%
321-60-8	2-Fluorobiphenyl	75%		40-106%
1718-51-0	Terphenyl-d14	77%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035902.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-3	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035902.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	980 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	0.75 J	1.0	0.51	ug/l	J
208-96-8	Acenaphthylene	ND	1.0	0.51	ug/l	
120-12-7	Anthracene	ND	1.0	0.51	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.051	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.051	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.051	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.26	ug/l	
86-73-7	Fluorene	1.3	1.0	0.26	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.051	ug/l	
90-12-0	1-Methylnaphthalene	3.4	1.0	0.26	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.26	ug/l	
91-20-3	Naphthalene	ND	1.0	0.26	ug/l	
85-01-8	Phenanthrene	0.52 J	1.0	0.51	ug/l	J
129-00-0	Pyrene	ND	1.0	0.26	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09439.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD01		
Lab Sample ID:	F51154-4	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	66.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09439.D	1	07/26/07	NJ	07/25/07	OP21602	SR446
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1300	500	ug/kg	
95-57-8	2-Chlorophenol	ND	250	50	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	250	50	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	250	50	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	250	50	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1300	500	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	500	100	ug/kg	
95-48-7	2-Methylphenol	ND	250	50	ug/kg	
	3&4-Methylphenol	ND	250	50	ug/kg	
88-75-5	2-Nitrophenol	ND	250	50	ug/kg	
100-02-7	4-Nitrophenol	ND	1300	500	ug/kg	
87-86-5	Pentachlorophenol	ND	1300	500	ug/kg	
108-95-2	Phenol	ND	250	50	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	250	50	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	250	50	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	250	50	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	500	130	ug/kg	
100-51-6	Benzyl Alcohol	ND	250	50	ug/kg	
91-58-7	2-Chloronaphthalene	ND	250	50	ug/kg	
106-47-8	4-Chloroaniline	ND	500	200	ug/kg	
86-74-8	Carbazole	ND	250	50	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	250	50	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	250	100	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	250	50	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	250	50	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	250	50	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	250	50	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	250	50	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	100	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	100	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	500	250	ug/kg	
132-64-9	Dibenzofuran	ND	250	50	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD01		
Lab Sample ID:	F51154-4	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	66.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	500	130	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	500	250	ug/kg	
84-66-2	Diethyl phthalate	ND	500	130	ug/kg	
131-11-3	Dimethyl phthalate	ND	500	130	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	500	250	ug/kg	
118-74-1	Hexachlorobenzene	ND	250	50	ug/kg	
87-68-3	Hexachlorobutadiene	ND	250	100	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	250	100	ug/kg	
67-72-1	Hexachloroethane	ND	250	100	ug/kg	
78-59-1	Isophorone	ND	250	50	ug/kg	
88-74-4	2-Nitroaniline	ND	500	130	ug/kg	
99-09-2	3-Nitroaniline	ND	500	130	ug/kg	
100-01-6	4-Nitroaniline	ND	500	180	ug/kg	
98-95-3	Nitrobenzene	ND	250	50	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	250	100	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	250	50	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	250	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	68%		40-102%
4165-62-2	Phenol-d5	75%		41-100%
118-79-6	2,4,6-Tribromophenol	85%		42-108%
4165-60-0	Nitrobenzene-d5	65%		40-105%
321-60-8	2-Fluorobiphenyl	68%		43-107%
1718-51-0	Terphenyl-d14	84%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035879.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD01		
Lab Sample ID:	F51154-4	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	66.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035879.D	4	07/27/07	RB	07/27/07	OP21630	SW1858
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	400	100	ug/kg	
208-96-8	Acenaphthylene	ND	400	100	ug/kg	
120-12-7	Anthracene	ND	400	60	ug/kg	
56-55-3	Benzo(a)anthracene	ND	80	20	ug/kg	
50-32-8	Benzo(a)pyrene	ND	80	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	80	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	80	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	80	20	ug/kg	
218-01-9	Chrysene	ND	80	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	80	20	ug/kg	
206-44-0	Fluoranthene	ND	400	70	ug/kg	
86-73-7	Fluorene	ND	400	60	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	80	20	ug/kg	
90-12-0	1-Methylnaphthalene	ND	400	60	ug/kg	
91-57-6	2-Methylnaphthalene	ND	400	60	ug/kg	
91-20-3	Naphthalene	ND	400	60	ug/kg	
85-01-8	Phenanthrene	ND	400	60	ug/kg	
129-00-0	Pyrene	ND	400	70	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	76%		40-105%
321-60-8	2-Fluorobiphenyl	82%		43-107%
1718-51-0	Terphenyl-d14	78%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD02		
Lab Sample ID:	F51154-5	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09440.D	1	07/26/07	NJ	07/25/07	OP21602	SR446
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1400	560	ug/kg	
95-57-8	2-Chlorophenol	ND	280	56	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	280	56	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	280	56	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	280	56	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1400	560	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	560	110	ug/kg	
95-48-7	2-Methylphenol	ND	280	56	ug/kg	
	3&4-Methylphenol	ND	280	56	ug/kg	
88-75-5	2-Nitrophenol	ND	280	56	ug/kg	
100-02-7	4-Nitrophenol	ND	1400	560	ug/kg	
87-86-5	Pentachlorophenol	ND	1400	560	ug/kg	
108-95-2	Phenol	ND	280	56	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	280	56	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	280	56	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	280	56	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	560	140	ug/kg	
100-51-6	Benzyl Alcohol	ND	280	56	ug/kg	
91-58-7	2-Chloronaphthalene	ND	280	56	ug/kg	
106-47-8	4-Chloroaniline	ND	560	220	ug/kg	
86-74-8	Carbazole	ND	280	56	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	280	56	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	280	110	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	280	56	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	280	56	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	280	56	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	280	56	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	280	56	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	280	110	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	280	110	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	560	280	ug/kg	
132-64-9	Dibenzofuran	ND	280	56	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD02		
Lab Sample ID:	F51154-5	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	560	140	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	560	280	ug/kg	
84-66-2	Diethyl phthalate	ND	560	140	ug/kg	
131-11-3	Dimethyl phthalate	ND	560	140	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	560	280	ug/kg	
118-74-1	Hexachlorobenzene	ND	280	56	ug/kg	
87-68-3	Hexachlorobutadiene	ND	280	110	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	280	110	ug/kg	
67-72-1	Hexachloroethane	ND	280	110	ug/kg	
78-59-1	Isophorone	ND	280	56	ug/kg	
88-74-4	2-Nitroaniline	ND	560	140	ug/kg	
99-09-2	3-Nitroaniline	ND	560	140	ug/kg	
100-01-6	4-Nitroaniline	ND	560	200	ug/kg	
98-95-3	Nitrobenzene	ND	280	56	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	280	110	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	280	56	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	280	56	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	73%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	66%		43-107%
1718-51-0	Terphenyl-d14	72%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035880.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	AOSD02		
Lab Sample ID:	F51154-5	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	59.3
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035880.D	4	07/27/07	RB	07/27/07	OP21630	SW1858
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	450	110	ug/kg	
208-96-8	Acenaphthylene	ND	450	110	ug/kg	
120-12-7	Anthracene	ND	450	67	ug/kg	
56-55-3	Benzo(a)anthracene	ND	90	22	ug/kg	
50-32-8	Benzo(a)pyrene	ND	90	22	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	90	22	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	90	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	90	22	ug/kg	
218-01-9	Chrysene	ND	90	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	90	22	ug/kg	
206-44-0	Fluoranthene	ND	450	78	ug/kg	
86-73-7	Fluorene	ND	450	67	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	90	22	ug/kg	
90-12-0	1-Methylnaphthalene	ND	450	67	ug/kg	
91-57-6	2-Methylnaphthalene	ND	450	67	ug/kg	
91-20-3	Naphthalene	ND	450	67	ug/kg	
85-01-8	Phenanthrene	ND	450	67	ug/kg	
129-00-0	Pyrene	ND	450	78	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	78%		40-105%
321-60-8	2-Fluorobiphenyl	79%		43-107%
1718-51-0	Terphenyl-d14	81%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003668.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003668.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	1030 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND R	24	9.7	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.97	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	1.9	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.97	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	1.9	ug/l	
51-28-5	2,4-Dinitrophenol	ND	24	9.7	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.7	1.9	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.97	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.97	ug/l	
100-02-7	4-Nitrophenol	ND	24	9.7	ug/l	
87-86-5	Pentachlorophenol	ND	24	9.7	ug/l	
108-95-2	Phenol	ND	4.9	1.9	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.97	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.97	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	1.9	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.97	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	1.9	ug/l	
86-74-8	Carbazole	ND	4.9	0.97	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.97	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.97	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.97	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.97	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.97	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.7	1.9	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.97	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	1.9	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	1.9	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	1.9	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	1.9	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	1.9	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.8	ug/l	
78-59-1	Isophorone	ND	4.9	0.97	ug/l	
88-74-4	2-Nitroaniline	ND	9.7	1.9	ug/l	
99-09-2	3-Nitroaniline	ND	9.7	1.9	ug/l	
100-01-6	4-Nitroaniline	ND	9.7	1.9	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.97	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.97	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.97	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	41%		14-62%
4165-62-2	Phenol-d5	28%		10-40%
118-79-6	2,4,6-Tribromophenol	78%		33-118%
4165-60-0	Nitrobenzene-d5	73%		42-108%
321-60-8	2-Fluorobiphenyl	75%		40-106%
1718-51-0	Terphenyl-d14	73%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035903.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	1030 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.97	0.49	ug/l	
208-96-8	Acenaphthylene	ND	0.97	0.49	ug/l	
120-12-7	Anthracene	ND	0.97	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.19	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.19	0.097	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.19	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.19	0.097	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.19	0.097	ug/l	
218-01-9	Chrysene	ND	0.19	0.097	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.19	0.049	ug/l	
206-44-0	Fluoranthene	ND	0.97	0.24	ug/l	
86-73-7	Fluorene	ND	0.97	0.24	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.19	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	0.97	0.24	ug/l	
91-57-6	2-Methylnaphthalene	ND	0.97	0.24	ug/l	
91-20-3	Naphthalene	ND	0.97	0.24	ug/l	
85-01-8	Phenanthrene	ND	0.97	0.49	ug/l	
129-00-0	Pyrene	ND	0.97	0.24	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003669.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003669.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND R	28	11	ug/l	
95-57-8	2-Chlorophenol	ND	5.7	1.1	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.7	2.3	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.7	1.1	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.7	2.3	ug/l	
51-28-5	2,4-Dinitrophenol	ND	28	11	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	11	2.3	ug/l	
95-48-7	2-Methylphenol	ND	5.7	1.1	ug/l	
	3&4-Methylphenol	ND	5.7	1.5	ug/l	
88-75-5	2-Nitrophenol	ND	5.7	1.1	ug/l	
100-02-7	4-Nitrophenol	ND	28	11	ug/l	
87-86-5	Pentachlorophenol	ND	28	11	ug/l	
108-95-2	Phenol	ND	5.7	2.3	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.7	1.1	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.7	1.1	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.7	1.4	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.7	2.3	ug/l	
100-51-6	Benzyl Alcohol	ND	5.7	1.1	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.7	1.5	ug/l	
106-47-8	4-Chloroaniline	ND	5.7	2.3	ug/l	
86-74-8	Carbazole	ND	5.7	1.1	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.7	1.1	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.7	1.1	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.7	1.1	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.7	1.5	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.7	1.7	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.7	1.8	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.7	1.7	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.7	1.1	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.7	1.1	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	11	2.3	ug/l	
132-64-9	Dibenzofuran	ND	5.7	1.1	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.7	2.3	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.7	2.3	ug/l	
84-66-2	Diethyl phthalate	ND	5.7	2.3	ug/l	
131-11-3	Dimethyl phthalate	ND	5.7	2.3	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.7	2.3	ug/l	
118-74-1	Hexachlorobenzene	ND	5.7	1.4	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.7	1.9	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.7	1.7	ug/l	
67-72-1	Hexachloroethane	ND	5.7	2.2	ug/l	
78-59-1	Isophorone	ND	5.7	1.1	ug/l	
88-74-4	2-Nitroaniline	ND	11	2.3	ug/l	
99-09-2	3-Nitroaniline	ND	11	2.3	ug/l	
100-01-6	4-Nitroaniline	ND	11	2.3	ug/l	
98-95-3	Nitrobenzene	ND	5.7	1.1	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.7	1.1	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.7	1.1	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.7	1.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	44%		14-62%
4165-62-2	Phenol-d5	32%		10-40%
118-79-6	2,4,6-Tribromophenol	76%		33-118%
4165-60-0	Nitrobenzene-d5	69%		42-108%
321-60-8	2-Fluorobiphenyl	70%		40-106%
1718-51-0	Terphenyl-d14	79%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035904.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035904.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.57	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.57	ug/l	
120-12-7	Anthracene	ND	1.1	0.57	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.23	0.057	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.23	0.11	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.23	0.057	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.23	0.11	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.23	0.11	ug/l	
218-01-9	Chrysene	ND	0.23	0.11	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.23	0.057	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.28	ug/l	
86-73-7	Fluorene	ND	1.1	0.28	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.23	0.057	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.1	0.28	ug/l	
91-20-3	Naphthalene	ND	1.1	0.28	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.57	ug/l	
129-00-0	Pyrene	ND	1.1	0.28	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003670.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003670.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND R	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	42%		14-62%
4165-62-2	Phenol-d5	28%		10-40%
118-79-6	2,4,6-Tribromophenol	80%		33-118%
4165-60-0	Nitrobenzene-d5	74%		42-108%
321-60-8	2-Fluorobiphenyl	75%		40-106%
1718-51-0	Terphenyl-d14	80%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035905.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035905.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09468.D

Form I COPY

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09468.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	2300	900	ug/kg	
95-57-8	2-Chlorophenol	ND	450	90	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	450	90	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	450	90	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	450	90	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	2300	900	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	900	180	ug/kg	
95-48-7	2-Methylphenol	ND	450	90	ug/kg	
	3&4-Methylphenol	ND	450	90	ug/kg	
88-75-5	2-Nitrophenol	ND	450	90	ug/kg	
100-02-7	4-Nitrophenol	ND	2300	900	ug/kg	
87-86-5	Pentachlorophenol	ND	2300	900	ug/kg	
108-95-2	Phenol	ND	450	90	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	450	90	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	450	90	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	450	90	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	900	230	ug/kg	
100-51-6	Benzyl Alcohol	ND	450	90	ug/kg	
91-58-7	2-Chloronaphthalene	ND	450	90	ug/kg	
106-47-8	4-Chloroaniline	ND	900	360	ug/kg	
86-74-8	Carbazole	ND	450	90	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	450	90	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	450	180	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	450	90	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	450	90	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	450	90	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	450	90	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	450	90	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	450	180	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	450	180	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	900	450	ug/kg	
132-64-9	Dibenzofuran	ND	450	90	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	900	230	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	900	450	ug/kg	
84-66-2	Diethyl phthalate	ND	900	230	ug/kg	
131-11-3	Dimethyl phthalate	ND	900	230	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	900	450	ug/kg	
118-74-1	Hexachlorobenzene	ND	450	90	ug/kg	
87-68-3	Hexachlorobutadiene	ND	450	180	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	450	180	ug/kg	
67-72-1	Hexachloroethane	ND	450	180	ug/kg	
78-59-1	Isophorone	ND	450	90	ug/kg	
88-74-4	2-Nitroaniline	ND	900	230	ug/kg	
99-09-2	3-Nitroaniline	ND	900	230	ug/kg	
100-01-6	4-Nitroaniline	ND	900	320	ug/kg	
98-95-3	Nitrobenzene	ND	450	90	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	450	180	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	450	90	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	450	90	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	47%		40-102%
4165-62-2	Phenol-d5	53%		41-100%
118-79-6	2,4,6-Tribromophenol	55%		42-108%
4165-60-0	Nitrobenzene-d5	44%		40-105%
321-60-8	2-Fluorobiphenyl	49%		43-107%
1718-51-0	Terphenyl-d14	57%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035942.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035942.D	4	07/31/07	RB	07/27/07	OP21636	SW1861
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	720	180	ug/kg	
208-96-8	Acenaphthylene	ND	720	180	ug/kg	
120-12-7	Anthracene	ND	720	110	ug/kg	
56-55-3	Benzo(a)anthracene	50.9 J	140	36	ug/kg	J
50-32-8	Benzo(a)pyrene	72.0 J	140	36	ug/kg	J
205-99-2	Benzo(b)fluoranthene	120 J	140	36	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	62.2 J	140	36	ug/kg	J
207-08-9	Benzo(k)fluoranthene	66.9 J	140	36	ug/kg	J
218-01-9	Chrysene	98.2 J	140	36	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	140	36	ug/kg	
206-44-0	Fluoranthene	174 J	720	130	ug/kg	J
86-73-7	Fluorene	ND	720	110	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	67.1 J	140	36	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	720	110	ug/kg	
91-57-6	2-Methylnaphthalene	ND	720	110	ug/kg	
91-20-3	Naphthalene	ND	720	110	ug/kg	
85-01-8	Phenanthrene	ND	720	110	ug/kg	
129-00-0	Pyrene	135 J	720	130	ug/kg	J

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09469.D

Form I OR1

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09469.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1000	400	ug/kg	
95-57-8	2-Chlorophenol	ND	200	40	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	200	40	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	200	40	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	200	40	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	400	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	400	81	ug/kg	
95-48-7	2-Methylphenol	ND	200	40	ug/kg	
	3&4-Methylphenol	ND	200	40	ug/kg	
88-75-5	2-Nitrophenol	ND	200	40	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	400	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	400	ug/kg	
108-95-2	Phenol	ND	200	40	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	200	40	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	200	40	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	200	40	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	400	100	ug/kg	
100-51-6	Benzyl Alcohol	ND	200	40	ug/kg	
91-58-7	2-Chloronaphthalene	ND	200	40	ug/kg	
106-47-8	4-Chloroaniline	ND	400	160	ug/kg	
86-74-8	Carbazole	ND	200	40	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	200	40	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	200	81	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	200	40	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	200	40	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	200	40	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	200	40	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	200	40	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	81	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	81	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	400	200	ug/kg	
132-64-9	Dibenzofuran	ND	200	40	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	400	100	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	400	200	ug/kg	
84-66-2	Diethyl phthalate	ND	400	100	ug/kg	
131-11-3	Dimethyl phthalate	ND	400	100	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	400	200	ug/kg	
118-74-1	Hexachlorobenzene	ND	200	40	ug/kg	
87-68-3	Hexachlorobutadiene	ND	200	81	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	200	81	ug/kg	
67-72-1	Hexachloroethane	ND	200	81	ug/kg	
78-59-1	Isophorone	ND	200	40	ug/kg	
88-74-4	2-Nitroaniline	ND	400	100	ug/kg	
99-09-2	3-Nitroaniline	ND	400	100	ug/kg	
100-01-6	4-Nitroaniline	ND	400	140	ug/kg	
98-95-3	Nitrobenzene	ND	200	40	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	200	81	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	200	40	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	200	40	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	66%		40-102%
4165-62-2	Phenol-d5	73%		41-100%
118-79-6	2,4,6-Tribromophenol	72%		42-108%
4165-60-0	Nitrobenzene-d5	60%		40-105%
321-60-8	2-Fluorobiphenyl	62%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035943.D

from E Corp

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035943.D	4	07/31/07	RB	07/27/07	OP21636	SW1861
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	320	81	ug/kg	
208-96-8	Acenaphthylene	ND	320	81	ug/kg	
120-12-7	Anthracene	ND	320	49	ug/kg	
56-55-3	Benzo(a)anthracene	17.4 L	65	16	ug/kg	J
50-32-8	Benzo(a)pyrene	22.9 L	65	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	40.2 L	65	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	20.0 L	65	16	ug/kg	J
207-08-9	Benzo(k)fluoranthene	24.2 L	65	16	ug/kg	J
218-01-9	Chrysene	34.0 L	65	16	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	65	16	ug/kg	
206-44-0	Fluoranthene	ND	320	57	ug/kg	
86-73-7	Fluorene	ND	320	49	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	21.0 L	65	16	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	320	49	ug/kg	
91-57-6	2-Methylnaphthalene	ND	320	49	ug/kg	
91-20-3	Naphthalene	ND	320	49	ug/kg	
85-01-8	Phenanthrene	ND	320	49	ug/kg	
129-00-0	Pyrene	ND	320	57	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09470.D

Run 1 only

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09470.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1000	420	ug/kg	
95-57-8	2-Chlorophenol	ND	210	42	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	210	42	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	210	42	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	210	42	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1000	420	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	420	83	ug/kg	
95-48-7	2-Methylphenol	ND	210	42	ug/kg	
	3&4-Methylphenol	ND	210	42	ug/kg	
88-75-5	2-Nitrophenol	ND	210	42	ug/kg	
100-02-7	4-Nitrophenol	ND	1000	420	ug/kg	
87-86-5	Pentachlorophenol	ND	1000	420	ug/kg	
108-95-2	Phenol	ND	210	42	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	210	42	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	210	42	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	210	42	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	420	100	ug/kg	
100-51-6	Benzyl Alcohol	ND	210	42	ug/kg	
91-58-7	2-Chloronaphthalene	ND	210	42	ug/kg	
106-47-8	4-Chloroaniline	ND	420	170	ug/kg	
86-74-8	Carbazole	ND	210	42	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	210	42	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	210	83	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	210	42	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	210	42	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	210	42	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	210	42	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	210	42	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	83	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	83	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	420	210	ug/kg	
132-64-9	Dibenzofuran	ND	210	42	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	420	100	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	420	210	ug/kg	
84-66-2	Diethyl phthalate	ND	420	100	ug/kg	
131-11-3	Dimethyl phthalate	ND	420	100	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	420	210	ug/kg	
118-74-1	Hexachlorobenzene	ND	210	42	ug/kg	
87-68-3	Hexachlorobutadiene	ND	210	83	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	210	83	ug/kg	
67-72-1	Hexachloroethane	ND	210	83	ug/kg	
78-59-1	Isophorone	ND	210	42	ug/kg	
88-74-4	2-Nitroaniline	ND	420	100	ug/kg	
99-09-2	3-Nitroaniline	ND	420	100	ug/kg	
100-01-6	4-Nitroaniline	ND	420	150	ug/kg	
98-95-3	Nitrobenzene	ND	210	42	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	210	83	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	210	42	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	210	42	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	68%		40-102%
4165-62-2	Phenol-d5	77%		41-100%
118-79-6	2,4,6-Tribromophenol	80%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	69%		43-107%
1718-51-0	Terphenyl-d14	81%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035973.D

Form I COM

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035973.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	330	83	ug/kg	
208-96-8	Acenaphthylene	ND	330	83	ug/kg	
120-12-7	Anthracene	ND	330	50	ug/kg	
56-55-3	Benzo(a)anthracene	46.3 J	66	17	ug/kg	J
50-32-8	Benzo(a)pyrene	67.3	66	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	113	66	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	53.9 J	66	17	ug/kg	J
207-08-9	Benzo(k)fluoranthene	64.7 J	66	17	ug/kg	J
218-01-9	Chrysene	90.1	66	17	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	66	17	ug/kg	
206-44-0	Fluoranthene	154 J	330	58	ug/kg	J
86-73-7	Fluorene	ND	330	50	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	57.2 J	66	17	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	330	50	ug/kg	
91-57-6	2-Methylnaphthalene	ND	330	50	ug/kg	
91-20-3	Naphthalene	ND	330	50	ug/kg	
85-01-8	Phenanthrene	60.2 J	330	50	ug/kg	J
129-00-0	Pyrene	141 J	330	58	ug/kg	J

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09471.D

Run I Only

Accutest Laboratories

Report of Analysis

3.1.5 3

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09471.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1400	570	ug/kg	
95-57-8	2-Chlorophenol	ND	290	57	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	290	57	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	290	57	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	290	57	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1400	570	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	570	110	ug/kg	
95-48-7	2-Methylphenol	ND	290	57	ug/kg	
	3&4-Methylphenol	ND	290	57	ug/kg	
88-75-5	2-Nitrophenol	ND	290	57	ug/kg	
100-02-7	4-Nitrophenol	ND	1400	570	ug/kg	
87-86-5	Pentachlorophenol	ND	1400	570	ug/kg	
108-95-2	Phenol	ND	290	57	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	290	57	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	290	57	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	290	57	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	570	140	ug/kg	
100-51-6	Benzyl Alcohol	ND	290	57	ug/kg	
91-58-7	2-Chloronaphthalene	ND	290	57	ug/kg	
106-47-8	4-Chloroaniline	ND	570	230	ug/kg	
86-74-8	Carbazole	ND	290	57	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	290	57	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	290	110	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	290	57	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	290	57	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	290	57	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	290	57	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	290	57	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	290	110	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	290	110	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	570	290	ug/kg	
132-64-9	Dibenzofuran	ND	290	57	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

For I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	570	140	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	570	290	ug/kg	
84-66-2	Diethyl phthalate	ND	570	140	ug/kg	
131-11-3	Dimethyl phthalate	ND	570	140	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	570	290	ug/kg	
118-74-1	Hexachlorobenzene	ND	290	57	ug/kg	
87-68-3	Hexachlorobutadiene	ND	290	110	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	290	110	ug/kg	
67-72-1	Hexachloroethane	ND	290	110	ug/kg	
78-59-1	Isophorone	ND	290	57	ug/kg	
88-74-4	2-Nitroaniline	ND	570	140	ug/kg	
99-09-2	3-Nitroaniline	ND	570	140	ug/kg	
100-01-6	4-Nitroaniline	ND	570	200	ug/kg	
98-95-3	Nitrobenzene	ND	290	57	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	290	110	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	290	57	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	290	57	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	66%		40-102%
4165-62-2	Phenol-d5	74%		41-100%
118-79-6	2,4,6-Tribromophenol	76%		42-108%
4165-60-0	Nitrobenzene-d5	61%		40-105%
321-60-8	2-Fluorobiphenyl	66%		43-107%
1718-51-0	Terphenyl-d14	76%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035974.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035974.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	460	110	ug/kg	
208-96-8	Acenaphthylene	ND	460	110	ug/kg	
120-12-7	Anthracene	ND	460	69	ug/kg	
56-55-3	Benzo(a)anthracene	29.0 J	92	23	ug/kg	J
50-32-8	Benzo(a)pyrene	31.9 J	92	23	ug/kg	J
205-99-2	Benzo(b)fluoranthene	45.6 J	92	23	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	92	23	ug/kg	
207-08-9	Benzo(k)fluoranthene	31.2 J	92	23	ug/kg	J
218-01-9	Chrysene	43.0 J	92	23	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	92	23	ug/kg	
206-44-0	Fluoranthene	ND	460	80	ug/kg	
86-73-7	Fluorene	ND	460	69	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	92	23	ug/kg	
90-12-0	1-Methylnaphthalene	ND	460	69	ug/kg	
91-57-6	2-Methylnaphthalene	ND	460	69	ug/kg	
91-20-3	Naphthalene	ND	460	69	ug/kg	
85-01-8	Phenanthrene	ND	460	69	ug/kg	
129-00-0	Pyrene	ND	460	80	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09472.D

Form I Cor

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09472.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	1200	500	ug/kg	
95-57-8	2-Chlorophenol	ND	250	50	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	250	50	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	250	50	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	250	50	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	1200	500	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	500	100	ug/kg	
95-48-7	2-Methylphenol	ND	250	50	ug/kg	
	3&4-Methylphenol	ND	250	50	ug/kg	
88-75-5	2-Nitrophenol	ND	250	50	ug/kg	
100-02-7	4-Nitrophenol	ND	1200	500	ug/kg	
87-86-5	Pentachlorophenol	ND	1200	500	ug/kg	
108-95-2	Phenol	ND	250	50	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	250	50	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	250	50	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	250	50	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	500	120	ug/kg	
100-51-6	Benzyl Alcohol	ND	250	50	ug/kg	
91-58-7	2-Chloronaphthalene	ND	250	50	ug/kg	
106-47-8	4-Chloroaniline	ND	500	200	ug/kg	
86-74-8	Carbazole	ND	250	50	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	250	50	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	250	100	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	250	50	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	250	50	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	250	50	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	250	50	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	250	50	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	250	100	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	250	100	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	500	250	ug/kg	
132-64-9	Dibenzofuran	ND	250	50	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OR1

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	500	120	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	500	250	ug/kg	
84-66-2	Diethyl phthalate	ND	500	120	ug/kg	
131-11-3	Dimethyl phthalate	ND	500	120	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	500	250	ug/kg	
118-74-1	Hexachlorobenzene	ND	250	50	ug/kg	
87-68-3	Hexachlorobutadiene	ND	250	100	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	250	100	ug/kg	
67-72-1	Hexachloroethane	ND	250	100	ug/kg	
78-59-1	Isophorone	ND	250	50	ug/kg	
88-74-4	2-Nitroaniline	ND	500	120	ug/kg	
99-09-2	3-Nitroaniline	ND	500	120	ug/kg	
100-01-6	4-Nitroaniline	ND	500	170	ug/kg	
98-95-3	Nitrobenzene	ND	250	50	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	250	100	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	250	50	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	250	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	47%		40-102%
4165-62-2	Phenol-d5	51%		41-100%
118-79-6	2,4,6-Tribromophenol	54%		42-108%
4165-60-0	Nitrobenzene-d5	44%		40-105%
321-60-8	2-Fluorobiphenyl	46%		43-107%
1718-51-0	Terphenyl-d14	54%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035975.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035975.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	400	100	ug/kg	
208-96-8	Acenaphthylene	ND	400	100	ug/kg	
120-12-7	Anthracene	ND	400	60	ug/kg	
56-55-3	Benzo(a)anthracene	26.2 J	80	20	ug/kg	J
50-32-8	Benzo(a)pyrene	27.9 J	80	20	ug/kg	J
205-99-2	Benzo(b)fluoranthene	37.5 J	80	20	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	20.8 J	80	20	ug/kg	J
207-08-9	Benzo(k)fluoranthene	26.9 J	80	20	ug/kg	J
218-01-9	Chrysene	32.8 J	80	20	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	80	20	ug/kg	
206-44-0	Fluoranthene	ND	400	70	ug/kg	
86-73-7	Fluorene	ND	400	60	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	20.2 J	80	20	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	400	60	ug/kg	
91-57-6	2-Methylnaphthalene	ND	400	60	ug/kg	
91-20-3	Naphthalene	ND	400	60	ug/kg	
85-01-8	Phenanthrene	ND	400	60	ug/kg	
129-00-0	Pyrene	ND	400	70	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: L037535.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L037535.D	1	07/31/07	RB	07/26/07	OP21610	SL1920
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	9.8	ug/l	
95-57-8	2-Chlorophenol	ND	4.9	0.98	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	4.9	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.9	0.98	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.9	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	9.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.8	2.0	ug/l	
95-48-7	2-Methylphenol	ND	4.9	0.98	ug/l	
	3&4-Methylphenol	ND	4.9	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	4.9	0.98	ug/l	
100-02-7	4-Nitrophenol	ND	25	9.8	ug/l	
87-86-5	Pentachlorophenol	ND	25	9.8	ug/l	
108-95-2	Phenol	ND	4.9	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	4.9	0.98	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.9	0.98	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	4.9	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	4.9	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	4.9	0.98	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.9	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	4.9	2.0	ug/l	
86-74-8	Carbazole	ND	4.9	0.98	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.9	0.98	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.9	0.98	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	4.9	0.98	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	4.9	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.9	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.9	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	4.9	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	4.9	0.98	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	4.9	0.98	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	9.8	2.0	ug/l	
132-64-9	Dibenzofuran	ND	4.9	0.98	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Only

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	4.9	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	4.9	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	4.9	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	4.9	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.9	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	4.9	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.9	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.9	1.5	ug/l	
67-72-1	Hexachloroethane	ND	4.9	1.9	ug/l	
78-59-1	Isophorone	ND	4.9	0.98	ug/l	
88-74-4	2-Nitroaniline	ND	9.8	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	9.8	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	9.8	2.0	ug/l	
98-95-3	Nitrobenzene	ND	4.9	0.98	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	4.9	0.98	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.9	0.98	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.9	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	46%		14-62%
4165-62-2	Phenol-d5	32%		10-40%
118-79-6	2,4,6-Tribromophenol	80%		33-118%
4165-60-0	Nitrobenzene-d5	79%		42-108%
321-60-8	2-Fluorobiphenyl	79%		40-106%
1718-51-0	Terphenyl-d14	76%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035923.D

Form I GC/MS

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035923.D	1	07/31/07	RB	07/26/07	OP21611	SW1860
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result		RL	MDL	Units	Q
83-32-9	Acenaphthene	ND		0.98	0.49	ug/l	
208-96-8	Acenaphthylene	ND		0.98	0.49	ug/l	
120-12-7	Anthracene	ND		0.98	0.49	ug/l	
56-55-3	Benzo(a)anthracene	ND		0.20	0.049	ug/l	
50-32-8	Benzo(a)pyrene	ND		0.20	0.098	ug/l	
205-99-2	Benzo(b)fluoranthene	ND		0.20	0.049	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND		0.20	0.098	ug/l	
207-08-9	Benzo(k)fluoranthene	ND		0.20	0.098	ug/l	
218-01-9	Chrysene	ND		0.20	0.098	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND		0.20	0.049	ug/l	
206-44-0	Fluoranthene	ND		0.98	0.25	ug/l	
86-73-7	Fluorene	ND		0.98	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND		0.20	0.049	ug/l	
90-12-0	1-Methylnaphthalene	ND	VL	0.98	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	VL	0.98	0.25	ug/l	
91-20-3	Naphthalene	ND		0.98	0.25	ug/l	
85-01-8	Phenanthrene	ND		0.98	0.49	ug/l	
129-00-0	Pyrene	ND		0.98	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09473.D

For I COA

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09473.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	940	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	940	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	75	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	940	380	ug/kg	
87-86-5	Pentachlorophenol	ND	940	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	94	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	380	150	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	75	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND VL	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND VL	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	75	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	75	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND VL	380	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	94	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	190	ug/kg	
84-66-2	Diethyl phthalate	ND	380	94	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	94	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	75	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND VL	190	75	ug/kg	
67-72-1	Hexachloroethane	ND VL	190	75	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	94	ug/kg	
99-09-2	3-Nitroaniline	ND	380	94	ug/kg	
100-01-6	4-Nitroaniline	ND	380	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	75	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	66%		40-102%
4165-62-2	Phenol-d5	71%		41-100%
118-79-6	2,4,6-Tribromophenol	66%		42-108%
4165-60-0	Nitrobenzene-d5	59%		40-105%
321-60-8	2-Fluorobiphenyl	60%		43-107%
1718-51-0	Terphenyl-d14	64%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035976.D

Form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035976.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	75	ug/kg	
208-96-8	Acenaphthylene	ND	300	75	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	16.2 J	60	15	ug/kg	J
50-32-8	Benzo(a)pyrene	18.0 J	60	15	ug/kg	J
205-99-2	Benzo(b)fluoranthene	24.7 J	60	15	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	15.1 J	60	15	ug/kg	J
207-08-9	Benzo(k)fluoranthene	15.2 J	60	15	ug/kg	J
218-01-9	Chrysene	21.1 J	60	15	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	60	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	15.1 J	60	15	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	300	45	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	45	ug/kg	
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	ND	300	45	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09476.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09476.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	380	150	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	76	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	76	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	76	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	190	ug/kg	
84-66-2	Diethyl phthalate	ND	380	95	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	76	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	76	ug/kg	
67-72-1	Hexachloroethane	ND	190	76	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	95	ug/kg	
99-09-2	3-Nitroaniline	ND	380	95	ug/kg	
100-01-6	4-Nitroaniline	ND	380	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	76	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	67%		40-102%
4165-62-2	Phenol-d5	72%		41-100%
118-79-6	2,4,6-Tribromophenol	70%		42-108%
4165-60-0	Nitrobenzene-d5	64%		40-105%
321-60-8	2-Fluorobiphenyl	63%		43-107%
1718-51-0	Terphenyl-d14	82%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035977.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035977.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	76	ug/kg	
208-96-8	Acenaphthylene	ND	310	76	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	53	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09477.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	370	150	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	74	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	74	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	74	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	123 J	370	93	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	370	190	ug/kg	
84-66-2	Diethyl phthalate	ND	370	93	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	74	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	74	ug/kg	
67-72-1	Hexachloroethane	ND	190	74	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	93	ug/kg	
99-09-2	3-Nitroaniline	ND	370	93	ug/kg	
100-01-6	4-Nitroaniline	ND	370	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	74	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	69%		40-102%
4165-62-2	Phenol-d5	79%		41-100%
118-79-6	2,4,6-Tribromophenol	79%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	74%		43-107%
1718-51-0	Terphenyl-d14	77%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035978.D

Form I Cpy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035978.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	74	ug/kg	
208-96-8	Acenaphthylene	ND	300	74	ug/kg	
120-12-7	Anthracene	ND	300	45	ug/kg	
56-55-3	Benzo(a)anthracene	ND	60	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	60	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	60	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	60	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	60	15	ug/kg	
218-01-9	Chrysene	17.1 J	60	15	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	60	15	ug/kg	
206-44-0	Fluoranthene	ND	300	52	ug/kg	
86-73-7	Fluorene	ND	300	45	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	60	15	ug/kg	
90-12-0	1-Methylnaphthalene	65.4 J	300	45	ug/kg	J
91-57-6	2-Methylnaphthalene	117 J	300	45	ug/kg	J
91-20-3	Naphthalene	ND	300	45	ug/kg	
85-01-8	Phenanthrene	75.1 J	300	45	ug/kg	J
129-00-0	Pyrene	ND	300	52	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09478.D U003771.D

Run I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R09478.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2 [b]	U003771.D	1	08/06/07	NJ	08/03/07	OP21735	SU184

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2	30.0 g	1.0 ml

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	910	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	910	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	72	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	910	360	ug/kg	
87-86-5	Pentachlorophenol	ND	910	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	91	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	360	140	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	72	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	72	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	72	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	180	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	128 J	360	91	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	360	180	ug/kg	
84-66-2	Diethyl phthalate	ND	360	91	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	91	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	72	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	72	ug/kg	
67-72-1	Hexachloroethane	ND	180	72	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	91	ug/kg	
99-09-2	3-Nitroaniline	ND	360	91	ug/kg	
100-01-6	4-Nitroaniline	ND	360	130	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	72	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	45%	53%	40-102%
4165-62-2	Phenol-d5	48%	62%	41-100%
118-79-6	2,4,6-Tribromophenol	41%	59%	42-108%
4165-60-0	Nitrobenzene-d5	50%	56%	40-105%
321-60-8	2-Fluorobiphenyl	49%	60%	43-107%
1718-51-0	Terphenyl-d14	51%	64%	45-119%

(a) All hits confirmed by re-extraction and reanalysis beyond holdtime.
(b) Confirmation run.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035979.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	290	72	ug/kg	
208-96-8	Acenaphthylene	ND	290	72	ug/kg	
120-12-7	Anthracene	ND	290	43	ug/kg	
56-55-3	Benzo(a)anthracene	ND	58	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND	58	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	21.1 J	58	14	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	58	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	58	14	ug/kg	
218-01-9	Chrysene	22.9 J	58	14	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	58	14	ug/kg	
206-44-0	Fluoranthene	ND	290	51	ug/kg	
86-73-7	Fluorene	ND	290	43	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	58	14	ug/kg	
90-12-0	1-Methylnaphthalene	49.5 J	290	43	ug/kg	J
91-57-6	2-Methylnaphthalene	60.7 J	290	43	ug/kg	J
91-20-3	Naphthalene	ND	290	43	ug/kg	
85-01-8	Phenanthrene	60.9 J	290	43	ug/kg	J
129-00-0	Pyrene	ND	290	51	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09479.D

Form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09479.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	380	150	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	76	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	76	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	76	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	190	ug/kg	
84-66-2	Diethyl phthalate	ND	380	95	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	76	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	76	ug/kg	
67-72-1	Hexachloroethane	ND	190	76	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	95	ug/kg	
99-09-2	3-Nitroaniline	ND	380	95	ug/kg	
100-01-6	4-Nitroaniline	ND	380	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	76	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	73%		40-102%
4165-62-2	Phenol-d5	78%		41-100%
118-79-6	2,4,6-Tribromophenol	82%		42-108%
4165-60-0	Nitrobenzene-d5	69%		40-105%
321-60-8	2-Fluorobiphenyl	70%		43-107%
1718-51-0	Terphenyl-d14	83%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035980.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035980.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	76	ug/kg	
208-96-8	Acenaphthylene	ND	300	76	ug/kg	
120-12-7	Anthracene	ND	300	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	46	ug/kg	
91-20-3	Naphthalene	ND	300	46	ug/kg	
85-01-8	Phenanthrene	ND	300	46	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09480.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09480.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	950	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	950	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	950	380	ug/kg	
87-86-5	Pentachlorophenol	ND	950	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	95	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	380	150	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	76	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	76	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	76	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	95	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	190	ug/kg	
84-66-2	Diethyl phthalate	ND	380	95	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	95	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	76	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	76	ug/kg	
67-72-1	Hexachloroethane	ND	190	76	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	95	ug/kg	
99-09-2	3-Nitroaniline	ND	380	95	ug/kg	
100-01-6	4-Nitroaniline	ND	380	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	76	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	64%		40-102%
4165-62-2	Phenol-d5	69%		41-100%
118-79-6	2,4,6-Tribromophenol	66%		42-108%
4165-60-0	Nitrobenzene-d5	59%		40-105%
321-60-8	2-Fluorobiphenyl	60%		43-107%
1718-51-0	Terphenyl-d14	66%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035981.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035981.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	76	ug/kg	
208-96-8	Acenaphthylene	ND	300	76	ug/kg	
120-12-7	Anthracene	ND	300	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	300	53	ug/kg	
86-73-7	Fluorene	ND	300	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	300	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	46	ug/kg	
91-20-3	Naphthalene	ND	300	46	ug/kg	
85-01-8	Phenanthrene	ND	300	46	ug/kg	
129-00-0	Pyrene	ND	300	53	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09481.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09481.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	900	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	900	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	72	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	900	360	ug/kg	
87-86-5	Pentachlorophenol	ND	900	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	90	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	360	140	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	72	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	72	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	72	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	180	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Corr

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	360	90	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	360	180	ug/kg	
84-66-2	Diethyl phthalate	ND	360	90	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	90	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	72	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	72	ug/kg	
67-72-1	Hexachloroethane	ND	180	72	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	90	ug/kg	
99-09-2	3-Nitroaniline	ND	360	90	ug/kg	
100-01-6	4-Nitroaniline	ND	360	130	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	72	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	60%		40-102%
4165-62-2	Phenol-d5	67%		41-100%
118-79-6	2,4,6-Tribromophenol	73%		42-108%
4165-60-0	Nitrobenzene-d5	59%		40-105%
321-60-8	2-Fluorobiphenyl	63%		43-107%
1718-51-0	Terphenyl-d14	75%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035982.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035982.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	290	72	ug/kg	
208-96-8	Acenaphthylene	ND	290	72	ug/kg	
120-12-7	Anthracene	ND	290	43	ug/kg	
56-55-3	Benzo(a)anthracene	38.2 J	58	14	ug/kg	J
50-32-8	Benzo(a)pyrene	35.6 J	58	14	ug/kg	J
205-99-2	Benzo(b)fluoranthene	42.4 J	58	14	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	18.9 J	58	14	ug/kg	J
207-08-9	Benzo(k)fluoranthene	31.1 J	58	14	ug/kg	J
218-01-9	Chrysene	40.1 J	58	14	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	58	14	ug/kg	
206-44-0	Fluoranthene	90.6 J	290	51	ug/kg	J
86-73-7	Fluorene	ND	290	43	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	21.3 J	58	14	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	290	43	ug/kg	
91-57-6	2-Methylnaphthalene	ND	290	43	ug/kg	
91-20-3	Naphthalene	ND	290	43	ug/kg	
85-01-8	Phenanthrene	67.0 J	290	43	ug/kg	J
129-00-0	Pyrene	83.8 J	290	51	ug/kg	J

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09482.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09482.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	890	360	ug/kg	
95-57-8	2-Chlorophenol	ND	180	36	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	36	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	36	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	36	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	890	360	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	360	71	ug/kg	
95-48-7	2-Methylphenol	ND	180	36	ug/kg	
	3&4-Methylphenol	ND	180	36	ug/kg	
88-75-5	2-Nitrophenol	ND	180	36	ug/kg	
100-02-7	4-Nitrophenol	ND	890	360	ug/kg	
87-86-5	Pentachlorophenol	ND	890	360	ug/kg	
108-95-2	Phenol	ND	180	36	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	36	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	36	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	36	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	360	89	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	36	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	36	ug/kg	
106-47-8	4-Chloroaniline	ND	360	140	ug/kg	
86-74-8	Carbazole	ND	180	36	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	36	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	71	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	36	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	36	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	36	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	36	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	36	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	71	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	71	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	360	180	ug/kg	
132-64-9	Dibenzofuran	ND	180	36	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OZ

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	360	89	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	360	180	ug/kg	
84-66-2	Diethyl phthalate	ND	360	89	ug/kg	
131-11-3	Dimethyl phthalate	ND	360	89	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	360	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	36	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	71	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	71	ug/kg	
67-72-1	Hexachloroethane	ND	180	71	ug/kg	
78-59-1	Isophorone	ND	180	36	ug/kg	
88-74-4	2-Nitroaniline	ND	360	89	ug/kg	
99-09-2	3-Nitroaniline	ND	360	89	ug/kg	
100-01-6	4-Nitroaniline	ND	360	120	ug/kg	
98-95-3	Nitrobenzene	ND	180	36	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	71	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	36	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	36	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	71%		40-102%
4165-62-2	Phenol-d5	79%		41-100%
118-79-6	2,4,6-Tribromophenol	77%		42-108%
4165-60-0	Nitrobenzene-d5	66%		40-105%
321-60-8	2-Fluorobiphenyl	65%		43-107%
1718-51-0	Terphenyl-d14	87%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035983.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035983.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	280	71	ug/kg	
208-96-8	Acenaphthylene	ND	280	71	ug/kg	
120-12-7	Anthracene	ND	280	43	ug/kg	
56-55-3	Benzo(a)anthracene	21.0 J	57	14	ug/kg	J
50-32-8	Benzo(a)pyrene	19.6 J	57	14	ug/kg	J
205-99-2	Benzo(b)fluoranthene	22.6 J	57	14	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	57	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	18.0 J	57	14	ug/kg	J
218-01-9	Chrysene	22.7 J	57	14	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	57	14	ug/kg	
206-44-0	Fluoranthene	ND	280	50	ug/kg	
86-73-7	Fluorene	ND	280	43	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	57	14	ug/kg	
90-12-0	1-Methylnaphthalene	ND	280	43	ug/kg	
91-57-6	2-Methylnaphthalene	ND	280	43	ug/kg	
91-20-3	Naphthalene	ND	280	43	ug/kg	
85-01-8	Phenanthrene	ND	280	43	ug/kg	
129-00-0	Pyrene	ND	280	50	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09483.D

Form I Cap

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09483.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	930	370	ug/kg	
95-57-8	2-Chlorophenol	ND	190	37	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	37	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	37	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	37	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	930	370	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	370	74	ug/kg	
95-48-7	2-Methylphenol	ND	190	37	ug/kg	
	3&4-Methylphenol	ND	190	37	ug/kg	
88-75-5	2-Nitrophenol	ND	190	37	ug/kg	
100-02-7	4-Nitrophenol	ND	930	370	ug/kg	
87-86-5	Pentachlorophenol	ND	930	370	ug/kg	
108-95-2	Phenol	ND	190	37	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	37	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	37	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	37	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	370	93	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	37	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	37	ug/kg	
106-47-8	4-Chloroaniline	ND	370	150	ug/kg	
86-74-8	Carbazole	ND	190	37	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	37	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	74	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	37	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	37	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	37	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	37	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	37	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	74	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	74	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	370	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	37	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I 03

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	370	93	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	370	190	ug/kg	
84-66-2	Diethyl phthalate	ND	370	93	ug/kg	
131-11-3	Dimethyl phthalate	ND	370	93	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	370	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	37	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	74	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	74	ug/kg	
67-72-1	Hexachloroethane	ND	190	74	ug/kg	
78-59-1	Isophorone	ND	190	37	ug/kg	
88-74-4	2-Nitroaniline	ND	370	93	ug/kg	
99-09-2	3-Nitroaniline	ND	370	93	ug/kg	
100-01-6	4-Nitroaniline	ND	370	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	37	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	74	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	37	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	37	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	75%		40-102%
4165-62-2	Phenol-d5	82%		41-100%
118-79-6	2,4,6-Tribromophenol	83%		42-108%
4165-60-0	Nitrobenzene-d5	72%		40-105%
321-60-8	2-Fluorobiphenyl	73%		43-107%
1718-51-0	Terphenyl-d14	90%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035984.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035984.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	300	74	ug/kg	
208-96-8	Acenaphthylene	ND	300	74	ug/kg	
120-12-7	Anthracene	ND	300	44	ug/kg	
56-55-3	Benzo(a)anthracene	39.2 J	59	15	ug/kg	J
50-32-8	Benzo(a)pyrene	40.0 J	59	15	ug/kg	J
205-99-2	Benzo(b)fluoranthene	45.0 J	59	15	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	23.5 J	59	15	ug/kg	J
207-08-9	Benzo(k)fluoranthene	32.3 J	59	15	ug/kg	J
218-01-9	Chrysene	41.7 J	59	15	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	59	15	ug/kg	
206-44-0	Fluoranthene	81.7 J	300	52	ug/kg	J
86-73-7	Fluorene	ND	300	44	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	26.3 J	59	15	ug/kg	J
90-12-0	1-Methylnaphthalene	ND	300	44	ug/kg	
91-57-6	2-Methylnaphthalene	ND	300	44	ug/kg	
91-20-3	Naphthalene	ND	300	44	ug/kg	
85-01-8	Phenanthrene	48.8 J	300	44	ug/kg	J
129-00-0	Pyrene	74.7 J	300	52	ug/kg	J

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09484.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	880	350	ug/kg	
95-57-8	2-Chlorophenol	ND	180	35	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	35	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	35	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	35	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	880	350	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	350	70	ug/kg	
95-48-7	2-Methylphenol	ND	180	35	ug/kg	
	3&4-Methylphenol	ND	180	35	ug/kg	
88-75-5	2-Nitrophenol	ND	180	35	ug/kg	
100-02-7	4-Nitrophenol	ND	880	350	ug/kg	
87-86-5	Pentachlorophenol	ND	880	350	ug/kg	
108-95-2	Phenol	ND	180	35	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	35	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	35	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	180	35	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	350	88	ug/kg	
100-51-6	Benzyl Alcohol	ND	180	35	ug/kg	
91-58-7	2-Chloronaphthalene	ND	180	35	ug/kg	
106-47-8	4-Chloroaniline	ND	350	140	ug/kg	
86-74-8	Carbazole	ND	180	35	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	180	35	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	180	70	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	180	35	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	180	35	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	180	35	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	180	35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	180	35	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	180	70	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	180	70	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	350	180	ug/kg	
132-64-9	Dibenzofuran	ND	180	35	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I only

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	350	88	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	350	180	ug/kg	
84-66-2	Diethyl phthalate	ND	350	88	ug/kg	
131-11-3	Dimethyl phthalate	ND	350	88	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	350	180	ug/kg	
118-74-1	Hexachlorobenzene	ND	180	35	ug/kg	
87-68-3	Hexachlorobutadiene	ND	180	70	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	180	70	ug/kg	
67-72-1	Hexachloroethane	ND	180	70	ug/kg	
78-59-1	Isophorone	ND	180	35	ug/kg	
88-74-4	2-Nitroaniline	ND	350	88	ug/kg	
99-09-2	3-Nitroaniline	ND	350	88	ug/kg	
100-01-6	4-Nitroaniline	ND	350	120	ug/kg	
98-95-3	Nitrobenzene	ND	180	35	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	180	70	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	35	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	180	35	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	62%		40-102%
4165-62-2	Phenol-d5	72%		41-100%
118-79-6	2,4,6-Tribromophenol	72%		42-108%
4165-60-0	Nitrobenzene-d5	67%		40-105%
321-60-8	2-Fluorobiphenyl	67%		43-107%
1718-51-0	Terphenyl-d14	82%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035985.D

Form I COR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035985.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result		RL	MDL	Units	Q
83-32-9	Acenaphthene	ND		280	70	ug/kg	
208-96-8	Acenaphthylene	ND		280	70	ug/kg	
120-12-7	Anthracene	ND		280	42	ug/kg	
56-55-3	Benzo(a)anthracene	ND		56	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND		56	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND		56	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND		56	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND		56	14	ug/kg	
218-01-9	Chrysene	ND		56	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND		56	14	ug/kg	
206-44-0	Fluoranthene	ND		280	49	ug/kg	
86-73-7	Fluorene	ND		280	42	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND		56	14	ug/kg	
90-12-0	1-Methylnaphthalene	92.0	J	280	42	ug/kg	J
91-57-6	2-Methylnaphthalene	115	J	280	42	ug/kg	J
91-20-3	Naphthalene	82.2	J	280	42	ug/kg	J
85-01-8	Phenanthrene	65.4	J	280	42	ug/kg	J
129-00-0	Pyrene	ND		280	49	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09485.D

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09485.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	870	350	ug/kg	
95-57-8	2-Chlorophenol	ND	170	35	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	170	35	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	170	35	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	170	35	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	870	350	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	350	69	ug/kg	
95-48-7	2-Methylphenol	ND	170	35	ug/kg	
	3&4-Methylphenol	ND	170	35	ug/kg	
88-75-5	2-Nitrophenol	ND	170	35	ug/kg	
100-02-7	4-Nitrophenol	ND	870	350	ug/kg	
87-86-5	Pentachlorophenol	ND	870	350	ug/kg	
108-95-2	Phenol	ND	170	35	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	170	35	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	170	35	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	170	35	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	350	87	ug/kg	
100-51-6	Benzyl Alcohol	ND	170	35	ug/kg	
91-58-7	2-Chloronaphthalene	ND	170	35	ug/kg	
106-47-8	4-Chloroaniline	ND	350	140	ug/kg	
86-74-8	Carbazole	ND	170	35	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	170	35	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	170	69	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	170	35	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	170	35	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	170	35	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	170	35	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	170	35	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	170	69	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	170	69	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	350	170	ug/kg	
132-64-9	Dibenzofuran	ND	170	35	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Am I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	350	87	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	350	170	ug/kg	
84-66-2	Diethyl phthalate	ND	350	87	ug/kg	
131-11-3	Dimethyl phthalate	ND	350	87	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	350	170	ug/kg	
118-74-1	Hexachlorobenzene	ND	170	35	ug/kg	
87-68-3	Hexachlorobutadiene	ND	170	69	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	170	69	ug/kg	
67-72-1	Hexachloroethane	ND	170	69	ug/kg	
78-59-1	Isophorone	ND	170	35	ug/kg	
88-74-4	2-Nitroaniline	ND	350	87	ug/kg	
99-09-2	3-Nitroaniline	ND	350	87	ug/kg	
100-01-6	4-Nitroaniline	ND	350	120	ug/kg	
98-95-3	Nitrobenzene	ND	170	35	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	170	69	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	170	35	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	170	35	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	44%		40-102%
4165-62-2	Phenol-d5	49%		41-100%
118-79-6	2,4,6-Tribromophenol	55%		42-108%
4165-60-0	Nitrobenzene-d5	46%		40-105%
321-60-8	2-Fluorobiphenyl	49%		43-107%
1718-51-0	Terphenyl-d14	57%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035986.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035986.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	280	69	ug/kg	
208-96-8	Acenaphthylene	ND	280	69	ug/kg	
120-12-7	Anthracene	ND	280	42	ug/kg	
56-55-3	Benzo(a)anthracene	ND	56	14	ug/kg	
50-32-8	Benzo(a)pyrene	ND	56	14	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	56	14	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	56	14	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	56	14	ug/kg	
218-01-9	Chrysene	ND	56	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	56	14	ug/kg	
206-44-0	Fluoranthene	ND	280	49	ug/kg	
86-73-7	Fluorene	ND	280	42	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	56	14	ug/kg	
90-12-0	1-Methylnaphthalene	51.4 J	280	42	ug/kg	J
91-57-6	2-Methylnaphthalene	56.4 J	280	42	ug/kg	J
91-20-3	Naphthalene	ND	280	42	ug/kg	
85-01-8	Phenanthrene	45.3 J	280	42	ug/kg	J
129-00-0	Pyrene	ND	280	49	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: R09486.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R09486.D	1	07/30/07	NJ	07/27/07	OP21634	SR448
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic acid	ND	960	380	ug/kg	
95-57-8	2-Chlorophenol	ND	190	38	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	38	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	38	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	38	ug/kg	
51-28-5	2,4-Dinitrophenol	ND	960	380	ug/kg	
534-52-1	4,6-Dinitro-o-cresol	ND	380	76	ug/kg	
95-48-7	2-Methylphenol	ND	190	38	ug/kg	
	3&4-Methylphenol	ND	190	38	ug/kg	
88-75-5	2-Nitrophenol	ND	190	38	ug/kg	
100-02-7	4-Nitrophenol	ND	960	380	ug/kg	
87-86-5	Pentachlorophenol	ND	960	380	ug/kg	
108-95-2	Phenol	ND	190	38	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	38	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	38	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	190	38	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	380	96	ug/kg	
100-51-6	Benzyl Alcohol	ND	190	38	ug/kg	
91-58-7	2-Chloronaphthalene	ND	190	38	ug/kg	
106-47-8	4-Chloroaniline	ND	380	150	ug/kg	
86-74-8	Carbazole	ND	190	38	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	190	38	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	190	76	ug/kg	
108-60-1	bis(2-Chloroisopropyl)ether	ND	190	38	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	190	38	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	190	38	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	190	38	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	190	38	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	76	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	76	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	380	190	ug/kg	
132-64-9	Dibenzofuran	ND	190	38	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	380	96	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	380	190	ug/kg	
84-66-2	Diethyl phthalate	ND	380	96	ug/kg	
131-11-3	Dimethyl phthalate	ND	380	96	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	380	190	ug/kg	
118-74-1	Hexachlorobenzene	ND	190	38	ug/kg	
87-68-3	Hexachlorobutadiene	ND	190	76	ug/kg	
77-47-4	Hexachlorocyclopentadiene	ND	190	76	ug/kg	
67-72-1	Hexachloroethane	ND	190	76	ug/kg	
78-59-1	Isophorone	ND	190	38	ug/kg	
88-74-4	2-Nitroaniline	ND	380	96	ug/kg	
99-09-2	3-Nitroaniline	ND	380	96	ug/kg	
100-01-6	4-Nitroaniline	ND	380	130	ug/kg	
98-95-3	Nitrobenzene	ND	190	38	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	190	76	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	38	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	190	38	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	74%		40-102%
4165-62-2	Phenol-d5	84%		41-100%
118-79-6	2,4,6-Tribromophenol	84%		42-108%
4165-60-0	Nitrobenzene-d5	71%		40-105%
321-60-8	2-Fluorobiphenyl	75%		43-107%
1718-51-0	Terphenyl-d14	85%		45-119%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035987.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035987.D	4	08/01/07	RB	07/27/07	OP21636	SW1862
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	310	76	ug/kg	
208-96-8	Acenaphthylene	ND	310	76	ug/kg	
120-12-7	Anthracene	ND	310	46	ug/kg	
56-55-3	Benzo(a)anthracene	ND	61	15	ug/kg	
50-32-8	Benzo(a)pyrene	ND	61	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	61	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	61	15	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	61	15	ug/kg	
218-01-9	Chrysene	ND	61	15	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	61	15	ug/kg	
206-44-0	Fluoranthene	ND	310	54	ug/kg	
86-73-7	Fluorene	ND	310	46	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	61	15	ug/kg	
90-12-0	1-Methylnaphthalene	ND	310	46	ug/kg	
91-57-6	2-Methylnaphthalene	ND	310	46	ug/kg	
91-20-3	Naphthalene	ND	310	46	ug/kg	
85-01-8	Phenanthrene	ND	310	46	ug/kg	
129-00-0	Pyrene	ND	310	54	ug/kg	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: U003671.D

for I only

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U003671.D	1	07/31/07	NJ	07/24/07	OP21580	SU180
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	25	10	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	1.0	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	2.0	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	1.0	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	2.0	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	10	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	1.0	ug/l	
	3&4-Methylphenol	ND	5.0	1.3	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	1.0	ug/l	
100-02-7	4-Nitrophenol	ND	25	10	ug/l	
87-86-5	Pentachlorophenol	ND	25	10	ug/l	
108-95-2	Phenol	ND	5.0	2.0	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.0	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	1.0	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	5.0	1.2	ug/l	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.0	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	1.0	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	1.3	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	2.0	ug/l	
86-74-8	Carbazole	ND	5.0	1.0	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	1.0	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	1.0	ug/l	
108-60-1	bis(2-Chloroisopropyl)ether	ND	5.0	1.0	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	5.0	1.3	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	1.5	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	1.6	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	5.0	1.5	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	5.0	1.0	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	5.0	1.0	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	10	2.0	ug/l	
132-64-9	Dibenzofuran	ND	5.0	1.0	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

ABN TCL List w/o PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
84-74-2	Di-n-butyl phthalate	ND	5.0	2.0	ug/l	
117-84-0	Di-n-octyl phthalate	ND	5.0	2.0	ug/l	
84-66-2	Diethyl phthalate	ND	5.0	2.0	ug/l	
131-11-3	Dimethyl phthalate	ND	5.0	2.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	2.0	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	1.2	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	1.7	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.5	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.9	ug/l	
78-59-1	Isophorone	ND	5.0	1.0	ug/l	
88-74-4	2-Nitroaniline	ND	10	2.0	ug/l	
99-09-2	3-Nitroaniline	ND	10	2.0	ug/l	
100-01-6	4-Nitroaniline	ND	10	2.0	ug/l	
98-95-3	Nitrobenzene	ND	5.0	1.0	ug/l	
621-64-7	N-Nitroso-di-n-propylamine	ND	5.0	1.0	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	1.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	43%		14-62%
4165-62-2	Phenol-d5	27%		10-40%
118-79-6	2,4,6-Tribromophenol	80%		33-118%
4165-60-0	Nitrobenzene-d5	76%		42-108%
321-60-8	2-Fluorobiphenyl	79%		40-106%
1718-51-0	Terphenyl-d14	83%		39-121%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: W035906.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8270C BY SIM SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W035906.D	1	07/30/07	RB	07/24/07	OP21581	SW1859
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.50	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.50	ug/l	
120-12-7	Anthracene	ND	1.0	0.50	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	0.050	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	0.10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	0.050	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	0.10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	0.10	ug/l	
218-01-9	Chrysene	ND	0.20	0.10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	0.050	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.25	ug/l	
86-73-7	Fluorene	ND	1.0	0.25	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	0.050	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.25	ug/l	
91-20-3	Naphthalene	ND	1.0	0.25	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.50	ug/l	
129-00-0	Pyrene	ND	1.0	0.25	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F51154

DATE: September 26, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. Aqueous samples were analyzed for pesticides and PCBs using USEPA Method 3510C/8081A and 3510C/8082, respectively. Solid samples were analyzed for pesticides and PCBs using USEPA Method 3550B/8081A and 3550B/8082, respectively. A total of five aqueous samples and seventeen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	41SD11	F51154-22
41SW09	F51154-7	49SS02	F51154-23
41SW10	F51154-8	49SS03	F51154-24
41SD08	F51154-9	49SS04	F51154-25
41SD09	F51154-10	49SS05	F51154-26
41SD10	F51154-11	59SS06	F51154-27
LFSD01	F51154-15	59SS07	F51154-28
TMSD01	F51154-16	59SS08	F51154-29
LFSW01	F51154-17	59SS09	F51154-30
APSD01	F5 1154-18	59SS10	F51154-31
TMSW01	F51154-20	TMSS05	F51154-32

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/26/07
Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F51154

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For aqueous samples, pesticide and PCB compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. For solid samples, pesticide and PCB compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 07/18/07 and 07/19/07. For aqueous samples collected 07/18/07 and 07/19/07, the pesticides and PCBs were extracted on 07/24/07 and analyzed on 07/26/07. For solid samples collected 07/18/07 and 07/19/07, the pesticides were extracted on 07/27/07 and analyzed on 07/31/07, 08/02/07, 08/06/07, and 08/08/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- For analysis performed on 07/24/07 @14:31, endrin and 4,4'-DDT percent breakdowns were 10.3% and 9.0% on signal #1 and 10.8% and 7.8% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 07/26/07 @11:10, endrin and 4,4'-DDT percent breakdowns were 12.4% and 4.2% on signal #1 and 13.8% and 3.7% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/01/07 @12:02, endrin and 4,4'-DDT percent breakdowns were 13.7% and 8.0% on signal #1 and 14.5% and 7.7% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/02/07 @11:19, endrin and 4,4'-DDT percent breakdowns were 13.3% and 7.7% on signal #1 and 14.5% and 7.2% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/04/07 @09:09, endrin and 4,4'-DDT percent breakdowns were 14.1% and 5.0% on signal #1 and 13.8% and 4.5% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 07/13/07 @13:24, endrin and 4,4'-DDT percent breakdowns were 11.8% and 6.5% on signal #1 and 12.0% and 5.6% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 07/31/07 @13:54, endrin and 4,4'-DDT percent breakdowns were 10.9% and 11.4% on signal #1 and 10.1% and 9.2% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/06/07 @09:25, endrin and 4,4'-DDT percent breakdowns were 11.2% and 7.1% on signal #1 and 10.7% and 5.6% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.995. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- For the pesticide initial calibration performed on 07/24/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/01/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/04/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples TMSD01 (F51154-16), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 07/13/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/06/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), 49SS04 (F51154-25), 59SS06 (F51154-27), 59SS07 (F51154-28), and 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 07/28/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 07/26/07 on instrument ECD7, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 08/02/07 on instrument ECD7, all criteria were met. No qualifiers were applied. Sample 49SS02 (F51154-23) was analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the initial calibration should be no greater than ±20%.

- For pesticide initial calibration verification performed on 07/24/07 @17:08 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 07/26/07 @15:31 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 07/26/07 @19:00 on instrument ECD5, endrin (25.4%) was outside criteria for the signal #1. Endrin (24.4%) was outside criteria for the signal #2. Endrin was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/01/07 @15:15 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/02/07 @14:21 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/02/07 @17:22 on instrument ECD5, 4,4'-DDT (23.5%) was outside criteria for the signal #1. 4,4'-DDT (24.1%) was outside criteria for the signal #2. 4,4'-DDT was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/04/07 @12:47 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/08/07 @13:34 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Sample TMSD01 (F51154-16) was analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/08/07 @14:59 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples TMSD01 (F51154-16), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/08/07 @17:30 on instrument ECD5, heptachlor (30.4%), 4,4'-DDD (22.4%), 4,4'-DDT (87.0%; grossly exceeding), methoxychlor (82.0%; grossly exceeding), and endrin ketone (29.8%) were outside criteria for the signal #1. Heptachlor (31.3%), 4,4'-DDD (26.7%), 4,4'-DDT (88.2%; grossly exceeding), methoxychlor (83.0%; grossly exceeding), and endrin ketone (33.5%) were outside criteria for the signal #2. No samples reported was analyzed using this continuing calibration; therefore, no qualifiers were applied based upon these outliers.

- For pesticide initial calibration verification performed on 07/13/07 @15:47 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 07/31/07 @14:52 on instrument ECD6, all criteria were met for signal #1. 4,4'-DDT (25.4%) was outside criteria for the signal #2. 4,4'-DDT was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), and 49SS02 (F51154-23) were analyzed using this continuing calibration.

- For toxaphene pesticide continuing calibration performed on 07/31/07 @15:08 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For chlordane pesticide continuing calibration performed on 07/31/07 @15:24 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 07/31/07 @18:23 on instrument ECD6, 4,4'-DDT (65.7%; grossly exceeding) and methoxychlor (53.6%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDT (69.1%; grossly exceeding) and methoxychlor (57.7%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. Samples 49SS03 (F51154-24), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 07/31/07 @19:42 on instrument ECD6, 4,4'-DDT (64.5%; grossly exceeding) and methoxychlor (53.9%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDT (67.9%; grossly exceeding) and methoxychlor (56.8%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/06/07 @12:29 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/06/07 @15:35 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), 49SS04 (F51154-25), 59SS06 (F51154-27), 59SS07 (F51154-28), and 59SS08 (F51154-29) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @18:29 on instrument ECD6, 4,4'-DDT (47.6%; grossly exceeding) and methoxychlor (43.5%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDT (45.2%; grossly exceeding) and methoxychlor (43.0%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. Samples 59SS09 (F51154-30) and 59SS10 (F51154-31) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @19:32 on instrument ECD6, 4,4'-DDD (20.6%), 4,4'-DDT (51.2%; grossly exceeding), and methoxychlor (43.4%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDD (21.0%), 4,4'-DDT (67.9%; grossly exceeding), and methoxychlor (56.8%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. 4,4'-DDD was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), and 49SS04 (F51154-25) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @22:42 on instrument ECD6, heptachlor (37.9%), 4,4'-DDD (30.8%), 4,4'-DDT (95.2%; grossly exceeding), methoxychlor (89.2%; grossly exceeding), and endrin ketone (50.6%; grossly exceeding) were outside criteria for the signal #1. Heptachlor (36.0%), 4,4'-DDE (21.1%), 4,4'-DDD (56.2%; grossly exceeding), 4,4'-DDT (88.8%; grossly exceeding), methoxychlor (80.5%; grossly exceeding), and endrin ketone (47.3%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDD, 4,4'-DDT, methoxychlor, and endrin ketone were qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Ds. Heptachlor and 4,4'-DDE were non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 07/28/07 @14:59 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @09:51 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), and 41SD11 (F51154-22) were analyzed using this continuing calibration.

- For PCB 1248 continuing calibration performed on 07/31/07 @10:13 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1242 continuing calibration performed on 07/31/07 @10:30 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1232/1268 continuing calibration performed on 07/31/07 @10:47 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1221/1254 continuing calibration performed on 07/31/07 @11:04 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @14:29 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @17:54 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample TMSS05 (F51154-32) was analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @18:45 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/01/07 @09:49 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 49SS03 (F51154-24) was analyzed using this continuing calibration.

- For PCB 1248 continuing calibration performed on 08/01/07 @10:06 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1242 continuing calibration performed on 08/01/07 @10:23 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1232/1268 continuing calibration performed on 08/01/07 @10:44 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1221/1254 continuing calibration performed on 08/01/07 @11:01 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/01/07 @13:56 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 07/26/07 @13:51 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 07/26/07 @18:39 on instrument ECD7, PCB1016-A (28.0%) was outside criteria for signal #1; however, the average %D for PCB1016 was 12.4%. PCB1016-A (40.6%), PCB1016-B (29.9%), and PCB1016-F (22.8%) were outside criteria for signal #2. The average %D for PCB1016 was 20.9% for signal #2. PCB 1016 was non-detect for all associated samples and was qualified estimated "UJ" for non-detects based upon the high %D. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/26/07 @21:45 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 08/02/07 @13:41 on instrument ECD7, all criteria were met. No qualifiers were applied. Sample 49SS02 (F51154-23) was analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 08/02/07 @16:48 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	07/26/07	OP21578-MB	All target <½MRL	NA	NA	None
Pesticides	09/24/07	RB083007	All target <½MRL	NA	NA	None
PCBs	06/27/07	OP21577-MB	All target <½MRL	NA	NA	None
PCBs	09/14/07	RB083007	All target <½MRL	NA	NA	None
Parameter	**Analysis Date**	**QC Blank ID**	**Compound**	**Max Conc. µg/kg**	**Action Level µg/kg**	**B qualified samples**
Pesticides	07/31/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	08/02/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	08/06/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	08/08/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	07/02/07	RB071807	All target <½MRL	NA	NA	None
Pesticides	07/02/07	072407R	All target <½MRL	NA	NA	None
Pesticides	07/02/07	072507R	All target <½MRL	NA	NA	None
PCBs	07/26/07	OP21641-MB	All target <½MRL	NA	NA	None
PCBs	07/27/07	OP21641-MB	All target <½MRL	NA	NA	None
PCBs	07/27/07	OP21641-MB	All target <½MRL	NA	NA	None
PCBs	06/27/07	RB071807	All target <½MRL	NA	NA	None
PCBs	06/27/07	072407R	All target <½MRL	NA	NA	None
PCBs	06/27/07	072507R	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Tetrachloro-m-xylene:	Pesticides: 42-127% (DoD QSM 25-140%)
	Decachlorobiphenyl:	Pesticides: 27-127% (DoD QSM 30-135%)
Aqueous Criteria:	Tetrachloro-m-xylene:	PCBs: 38-127% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 25-137% (DoD QSM 40-135%)
Solid Criteria:	Tetrachloro-m-xylene:	Pesticides: 46-122% (DoD QSM 70-125%)
	Decachlorobiphenyl:	Pesticides: 50-133% (DoD QSM 55-130%)
Solid Criteria:	Tetrachloro-m-xylene:	PCBs: 44-126% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 39-157% (DoD QSM 60-125%)

- For pesticides sample 41SD10 (F51154-11), all criteria were met for the original run. For the confirmation, tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample TMSD01 (F51154-16), tetrachloro-m-xylene (50.0%) and decachlorobiphenyl (37.0%) were outside criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (62.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 41SD11 (F51154-22), tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (65.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 49SS02 (F51154-23), tetrachloro-m-xylene (53.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (51.0%) and decachlorobiphenyl (48.0%) were outside criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries for run #2.

- For pesticides sample 49SS03 (F51154-24), tetrachloro-m-xylene (64.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. For the confirmation, tetrachloro-m-xylene (62.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 59SS07 (F51154-28), all criteria were met for the original run. For the confirmation, tetrachloro-m-xylene (67.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 59SS09 (F51154-30), tetrachloro-m-xylene (66.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 59SS10 (F51154-31), tetrachloro-m-xylene (55.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, all criteria were met.

- For pesticides sample TMSS05 (F51154-32), all criteria were met for the original run. For the confirmation, tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For PCBs sample 41SD08 (F51154-9), decachlorobiphenyl (57.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 41SD10 (F51154-11), decachlorobiphenyl (56.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample LFSD01 (F51154-15), decachlorobiphenyl (48.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample TMSD01 (F51154-16), decachlorobiphenyl (59.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 59SS06 (F51154-27), decachlorobiphenyl (59.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 59SS07 (F51154-28), decachlorobiphenyl (59.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For all other samples, all criteria were met for pesticides and PCBs analysis.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). DoD QSM solid LCS recovery limits are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21578-BS was used as the aqueous LCS for the pesticide analysis on 07/26/07. Compound endrin aldehyde (12%) was outside DoD QSM criteria, however within laboratory criteria. Compound endrin aldehyde was non-detect for all associated samples and was qualified estimated bias "UL" for non-detects based upon very low recovery. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21640-BS was used as the solid LCS for the pesticide analysis on 07/31/07. Compound endrin aldehyde (8%) was outside DoD QSM criteria, however within laboratory criteria. Compound endrin aldehyde was non-detect for all associated samples and was qualified estimated bias "UL" for non-detects based upon very low recovery. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

- Sample OP21577-BS was used as the aqueous LCS for the PCB analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21641-BS was used as the solid LCS for the PCB analysis on 07/31/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). DoD solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample LFSW01 (F51154-17) was used as the MS/MSD for the pesticide analysis on 07/26/07. Compound endrin aldehyde (21%, 15%) was outside DoD QSM criteria, however within laboratory criteria. The LCS was also low in recovery (See Section VII). Compound endrin aldehyde was non-detect for all samples and qualified estimated bias low "UL" for non-detects for the spiked sample based upon very low recoveries. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used as the MS/MSD for the PCB analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample 49SS04 (F51154-25) was used as the MS/MSD for the pesticide analysis on 08/06/07. Compounds delta-BHC (RPD=56%), alpha chlordane (72%), gamma chlordane (74%), dieldrin (70%), 4,4'-DDE (72%), 4,4'-DDT (48%, 0%; RPD=200%), endrin (70%), endosulfan sulfate (0%, RPD=200%), endrin aldehyde (0%, 0%), endrin ketone (62%), endosulfan II (70%), and methoxychlor (60%, 44%, RPD=29%) were outside DoD QSM criteria and/or laboratory criteria. The LCS was also low in recovery (See Section VII). Compounds 4,4'-DDT, endosulfan sulfate, and endrin aldehyde were rejected for the spiked sample based upon no recovery found. Compounds alpha chlordane, gamma chlordane, dieldrin, 4,4'-DDE, endrin, endrin ketone, endosulfan II, and methoxychlor were non-detect for the spiked sample and qualified estimated bias low "UL" for non-detects based upon low recoveries. Delta-BHC was qualified "UJ" for the spiked sample based upon the high RPD. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

- Sample 59SS06 (F51154-27) was used as the MS/MSD for the PCB analysis on 07/31/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

IX-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for chlorinated pesticides and PCBs. All chlorinated pesticides and PCBs target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for chlorinated pesticides and PCBs. All chlorinated pesticides and PCBs target compounds were non-detect, except for Aroclor 1254. PCB 1254 was detected at 41.1 µg/kg in the original sample and 75.6 µg/kg in the duplicate pair resulting in a RPD of 59.1%. PCB 1254 was qualified estimated "J" for the duplicate pair based upon the high RPD.

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for chlorinated pesticides and PCBs. All detected chlorinated pesticides and PCBs target compounds found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other chlorinated pesticides and PCBs target compounds were non-detect. alpha-Chlordane (88.4%), gamma-Chlordane (70.7%), and Aroclor 1260 (58.1%) were above criteria due to low concentration levels detected below the MRL and/or matrix effects. alpha-Chlordane, gamma-chlordane, and aroclor 1260 were qualified estimated "J" for the original and duplicate pair samples based upon these outliers. For all other compounds, all criteria were met.

Table 3 Field Precision Hits Analysis Summary for Chlorinated Pesticides and PCBs for Duplicate Pair LFSD01 (F51154-15) and TMSD01 (F51154-16)

Compound	Original Sample (µg/kg)	Duplicate Pair (µg/kg)	%RPD
Heptachlor epoxide	14U	1.7J	NA
alpha-Chlordane	13.7J	5.3	88.4
gamma-Chlordane	13.6J	6.5	70.7
Aroclor 1260	135	74.2	58.1

J = Estimated value <MRL and >MDL.
U = Non-detect as <MRL.
NA = Not Applicable

X-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

- For sample 59SS07 (F51154-28), dieldrin (86.8%) and heptachlor epoxide (57.4%) were outside criteria. All other target compounds were within criteria. Dieldrin and heptachlor epoxide were qualified estimated "J" based upon the high %Ds.

- For sample 59SS08 (F51154-29), dieldrin (114%) and 4,4'-DDD (82.4%) were outside criteria. All other target compounds were within criteria. Dieldrin and 4,4'-DDD were qualified estimated "J" based upon the high %Ds.

- For all other samples with detected chlorinated pesticides and PCBs, the %D (average %D for multi-peak compounds) between the primary and secondary columns was within criteria.

Sample: LFSW01MS (F51154-17MS), alpha-chlordane

Conc. µg/L = (Amt * DF * Vt) / (CF * Vo)

where: Amt is the response on column (ng/mL) of the sample
CF = Calibration Factor (from initial calibration)
Vt is the volume of final extract (mL)
DF is the dilution factor
Vo is the volume of the sample extracted (mL)

Conc. µg/L = (9068815 ng/mL * 1 * 10 mL) / (212100 * 430 mL)
= 0.99 ng/mL = 0.99 µg/L

Reported Conc. = 0.99 µg/L
%D = 0.0%
Values were within 10% difference

Sample: **LFSW01MS (F51154-17MS), Aroclor 1260**

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (µL).
Vs = Volume of sample extracted (L).
DF = Dilution factor

Signal #1
Conc1 µg/L = (1118429 * 10000* 1) / (3120 *(1000000) * 1 * 0.44) = 8.15 µg/L
Conc2 µg/L = (1273241 * 10000* 1) / (3552 *(1000000) * 1 * 0.44) = 8.15 µg/L
Conc3 µg/L = (1179335 * 10000* 1) / (3200 *(1000000) * 1 * 0.44) = 8.38 µg/L
Conc4 µg/L = (944050 * 10000* 1) / (2782 *(1000000) * 1 * 0.44) = 8.07 µg/L
Conc5 µg/L = (2049224 * 10000* 1) / (5769 *(1000000) * 1 * 0.44) = 7.66 µg/L
Conc6 µg/L = (772955 * 10000* 1) / (2276 *(1000000) * 1 * 0.44) = 7.72 µg/L
Average concentration = 8.0 µg/L

Signal #2
Conc1 µg/L = (689475 * 10000* 1) / (1917 *(1000000) * 1 * 0.44) = 8.17 µg/L
Conc2 µg/L = (800449 * 10000* 1) / (2172 *(1000000) * 1 * 0.44) = 8.38 µg/L
Conc3 µg/L = (772763 * 10000* 1) / (2088 *(1000000) * 1 * 0.44) = 8.41 µg/L
Conc4 µg/L = (589063 * 10000* 1) / (1698 *(1000000) * 1 * 0.44) = 7.88 µg/L
Conc5 µg/L = (1340728 * 10000* 1) / (3820 *(1000000) * 1 * 0.44) = 7.98 µg/L
Conc6 µg/L = (504915 * 10000* 1) / (1482 *(1000000) * 1 * 0.44) = 7.74 µg/L
Average concentration = 8.1 µg/L

Reported Value = 8.0 µg/L (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

Sample: LFSD01 (F51154-15), alpha-chlordane

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (mL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100 = 1.0 for Wet Weight
DF = Dilution factor

Conc. µg/kg = (166174 Area*10000µL*5) / (34180 Area/pg*(1000 pg/ng)*1 µL*30.7g*0.5790) = 13.7 µg/kg

Reported Value = 13.7 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: 49SS03 (F51154-24), Aroclor 1260

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (µL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100 = 1.0 for Wet Weight
DF = Dilution factor

Signal #1
Conc1 µg/kg = (0*10000*2) / (8040*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc2 µg/kg = (0*10000*2) / (9920*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc3 µg/kg = (0*10000*2) / (9980*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc4 µg/kg = (685577*10000*2) / (7129*(1000)*1*29.9*0.9200) = 69.92 µg/kg
Conc5 µg/kg = (1484623*10000*2) / (16390*(1000)*1*29.9*0.9200) = 65.86 µg/kg
Conc6 µg/kg = (1094850*10000*2) / (9500*(1000)*1*29.9*0.9200) = 83.79 µg/kg
Average concentration = 73.2 µg/kg (Peaks 4 → 6)

Signal #2
Conc1 µg/kg = (0*10000*2) / (1276*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc2 µg/kg = (0*10000*2) / (1547*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc3 µg/kg = (0*10000*2) / (1420*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc4 µg/kg = (171305*10000*2) / (1103*(1000)*1*29.9*0.9200) = 112.92 µg/kg
Conc5 µg/kg = (238470*10000*2) / (2556*(1000)*1*29.9*0.9200) = 67.83 µg/kg
Conc6 µg/kg = (141537*10000*2) / (1028*(1000)*1*29.9*0.9200) = 100.10 µg/kg
Average concentration = 93.6 µg/kg (Peaks 4 → 6)

Reported Value = 73.2 µg/kg (signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: KK20472.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20472.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.020	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.015	ug/l	
319-85-7	beta-BHC	ND	0.050	0.020	ug/l	
319-86-8	delta-BHC	ND	0.050	0.020	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.015	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.015	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.015	ug/l	
60-57-1	Dieldrin	ND	0.050	0.015	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.040	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.10	0.040	ug/l	
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.015	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.020	ug/l	
76-44-8	Heptachlor	ND	0.050	0.020	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.015	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.040	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		42-127%
2051-24-3	Decachlorobiphenyl	74%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022300.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022300.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UJ	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		38-127%
2051-24-3	Decachlorobiphenyl	78%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20473.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20473.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	940 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.053	0.021	ug/l	
319-84-6	alpha-BHC	ND	0.053	0.016	ug/l	
319-85-7	beta-BHC	ND	0.053	0.021	ug/l	
319-86-8	delta-BHC	ND	0.053	0.021	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.053	0.016	ug/l	
5103-71-9	alpha-Chlordane	ND	0.053	0.016	ug/l	
5103-74-2	gamma-Chlordane	ND	0.053	0.016	ug/l	
60-57-1	Dieldrin	ND	0.053	0.016	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.021	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.021	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.021	ug/l	
72-20-8	Endrin	ND	0.11	0.043	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.021	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.11	0.043	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.021	ug/l	
959-98-8	Endosulfan-I	ND	0.053	0.016	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.021	ug/l	
76-44-8	Heptachlor	ND	0.053	0.021	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.053	0.016	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.043	ug/l	
8001-35-2	Toxaphene	ND	2.7	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	76%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022301.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022301.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	940 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND VJ	0.53	0.27	ug/l	
11104-28-2	Aroclor 1221	ND	0.53	0.43	ug/l	
11141-16-5	Aroclor 1232	ND	0.53	0.43	ug/l	
53469-21-9	Aroclor 1242	ND	0.53	0.27	ug/l	
12672-29-6	Aroclor 1248	ND	0.53	0.27	ug/l	
11097-69-1	Aroclor 1254	ND	0.53	0.27	ug/l	
11096-82-5	Aroclor 1260	ND	0.53	0.27	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	87%		38-127%
2051-24-3	Decachlorobiphenyl	81%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20474.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20474.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.020	ug/l	
319-84-6	alpha-BHC	ND	0.049	0.015	ug/l	
319-85-7	beta-BHC	ND	0.049	0.020	ug/l	
319-86-8	delta-BHC	ND	0.049	0.020	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.015	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.015	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.015	ug/l	
60-57-1	Dieldrin	ND	0.049	0.015	ug/l	
72-54-8	4,4'-DDD	ND	0.098	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.098	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.098	0.020	ug/l	
72-20-8	Endrin	ND	0.098	0.039	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.098	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.098	0.039	ug/l	
53494-70-5	Endrin ketone	ND	0.098	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.049	0.015	ug/l	
33213-65-9	Endosulfan-II	ND	0.098	0.020	ug/l	
76-44-8	Heptachlor	ND	0.049	0.020	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.015	ug/l	
72-43-5	Methoxychlor	ND	0.098	0.039	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		42-127%
2051-24-3	Decachlorobiphenyl	76%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022302.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022302.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UT	0.49	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l	
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l	
53469-21-9	Aroclor 1242	ND	0.49	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.49	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.49	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.49	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		38-127%
2051-24-3	Decachlorobiphenyl	80%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08193.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08178.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	30.7 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	4.4	1.1	ug/kg	
319-84-6	alpha-BHC	ND	4.4	1.2	ug/kg	
319-85-7	beta-BHC	ND	4.4	1.1	ug/kg	
319-86-8	delta-BHC	ND	4.4	1.9	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	4.4	1.5	ug/kg	
5103-71-9	alpha-Chlordane	ND	4.4	0.88	ug/kg	
5103-74-2	gamma-Chlordane	ND	4.4	0.97	ug/kg	
60-57-1	Dieldrin	ND	4.4	0.97	ug/kg	
72-54-8	4,4'-DDD	ND	8.8	1.8	ug/kg	
72-55-9	4,4'-DDE	ND	8.8	1.8	ug/kg	
50-29-3	4,4'-DDT	ND [a] UJ	88	20	ug/kg	
72-20-8	Endrin	ND	8.8	1.8	ug/kg	
1031-07-8	Endosulfan sulfate	ND	8.8	2.9	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	8.8	2.6	ug/kg	
53494-70-5	Endrin ketone	ND	8.8	1.8	ug/kg	
959-98-8	Endosulfan-I	ND	4.4	0.97	ug/kg	
33213-65-9	Endosulfan-II	ND	8.8	1.3	ug/kg	
76-44-8	Heptachlor	ND [a]	44	12	ug/kg	
1024-57-3	Heptachlor epoxide	ND	4.4	0.88	ug/kg	
72-43-5	Methoxychlor	ND [a] UJ	88	18	ug/kg	
8001-35-2	Toxaphene	ND	220	110	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%	76%	46-122%
2051-24-3	Decachlorobiphenyl	78%	87%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64232.D

Fin I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64232.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	44	22	ug/kg	
11104-28-2	Aroclor 1221	ND	44	35	ug/kg	
11141-16-5	Aroclor 1232	ND	44	35	ug/kg	
53469-21-9	Aroclor 1242	ND	44	22	ug/kg	
12672-29-6	Aroclor 1248	ND	44	22	ug/kg	
11097-69-1	Aroclor 1254	ND	44	22	ug/kg	
11096-82-5	Aroclor 1260	ND	44	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%		44-126%
2051-24-3	Decachlorobiphenyl	57%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08194.D TT08179.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08194.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08179.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
50-29-3	4,4'-DDT	ND [a] VJ	40	9.2	ug/kg	
72-20-8	Endrin	ND	4.0	0.80	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	4.0	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
76-44-8	Heptachlor	ND [a]	20	5.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND [a] VJ	40	8.0	ug/kg	
8001-35-2	Toxaphene	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%	70%	46-122%
2051-24-3	Decachlorobiphenyl	79%	77%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64233.D

For I Carey

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64233.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254	ND	20	10	ug/kg	
11096-82-5	Aroclor 1260	ND	20	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		44-126%
2051-24-3	Decachlorobiphenyl	66%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08195.D TT08180.D

Run I Opy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08195.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08180.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2	30.2 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.1	0.50	ug/kg	
319-84-6	alpha-BHC	ND	2.1	0.59	ug/kg	
319-85-7	beta-BHC	ND	2.1	0.54	ug/kg	
319-86-8	delta-BHC	ND	2.1	0.92	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.1	0.71	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.1	0.42	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.1	0.46	ug/kg	
60-57-1	Dieldrin	ND	2.1	0.46	ug/kg	
72-54-8	4,4'-DDD	ND	4.2	0.84	ug/kg	
72-55-9	4,4'-DDE	ND	4.2	0.84	ug/kg	
50-29-3	4,4'-DDT	ND [a] UJ	42	9.6	ug/kg	
72-20-8	Endrin	ND	4.2	0.84	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.2	1.4	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	4.2	1.3	ug/kg	
53494-70-5	Endrin ketone	ND	4.2	0.84	ug/kg	
959-98-8	Endosulfan-I	ND	2.1	0.46	ug/kg	
33213-65-9	Endosulfan-II	ND	4.2	0.63	ug/kg	
76-44-8	Heptachlor	ND [a]	21	5.9	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.1	0.42	ug/kg	
72-43-5	Methoxychlor	ND [a] UJ	42	8.4	ug/kg	
8001-35-2	Toxaphene	ND	100	52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	77%	69%	46-122%
2051-24-3	Decachlorobiphenyl	78%	78%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64234.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64234.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	21	10	ug/kg	
11104-28-2	Aroclor 1221	ND	21	17	ug/kg	
11141-16-5	Aroclor 1232	ND	21	17	ug/kg	
53469-21-9	Aroclor 1242	ND	21	10	ug/kg	
12672-29-6	Aroclor 1248	ND	21	10	ug/kg	
11097-69-1	Aroclor 1254	ND	21	10	ug/kg	
11096-82-5	Aroclor 1260	ND	21	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		44-126%
2051-24-3	Decachlorobiphenyl	56%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08068.D KK20593.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08068.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20593.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	30.7 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	14	3.4	ug/kg	
319-84-6	alpha-BHC	ND	14	3.9	ug/kg	
319-85-7	beta-BHC	ND	14	3.7	ug/kg	
319-86-8	delta-BHC	ND	14	6.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	14	4.8	ug/kg	
5103-71-9	alpha-Chlordane	13.7 J	14	2.8	ug/kg	J
5103-74-2	gamma-Chlordane	13.6 J	14	3.1	ug/kg	J
60-57-1	Dieldrin	ND	14	3.1	ug/kg	
72-54-8	4,4'-DDD	ND	28	5.6	ug/kg	
72-55-9	4,4'-DDE	ND	28	5.6	ug/kg	
50-29-3	4,4'-DDT	ND [b]	56	13	ug/kg	
72-20-8	Endrin	ND	28	5.6	ug/kg	
1031-07-8	Endosulfan sulfate	ND	28	9.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	28	8.4	ug/kg	
53494-70-5	Endrin ketone	ND	28	5.6	ug/kg	
959-98-8	Endosulfan-I	ND	14	3.1	ug/kg	
33213-65-9	Endosulfan-II	ND	28	4.2	ug/kg	
76-44-8	Heptachlor	ND	14	3.9	ug/kg	
1024-57-3	Heptachlor epoxide	ND	14	2.8	ug/kg	
72-43-5	Methoxychlor	ND [b]	56	11	ug/kg	
8001-35-2	Toxaphene	ND	700	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%	70%	46-122%
2051-24-3	Decachlorobiphenyl	76%	57%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64235.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64235.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	28	14	ug/kg	
11104-28-2	Aroclor 1221	ND	28	23	ug/kg	
11141-16-5	Aroclor 1232	ND	28	23	ug/kg	
53469-21-9	Aroclor 1242	ND	28	14	ug/kg	
12672-29-6	Aroclor 1248	ND	28	14	ug/kg	
11097-69-1	Aroclor 1254	ND	28	14	ug/kg	
11096-82-5	Aroclor 1260	135 J	28	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		44-126%
2051-24-3	Decachlorobiphenyl	48%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20783.D KK20775.D

Form I OCs

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20783.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	KK20775.D	10	08/08/07	FS	07/27/07	OP21640	GKK761

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND UL	2.5	0.61	ug/kg	
319-84-6	alpha-BHC	ND UL	2.5	0.71	ug/kg	
319-85-7	beta-BHC	ND UL	2.5	0.66	ug/kg	
319-86-8	delta-BHC	ND UL	2.5	1.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND UL	2.5	0.86	ug/kg	
5103-71-9	alpha-Chlordane	5.3 J	2.5	0.50	ug/kg	
5103-74-2	gamma-Chlordane	6.5 J	2.5	0.55	ug/kg	
60-57-1	Dieldrin	ND UL	2.5	0.55	ug/kg	
72-54-8	4,4'-DDD	ND UL	5.0	1.0	ug/kg	
72-55-9	4,4'-DDE	ND UL	5.0	1.0	ug/kg	
50-29-3	4,4'-DDT	ND [b]	51	12	ug/kg	
72-20-8	Endrin	ND UL	5.0	1.0	ug/kg	
1031-07-8	Endosulfan sulfate	ND UL	5.0	1.7	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	5.0	1.5	ug/kg	
53494-70-5	Endrin ketone	ND UL	5.0	1.0	ug/kg	
959-98-8	Endosulfan-I	ND UL	2.5	0.55	ug/kg	
33213-65-9	Endosulfan-II	ND UL	5.0	0.76	ug/kg	
76-44-8	Heptachlor	ND [b]	25	7.1	ug/kg	
1024-57-3	Heptachlor epoxide	1.7 L	2.5	0.50	ug/kg	J
72-43-5	Methoxychlor	ND [b]	51	10	ug/kg	
8001-35-2	Toxaphene	ND UL	130	63	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	50%	62%	46-122%
2051-24-3	Decachlorobiphenyl	37% [c]	61%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2
(c) Outside control limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64236.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64236.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	25	13	ug/kg	
11104-28-2	Aroclor 1221	ND	25	20	ug/kg	
11141-16-5	Aroclor 1232	ND	25	20	ug/kg	
53469-21-9	Aroclor 1242	ND	25	13	ug/kg	
12672-29-6	Aroclor 1248	ND	25	13	ug/kg	
11097-69-1	Aroclor 1254	ND	25	13	ug/kg	
11096-82-5	Aroclor 1260	74.2 J	25	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20476.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20476.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	1040 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.048	0.019	ug/l	
319-84-6	alpha-BHC	ND	0.048	0.014	ug/l	
319-85-7	beta-BHC	ND	0.048	0.019	ug/l	
319-86-8	delta-BHC	ND	0.048	0.019	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.048	0.014	ug/l	
5103-71-9	alpha-Chlordane	ND	0.048	0.014	ug/l	
5103-74-2	gamma-Chlordane	ND	0.048	0.014	ug/l	
60-57-1	Dieldrin	ND	0.048	0.014	ug/l	
72-54-8	4,4'-DDD	ND	0.096	0.019	ug/l	
72-55-9	4,4'-DDE	ND	0.096	0.019	ug/l	
50-29-3	4,4'-DDT	ND	0.096	0.019	ug/l	
72-20-8	Endrin	ND	0.096	0.038	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.096	0.019	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.096	0.038	ug/l	
53494-70-5	Endrin ketone	ND	0.096	0.019	ug/l	
959-98-8	Endosulfan-I	ND	0.048	0.014	ug/l	
33213-65-9	Endosulfan-II	ND	0.096	0.019	ug/l	
76-44-8	Heptachlor	ND	0.048	0.019	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.048	0.014	ug/l	
72-43-5	Methoxychlor	ND	0.096	0.038	ug/l	
8001-35-2	Toxaphene	ND	2.4	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		42-127%
2051-24-3	Decachlorobiphenyl	78%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022304.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022304.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	1040 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UJ	0.48	0.24	ug/l	
11104-28-2	Aroclor 1221	ND	0.48	0.38	ug/l	
11141-16-5	Aroclor 1232	ND	0.48	0.38	ug/l	
53469-21-9	Aroclor 1242	ND	0.48	0.24	ug/l	
12672-29-6	Aroclor 1248	ND	0.48	0.24	ug/l	
11097-69-1	Aroclor 1254	ND	0.48	0.24	ug/l	
11096-82-5	Aroclor 1260	ND	0.48	0.24	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	82%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08066.D KK20586.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08066.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20586.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	30.8 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.4	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.4	2.6	ug/kg	
319-85-7	beta-BHC	ND	9.4	2.4	ug/kg	
319-86-8	delta-BHC	ND	9.4	4.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.4	3.2	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.4	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.4	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.4	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.8	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.8	ug/kg	
50-29-3	4,4'-DDT	ND [b]	37	8.6	ug/kg	
72-20-8	Endrin	ND	19	3.8	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.2	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	19	5.6	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.8	ug/kg	
959-98-8	Endosulfan-I	ND	9.4	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.8	ug/kg	
76-44-8	Heptachlor	ND	9.4	2.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.4	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b]	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	470	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%	70%	46-122%
2051-24-3	Decachlorobiphenyl	80%	72%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64237.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64237.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.4	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254 [b]	42.0 J	19	9.4	ug/kg	J
11096-82-5	Aroclor 1260 [b]	41.8 J	19	9.4	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	77%		44-126%
2051-24-3	Decachlorobiphenyl	79%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20479.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20479.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.057	0.023	ug/l	
319-84-6	alpha-BHC	ND	0.057	0.017	ug/l	
319-85-7	beta-BHC	ND	0.057	0.023	ug/l	
319-86-8	delta-BHC	ND	0.057	0.023	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.057	0.017	ug/l	
5103-71-9	alpha-Chlordane	ND	0.057	0.017	ug/l	
5103-74-2	gamma-Chlordane	ND	0.057	0.017	ug/l	
60-57-1	Dieldrin	ND	0.057	0.017	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.023	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.023	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.023	ug/l	
72-20-8	Endrin	ND	0.11	0.045	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.023	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.11	0.045	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.023	ug/l	
959-98-8	Endosulfan-I	ND	0.057	0.017	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.023	ug/l	
76-44-8	Heptachlor	ND	0.057	0.023	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.057	0.017	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.045	ug/l	
8001-35-2	Toxaphene	ND	2.8	1.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	82%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022307.D

Run I Cal

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022307.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UJ	0.57	0.28	ug/l	
11104-28-2	Aroclor 1221	ND	0.57	0.45	ug/l	
11141-16-5	Aroclor 1232	ND	0.57	0.45	ug/l	
53469-21-9	Aroclor 1242	ND	0.57	0.28	ug/l	
12672-29-6	Aroclor 1248	ND	0.57	0.28	ug/l	
11097-69-1	Aroclor 1254	ND	0.57	0.28	ug/l	
11096-82-5	Aroclor 1260	ND	0.57	0.28	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	87%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08070.D KK20587.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08070.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20587.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.6	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.6	2.7	ug/kg	
319-85-7	beta-BHC	ND	9.6	2.5	ug/kg	
319-86-8	delta-BHC	ND	9.6	4.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.6	3.3	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.6	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.6	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.6	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.9	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.9	ug/kg	
50-29-3	4,4'-DDT	ND [b]	39	8.9	ug/kg	
72-20-8	Endrin	ND	19	3.9	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.4	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	19	5.8	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.9	ug/kg	
959-98-8	Endosulfan-I	ND	9.6	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.9	ug/kg	
76-44-8	Heptachlor	ND	9.6	2.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.6	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b]	39	7.7	ug/kg	
8001-35-2	Toxaphene	ND	480	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%	65%	46-122%
2051-24-3	Decachlorobiphenyl	80%	72%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64238.D

Run I copy

Accutest Laboratories

Report of Analysis

3122

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64238.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	90.2	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		44-126%
2051-24-3	Decachlorobiphenyl	76%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08071.D KK20588.D

Run I Cas

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08071.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20588.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.3	2.2	ug/kg	
319-84-6	alpha-BHC	ND	9.3	2.6	ug/kg	
319-85-7	beta-BHC	ND	9.3	2.4	ug/kg	
319-86-8	delta-BHC	ND	9.3	4.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.3	3.2	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.3	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.3	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.3	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.7	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.7	ug/kg	
50-29-3	4,4'-DDT	ND [b] VL	37	8.6	ug/kg	
72-20-8	Endrin	ND	19	3.7	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	19	5.6	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.7	ug/kg	
959-98-8	Endosulfan-I	ND	9.3	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.8	ug/kg	
76-44-8	Heptachlor	ND	9.3	2.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.3	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b] VL	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	470	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	53%	51%	46-122%
2051-24-3	Decachlorobiphenyl	59%	48% [c]	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2
(c) Outside control limits due to dilution.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022594.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XX022594.D	2	08/02/07	AC	07/27/07	OP21641	GXX189
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	37	19	ug/kg	
11104-28-2	Aroclor 1221	ND	37	30	ug/kg	
11141-16-5	Aroclor 1232	ND	37	30	ug/kg	
53469-21-9	Aroclor 1242	ND	37	19	ug/kg	
12672-29-6	Aroclor 1248	ND	37	19	ug/kg	
11097-69-1	Aroclor 1254	ND	37	37	ug/kg	
11096-82-5	Aroclor 1260	152	37	19	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	47%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08076.D KK20589.D

Form I Cpy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08076.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20589.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.1	2.2	ug/kg	
319-84-6	alpha-BHC	ND	9.1	2.5	ug/kg	
319-85-7	beta-BHC	ND	9.1	2.4	ug/kg	
319-86-8	delta-BHC	ND	9.1	4.0	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.1	3.1	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.1	1.8	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.1	2.0	ug/kg	
60-57-1	Dieldrin	ND	9.1	2.0	ug/kg	
72-54-8	4,4'-DDD	ND	18	3.6	ug/kg	
72-55-9	4,4'-DDE	ND	18	3.6	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	36	8.4	ug/kg	
72-20-8	Endrin	ND	18	3.6	ug/kg	
1031-07-8	Endosulfan sulfate	ND	18	6.0	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	18	5.5	ug/kg	
53494-70-5	Endrin ketone	ND	18	3.6	ug/kg	
959-98-8	Endosulfan-I	ND	9.1	2.0	ug/kg	
33213-65-9	Endosulfan-II	ND	18	2.7	ug/kg	
76-44-8	Heptachlor	ND [b]	18	5.1	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.1	1.8	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	36	7.3	ug/kg	
8001-35-2	Toxaphene	ND	450	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	64%	62%	46-122%
2051-24-3	Decachlorobiphenyl	67%	55%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64296.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64296.D	2	08/01/07	JB	07/27/07	OP21641	GST1698
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	36	18	ug/kg	
11104-28-2	Aroclor 1221	ND	36	29	ug/kg	
11141-16-5	Aroclor 1232	ND	36	29	ug/kg	
53469-21-9	Aroclor 1242	ND	36	18	ug/kg	
12672-29-6	Aroclor 1248	ND	36	18	ug/kg	
11097-69-1	Aroclor 1254 [b]	124 J	36	18	ug/kg	J
11096-82-5	Aroclor 1260 [b]	73.2 J	36	18	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	61%		44-126%
2051-24-3	Decachlorobiphenyl	62%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08196.D TT08182.D

Form I copy

Accutest Laboratories

Report of Analysis

3.2.5

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08196.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08182.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2	30.6 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND VJ	1.9	0.82	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND VL	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND VL	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND VL	1.9	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.75	ug/kg	
72-55-9	4,4'-DDE	ND VL	3.7	0.75	ug/kg	
50-29-3	4,4'-DDT	ND [a] VJ	37	8.6	ug/kg	
72-20-8	Endrin	ND VL	3.7	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND VL	3.7	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND VL	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND [a]	19	5.2	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND [a] VJ	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	93	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%	70%	46-122%
2051-24-3	Decachlorobiphenyl	68%	77%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64243.D

From I 87

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64243.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.3	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.3	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.3	ug/kg	
11097-69-1	Aroclor 1254	10.9 J	19	9.3	ug/kg	J
11096-82-5	Aroclor 1260	ND	19	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	67%		44-126%
2051-24-3	Decachlorobiphenyl	65%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08075.D KK20590.D

For L Coq

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08075.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20590.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.6	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.6	2.7	ug/kg	
319-85-7	beta-BHC	ND	9.6	2.5	ug/kg	
319-86-8	delta-BHC	ND	9.6	4.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.6	3.3	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.6	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.6	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.6	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.8	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.8	ug/kg	
50-29-3	4,4'-DDT	ND [b] VJ	38	8.8	ug/kg	
72-20-8	Endrin	ND	19	3.8	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	19	5.8	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.8	ug/kg	
959-98-8	Endosulfan-I	ND	9.6	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.9	ug/kg	
76-44-8	Heptachlor	ND [b]	19	5.4	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.6	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b] VJ	38	7.7	ug/kg	
8001-35-2	Toxaphene	ND	480	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%	72%	46-122%
2051-24-3	Decachlorobiphenyl	87%	72%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64244.D

Form I copy

Accutest Laboratories

Report of Analysis

3.2.6

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64244.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	41.1 J	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		44-126%
2051-24-3	Decachlorobiphenyl	68%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20778.D TT08181.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20778.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08181.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2	30.8 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.42	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.49	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.78	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.60	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.35	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.39	ug/kg	
72-54-8	4,4'-DDD	ND	3.5	0.71	ug/kg	
72-55-9	4,4'-DDE	ND	3.5	0.71	ug/kg	
50-29-3	4,4'-DDT	ND [a]	35	8.1	ug/kg	
72-20-8	Endrin	ND	3.5	0.71	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.5	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND vL	3.5	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.5	0.71	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.5	0.53	ug/kg	
76-44-8	Heptachlor	ND [a]	18	4.9	ug/kg	
1024-57-3	Heptachlor epoxide	0.48 J	1.8	0.35	ug/kg	J
72-43-5	Methoxychlor	ND [a]	35	7.1	ug/kg	
8001-35-2	Toxaphene	ND	88	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	110%	70%	46-122%
2051-24-3	Decachlorobiphenyl	88%	78%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64245.D

Form I COPY

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64245.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	8.8	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	8.8	ug/kg	
12672-29-6	Aroclor 1248	ND	18	8.8	ug/kg	
11097-69-1	Aroclor 1254	11.1 J	18	8.8	ug/kg	J
11096-82-5	Aroclor 1260	ND	18	8.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20779.D TT08185.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20779.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08185.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2	30.8 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.43	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.50	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.78	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.60	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.35	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	0.75 J	1.8	0.39	ug/kg	J
72-54-8	4,4'-DDD	ND	3.5	0.71	ug/kg	
72-55-9	4,4'-DDE	ND	3.5	0.71	ug/kg	
50-29-3	4,4'-DDT	ND [b]	35	8.2	ug/kg	
72-20-8	Endrin	ND	3.5	0.71	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.5	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.5	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.5	0.71	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.5	0.53	ug/kg	
76-44-8	Heptachlor	ND [b]	18	5.0	ug/kg	
1024-57-3	Heptachlor epoxide	0.46 J	1.8	0.35	ug/kg	J
72-43-5	Methoxychlor	ND [b]	35	7.1	ug/kg	
8001-35-2	Toxaphene	ND	89	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%	67%	46-122%
2051-24-3	Decachlorobiphenyl	62%	70%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64248.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64248.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result		RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND		18	8.9	ug/kg	
11104-28-2	Aroclor 1221	ND		18	14	ug/kg	
11141-16-5	Aroclor 1232	ND		18	14	ug/kg	
53469-21-9	Aroclor 1242	ND		18	8.9	ug/kg	
12672-29-6	Aroclor 1248	ND		18	8.9	ug/kg	
11097-69-1	Aroclor 1254 [b]	21.0	J	18	8.9	ug/kg	
11096-82-5	Aroclor 1260	ND		18	8.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Aroclor pattern appears to be weathered.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20780.D TT08186.D

Form I COR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20780.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08186.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2	30.1 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.82	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	0.44 J	1.9	0.41	ug/kg	J
72-54-8	4,4'-DDD	1.0 J	3.7	0.75	ug/kg	J
72-55-9	4,4'-DDE	ND	3.7	0.75	ug/kg	
50-29-3	4,4'-DDT	ND [b]	37	8.6	ug/kg	
72-20-8	Endrin	ND	3.7	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.7	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND [b]	19	5.2	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND [b]	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	93	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	120%	77%	46-122%
2051-24-3	Decachlorobiphenyl	100%	78%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64249.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64249.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.3	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.3	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.3	ug/kg	
11097-69-1	Aroclor 1254 [b]	24.7 J	19	9.3	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		44-126%
2051-24-3	Decachlorobiphenyl	66%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Aroclor pattern appears to be weathered.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20781.D TT08189.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20781.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08189.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2	30.5 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.7	0.41	ug/kg	
319-84-6	alpha-BHC	ND	1.7	0.48	ug/kg	
319-85-7	beta-BHC	ND	1.7	0.45	ug/kg	
319-86-8	delta-BHC	ND	1.7	0.76	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.7	0.59	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.7	0.34	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.7	0.38	ug/kg	
60-57-1	Dieldrin	ND	1.7	0.38	ug/kg	
72-54-8	4,4'-DDD	ND	3.4	0.69	ug/kg	
72-55-9	4,4'-DDE	ND	3.4	0.69	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	34	7.9	ug/kg	
72-20-8	Endrin	ND	3.4	0.69	ug/kg	
1031-07-8	Endosulfan sulfate	7.1	3.4	1.1	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.4	1.0	ug/kg	
53494-70-5	Endrin ketone	ND	3.4	0.69	ug/kg	
959-98-8	Endosulfan-I	ND	1.7	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	3.4	0.52	ug/kg	
76-44-8	Heptachlor	ND [b]	17	4.8	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.7	0.34	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	34	6.9	ug/kg	
8001-35-2	Toxaphene	ND	86	43	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%	69%	46-122%
2051-24-3	Decachlorobiphenyl	73%	80%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64250.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64250.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	17	8.6	ug/kg	
11104-28-2	Aroclor 1221	ND	17	14	ug/kg	
11141-16-5	Aroclor 1232	ND	17	14	ug/kg	
53469-21-9	Aroclor 1242	ND	17	8.6	ug/kg	
12672-29-6	Aroclor 1248	ND	17	8.6	ug/kg	
11097-69-1	Aroclor 1254	ND	17	8.6	ug/kg	
11096-82-5	Aroclor 1260	ND	17	8.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		44-126%
2051-24-3	Decachlorobiphenyl	72%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20782.D TT08190.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20782.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08190.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	31.7 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.7	0.41	ug/kg	
319-84-6	alpha-BHC	ND	1.7	0.48	ug/kg	
319-85-7	beta-BHC	ND	1.7	0.44	ug/kg	
319-86-8	delta-BHC	ND	1.7	0.75	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.7	0.58	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.7	0.34	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.7	0.37	ug/kg	
60-57-1	Dieldrin	ND	1.7	0.37	ug/kg	
72-54-8	4,4'-DDD	ND	3.4	0.68	ug/kg	
72-55-9	4,4'-DDE	ND	3.4	0.68	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	33	7.6	ug/kg	
72-20-8	Endrin	ND	3.4	0.68	ug/kg	
1031-07-8	Endosulfan sulfate	2.1 J	3.4	1.1	ug/kg	J
7421-93-4	Endrin aldehyde	ND UL	3.4	1.0	ug/kg	
53494-70-5	Endrin ketone	ND	3.4	0.68	ug/kg	
959-98-8	Endosulfan-I	ND	1.7	0.37	ug/kg	
33213-65-9	Endosulfan-II	ND	3.4	0.51	ug/kg	
76-44-8	Heptachlor	ND [b]	16	4.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.7	0.34	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	33	6.6	ug/kg	
8001-35-2	Toxaphene	ND	85	43	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	55%	80%	46-122%
2051-24-3	Decachlorobiphenyl	57%	81%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64251.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64251.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	17	8.5	ug/kg	
11104-28-2	Aroclor 1221	ND	17	14	ug/kg	
11141-16-5	Aroclor 1232	ND	17	14	ug/kg	
53469-21-9	Aroclor 1242	ND	17	8.5	ug/kg	
12672-29-6	Aroclor 1248	ND	17	8.5	ug/kg	
11097-69-1	Aroclor 1254	ND	17	8.5	ug/kg	
11096-82-5	Aroclor 1260	ND	17	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		44-126%
2051-24-3	Decachlorobiphenyl	80%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08074.D KK20592.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08074.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20592.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.7	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.7	2.7	ug/kg	
319-85-7	beta-BHC	ND	9.7	2.5	ug/kg	
319-86-8	delta-BHC	ND	9.7	4.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.7	3.3	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.7	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.7	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.7	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.9	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.9	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	39	8.9	ug/kg	
72-20-8	Endrin	ND	19	3.9	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.4	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	19	5.8	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.9	ug/kg	
959-98-8	Endosulfan-I	ND	9.7	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.9	ug/kg	
76-44-8	Heptachlor	ND [b]	19	5.4	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.7	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	39	7.7	ug/kg	
8001-35-2	Toxaphene	ND	480	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%	69%	46-122%
2051-24-3	Decachlorobiphenyl	86%	75%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64254.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64254.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.7	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.7	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.7	ug/kg	
11097-69-1	Aroclor 1254	75.6	19	9.7	ug/kg	J
11096-82-5	Aroclor 1260	ND	19	9.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	65%		44-126%
2051-24-3	Decachlorobiphenyl	70%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20475.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20475.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.054	0.022	ug/l	
319-84-6	alpha-BHC	ND	0.054	0.016	ug/l	
319-85-7	beta-BHC	ND	0.054	0.022	ug/l	
319-86-8	delta-BHC	ND	0.054	0.022	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.054	0.016	ug/l	
5103-71-9	alpha-Chlordane	ND	0.054	0.016	ug/l	
5103-74-2	gamma-Chlordane	ND	0.054	0.016	ug/l	
60-57-1	Dieldrin	ND	0.054	0.016	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.022	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.022	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.022	ug/l	
72-20-8	Endrin	ND	0.11	0.043	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.022	ug/l	
7421-93-4	Endrin aldehyde	ND	0.11	0.043	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.022	ug/l	
959-98-8	Endosulfan-I	ND	0.054	0.016	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.022	ug/l	
76-44-8	Heptachlor	ND	0.054	0.022	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.054	0.016	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.043	ug/l	
8001-35-2	Toxaphene	ND	2.7	1.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	71%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022303.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022303.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.54	0.27	ug/l	
11104-28-2	Aroclor 1221	ND	0.54	0.43	ug/l	
11141-16-5	Aroclor 1232	ND	0.54	0.43	ug/l	
53469-21-9	Aroclor 1242	ND	0.54	0.27	ug/l	
12672-29-6	Aroclor 1248	ND	0.54	0.27	ug/l	
11097-69-1	Aroclor 1254	ND	0.54	0.27	ug/l	
11096-82-5	Aroclor 1260	ND	0.54	0.27	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	87%		38-127%
2051-24-3	Decachlorobiphenyl	75%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Pesticides and PCBs
Accutest Laboratories, Inc., SDG F51154

DATE: September 26, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. Aqueous samples were analyzed for pesticides and PCBs using USEPA Method 3510C/8081A and 3510C/8082, respectively. Solid samples were analyzed for pesticides and PCBs using USEPA Method 3550B/8081A and 3550B/8082, respectively. A total of five aqueous samples and seventeen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	41SD11	F51154-22
41SW09	F51154-7	49SS02	F51154-23
41SW10	F51154-8	49SS03	F51154-24
41SD08	F51154-9	49SS04	F51154-25
41SD09	F51154-10	49SS05	F51154-26
41SD10	F51154-11	59SS06	F51154-27
LFSD01	F51154-15	59SS07	F51154-28
TMSD01	F51154-16	59SS08	F51154-29
LFSW01	F51154-17	59SS09	F51154-30
APSD01	F5 1154-18	59SS10	F51154-31
TMSW01	F51154-20	TMSS05	F51154-32

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
	X	Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
X		System Monitoring Compounds
X		Laboratory Control Samples
X		Matrix Spike/Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/26/07
Date

RFAAP VALIDATION REPORT
PESTICIDE/PCB REVIEW
SDG F51154

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For aqueous samples, pesticide and PCB compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. For solid samples, pesticide and PCB compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 07/18/07 and 07/19/07. For aqueous samples collected 07/18/07 and 07/19/07, the pesticides and PCBs were extracted on 07/24/07 and analyzed on 07/26/07. For solid samples collected 07/18/07 and 07/19/07, the pesticides were extracted on 07/27/07 and analyzed on 07/31/07, 08/02/07, 08/06/07, and 08/08/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check (Degradation Standard)
Performance checks on the gas chromatograph with electron capture detector (GC/ECD) system are performed to ensure adequate resolution and instrument sensitivity. The performance evaluation mixture (PEM) must be analyzed at the beginning of the analytical sequence. The breakdown of Endrin and 4,4'-DDT must be ≤15% on both signals.

- For analysis performed on 07/24/07 @14:31, endrin and 4,4'-DDT percent breakdowns were 10.3% and 9.0% on signal #1 and 10.8% and 7.8% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 07/26/07 @11:10, endrin and 4,4'-DDT percent breakdowns were 12.4% and 4.2% on signal #1 and 13.8% and 3.7% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/01/07 @12:02, endrin and 4,4'-DDT percent breakdowns were 13.7% and 8.0% on signal #1 and 14.5% and 7.7% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/02/07 @11:19, endrin and 4,4'-DDT percent breakdowns were 13.3% and 7.7% on signal #1 and 14.5% and 7.2% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/04/07 @09:09, endrin and 4,4'-DDT percent breakdowns were 14.1% and 5.0% on signal #1 and 13.8% and 4.5% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 07/13/07 @13:24, endrin and 4,4'-DDT percent breakdowns were 11.8% and 6.5% on signal #1 and 12.0% and 5.6% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 07/31/07 @13:54, endrin and 4,4'-DDT percent breakdowns were 10.9% and 11.4% on signal #1 and 10.1% and 9.2% on signal #2, respectively. All criteria were met. No qualifiers were applied.

- For analysis performed on 08/06/07 @09:25, endrin and 4,4'-DDT percent breakdowns were 11.2% and 7.1% on signal #1 and 10.7% and 5.6% on signal #2, respectively. All criteria were met. No qualifiers were applied.

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5 point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Calibration factors are generated for each compound. The DoD QSM specifies that the percent relative standard deviation (%RSD) for all single peak target analytes, and aroclors 1016, 1242, 1254, and 1260 must be <20% or the mean %RSD for all analytes in the standard must be ≤20%. If linear regression is used, the correlation coefficient must be ≥0.990. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits.

- For the pesticide initial calibration performed on 07/24/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/01/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/04/07 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples TMSD01 (F51154-16), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 07/13/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For the pesticide initial calibration performed on 08/06/07 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), 49SS04 (F51154-25), 59SS06 (F51154-27), 59SS07 (F51154-28), and 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 07/28/07 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 07/26/07 on instrument ECD7, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this initial calibration.

- For the PCB initial calibration performed on 08/02/07 on instrument ECD7, all criteria were met. No qualifiers were applied. Sample 49SS02 (F51154-23) was analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for pesticide/PCB target compounds. Continuing calibration standards containing both target compounds and surrogates are analyzed at the beginning of each 12-hour analytical shift and after every 20 samples. The DoD QSM specifies that the percent difference (%D) or the average %Ds for all analytes in the standard from the initial calibration should be no greater than ±20%.

- For pesticide initial calibration verification performed on 07/24/07 @17:08 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 07/26/07 @15:31 on instrument ECD5, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 07/26/07 @19:00 on instrument ECD5, endrin (25.4%) was outside criteria for the signal #1. Endrin (24.4%) was outside criteria for the signal #2. Endrin was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/01/07 @15:15 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/02/07 @14:21 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/02/07 @17:22 on instrument ECD5, 4,4'-DDT (23.5%) was outside criteria for the signal #1. 4,4'-DDT (24.1%) was outside criteria for the signal #2. 4,4'-DDT was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/04/07 @12:47 on instrument ECD5, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/08/07 @13:34 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Sample TMSD01 (F51154-16) was analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/08/07 @14:59 on instrument ECD5, all criteria were met for signal #1 and for the signal #2. No qualifiers were applied. Samples TMSD01 (F51154-16), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/08/07 @17:30 on instrument ECD5, heptachlor (30.4%), 4,4'-DDD (22.4%), 4,4'-DDT (87.0%; grossly exceeding), methoxychlor (82.0%; grossly exceeding), and endrin ketone (29.8%) were outside criteria for the signal #1. Heptachlor (31.3%), 4,4'-DDD (26.7%), 4,4'-DDT (88.2%; grossly exceeding), methoxychlor (83.0%; grossly exceeding), and endrin ketone (33.5%) were outside criteria for the signal #2. No samples reported was analyzed using this continuing calibration; therefore, no qualifiers were applied based upon these outliers.

- For pesticide initial calibration verification performed on 07/13/07 @15:47 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 07/31/07 @14:52 on instrument ECD6, all criteria were met for signal #1. 4,4'-DDT (25.4%) was outside criteria for the signal #2. 4,4'-DDT was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. Samples LFSD01 (F51154-15), APSD01 (F51154-18), 41SD11 (F51154-22), and 49SS02 (F51154-23) were analyzed using this continuing calibration.

- For toxaphene pesticide continuing calibration performed on 07/31/07 @15:08 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For chlordane pesticide continuing calibration performed on 07/31/07 @15:24 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 07/31/07 @18:23 on instrument ECD6, 4,4'-DDT (65.7%; grossly exceeding) and methoxychlor (53.6%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDT (69.1%; grossly exceeding) and methoxychlor (57.7%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. Samples 49SS03 (F51154-24), 49SS05 (F51154-26), and TMSS05 (F51154-32) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 07/31/07 @19:42 on instrument ECD6, 4,4'-DDT (64.5%; grossly exceeding) and methoxychlor (53.9%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDT (67.9%; grossly exceeding) and methoxychlor (56.8%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. No samples reported were analyzed using this continuing calibration.

- For pesticide initial calibration verification performed on 08/06/07 @12:29 on instrument ECD6, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For pesticide continuing calibration performed on 08/06/07 @15:35 on instrument ECD6, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), 49SS04 (F51154-25), 59SS06 (F51154-27), 59SS07 (F51154-28), and 59SS08 (F51154-29) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @18:29 on instrument ECD6, 4,4'-DDT (47.6%; grossly exceeding) and methoxychlor (43.5%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDT (45.2%; grossly exceeding) and methoxychlor (43.0%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. Samples 59SS09 (F51154-30) and 59SS10 (F51154-31) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @19:32 on instrument ECD6, 4,4'-DDD (20.6%), 4,4'-DDT (51.2%; grossly exceeding), and methoxychlor (43.4%; grossly exceeding) were outside criteria for the signal #1. 4,4'-DDD (21.0%), 4,4'-DDT (67.9%; grossly exceeding), and methoxychlor (56.8%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDT and methoxychlor were qualified estimated "UJ" for non-detects based upon the very high %Ds. 4,4'-DDD was non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), and 49SS04 (F51154-25) were analyzed using this continuing calibration.

- For pesticide continuing calibration performed on 08/06/07 @22:42 on instrument ECD6, heptachlor (37.9%), 4,4'-DDD (30.8%), 4,4'-DDT (95.2%; grossly exceeding), methoxychlor (89.2%; grossly exceeding), and endrin ketone (50.6%; grossly exceeding) were outside criteria for the signal #1. Heptachlor (36.0%), 4,4'-DDE (21.1%), 4,4'-DDD (56.2%; grossly exceeding), 4,4'-DDT (88.8%; grossly exceeding), methoxychlor (80.5%; grossly exceeding), and endrin ketone (47.3%; grossly exceeding) were outside criteria for the signal #2. 4,4'-DDD, 4,4'-DDT, methoxychlor, and endrin ketone were qualified estimated "J" for detects and "UJ" for non-detects based upon the very high %Ds. Heptachlor and 4,4'-DDE were non-detect for all associated samples; therefore, no qualifiers were applied based upon these outliers. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 07/28/07 @14:59 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @09:51 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), and 41SD11 (F51154-22) were analyzed using this continuing calibration.

- For PCB 1248 continuing calibration performed on 07/31/07 @10:13 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1242 continuing calibration performed on 07/31/07 @10:30 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1232/1268 continuing calibration performed on 07/31/07 @10:47 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1221/1254 continuing calibration performed on 07/31/07 @11:04 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @14:29 on instrument ECD3, all criteria were met. No qualifiers were applied. Samples 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @17:54 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample TMSS05 (F51154-32) was analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/31/07 @18:45 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/01/07 @09:49 on instrument ECD3, all criteria were met. No qualifiers were applied. Sample 49SS03 (F51154-24) was analyzed using this continuing calibration.

- For PCB 1248 continuing calibration performed on 08/01/07 @10:06 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1242 continuing calibration performed on 08/01/07 @10:23 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1232/1268 continuing calibration performed on 08/01/07 @10:44 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1221/1254 continuing calibration performed on 08/01/07 @11:01 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 08/01/07 @13:56 on instrument ECD3, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 07/26/07 @13:51 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 07/26/07 @18:39 on instrument ECD7, PCB1016-A (28.0%) was outside criteria for signal #1; however, the average %D for PCB1016 was 12.4%. PCB1016-A (40.6%), PCB1016-B (29.9%), and PCB1016-F (22.8%) were outside criteria for signal #2. The average %D for PCB1016 was 20.9% for signal #2. PCB 1016 was non-detect for all associated samples and was qualified estimated "UJ" for non-detects based upon the high %D. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were analyzed using this continuing calibration.

- For PCB 1016/1260 continuing calibration performed on 07/26/07 @21:45 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

- For PCB 1016/1260 initial calibration verification performed on 08/02/07 @13:41 on instrument ECD7, all criteria were met. No qualifiers were applied. Sample 49SS02 (F51154-23) was analyzed using this initial calibration verification.

- For PCB 1016/1260 continuing calibration performed on 08/02/07 @16:48 on instrument ECD7, all criteria were met. No qualifiers were applied. No samples reported were analyzed using this continuing calibration.

V-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for pesticide and PCB target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Parameter	Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
Pesticides	07/26/07	OP21578-MB	All target <½MRL	NA	NA	None
Pesticides	09/24/07	RB083007	All target <½MRL	NA	NA	None
PCBs	06/27/07	OP21577-MB	All target <½MRL	NA	NA	None
PCBs	09/14/07	RB083007	All target <½MRL	NA	NA	None
Parameter	**Analysis Date**	**QC Blank ID**	**Compound**	**Max Conc. µg/kg**	**Action Level µg/kg**	**B qualified samples**
Pesticides	07/31/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	08/02/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	08/06/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	08/08/07	OP21640-MB	All target <½MRL	NA	NA	None
Pesticides	07/02/07	RB071807	All target <½MRL	NA	NA	None
Pesticides	07/02/07	072407R	All target <½MRL	NA	NA	None
Pesticides	07/02/07	072507R	All target <½MRL	NA	NA	None
PCBs	07/26/07	OP21641-MB	All target <½MRL	NA	NA	None
PCBs	07/27/07	OP21641-MB	All target <½MRL	NA	NA	None
PCBs	07/27/07	OP21641-MB	All target <½MRL	NA	NA	None
PCBs	06/27/07	RB071807	All target <½MRL	NA	NA	None
PCBs	06/27/07	072407R	All target <½MRL	NA	NA	None
PCBs	06/27/07	072507R	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Surrogate spikes are added to all samples and blanks to measure their recovery in sample and blank matrices. The percent recoveries (%Rs) must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:	Tetrachloro-m-xylene:	Pesticides: 42-127% (DoD QSM 25-140%)
	Decachlorobiphenyl:	Pesticides: 27-127% (DoD QSM 30-135%)
Aqueous Criteria:	Tetrachloro-m-xylene:	PCBs: 38-127% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 25-137% (DoD QSM 40-135%)
Solid Criteria:	Tetrachloro-m-xylene:	Pesticides: 46-122% (DoD QSM 70-125%)
	Decachlorobiphenyl:	Pesticides: 50-133% (DoD QSM 55-130%)
Solid Criteria:	Tetrachloro-m-xylene:	PCBs: 44-126% (DoD QSM Not Listed)
	Decachlorobiphenyl:	PCBs: 39-157% (DoD QSM 60-125%)

- For pesticides sample 41SD10 (F51154-11), all criteria were met for the original run. For the confirmation, tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample TMSD01 (F51154-16), tetrachloro-m-xylene (50.0%) and decachlorobiphenyl (37.0%) were outside criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (62.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 41SD11 (F51154-22), tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (65.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 49SS02 (F51154-23), tetrachloro-m-xylene (53.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (51.0%) and decachlorobiphenyl (48.0%) were outside criteria. All detects were qualified "L" and non-detects "UL" based upon the low recoveries for run #2.

- For pesticides sample 49SS03 (F51154-24), tetrachloro-m-xylene (64.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. For the confirmation, tetrachloro-m-xylene (62.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 59SS07 (F51154-28), all criteria were met for the original run. For the confirmation, tetrachloro-m-xylene (67.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 59SS09 (F51154-30), tetrachloro-m-xylene (66.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For pesticides sample 59SS10 (F51154-31), tetrachloro-m-xylene (55.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier. Sample was re-analyzed for confirmation (run #2). For the confirmation, all criteria were met.

- For pesticides sample TMSS05 (F51154-32), all criteria were met for the original run. For the confirmation, tetrachloro-m-xylene (69.0%) was below DoD QSM criteria and within laboratory criteria. Decachlorobiphenyl was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier for run #2.

- For PCBs sample 41SD08 (F51154-9), decachlorobiphenyl (57.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 41SD10 (F51154-11), decachlorobiphenyl (56.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample LFSD01 (F51154-15), decachlorobiphenyl (48.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample TMSD01 (F51154-16), decachlorobiphenyl (59.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 59SS06 (F51154-27), decachlorobiphenyl (59.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For PCBs sample 59SS07 (F51154-28), decachlorobiphenyl (59.0%) was below DoD QSM criteria and within laboratory criteria. Tetrachloro-m-xylene was within criteria. Since only one surrogate was outside criteria, no qualifiers were applied based upon this outlier.

- For all other samples, all criteria were met for pesticides and PCBs analysis.

VII-Laboratory Control Samples
Laboratory control samples (LCS) are used to monitor laboratory accuracy by calculating the percent recoveries of the spiked compounds. All LCS percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). DoD QSM solid LCS recovery limits are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21578-BS was used as the aqueous LCS for the pesticide analysis on 07/26/07. Compound endrin aldehyde (12%) was outside DoD QSM criteria, however within laboratory criteria. Compound endrin aldehyde was non-detect for all associated samples and was qualified estimated bias "UL" for non-detects based upon very low recovery. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21640-BS was used as the solid LCS for the pesticide analysis on 07/31/07. Compound endrin aldehyde (8%) was outside DoD QSM criteria, however within laboratory criteria. Compound endrin aldehyde was non-detect for all associated samples and was qualified estimated bias "UL" for non-detects based upon very low recovery. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

- Sample OP21577-BS was used as the aqueous LCS for the PCB analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21641-BS was used as the solid LCS for the PCB analysis on 07/31/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

VIII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-14 and Table D-16 of the DoD QSM (DoD, 2006). DoD solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-15 and Table D-17 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample LFSW01 (F51154-17) was used as the MS/MSD for the pesticide analysis on 07/26/07. Compound endrin aldehyde (21%, 15%) was outside DoD QSM criteria, however within laboratory criteria. The LCS was also low in recovery (See Section VII). Compound endrin aldehyde was non-detect for all samples and qualified estimated bias low "UL" for non-detects for the spiked sample based upon very low recoveries. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used as the MS/MSD for the PCB analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample 49SS04 (F51154-25) was used as the MS/MSD for the pesticide analysis on 08/06/07. Compounds delta-BHC (RPD=56%), alpha chlordane (72%), gamma chlordane (74%), dieldrin (70%), 4,4'-DDE (72%), 4,4'-DDT (48%, 0%; RPD=200%), endrin (70%), endosulfan sulfate (0%, RPD=200%), endrin aldehyde (0%, 0%), endrin ketone (62%), endosulfan II (70%), and methoxychlor (60%, 44%, RPD=29%) were outside DoD QSM criteria and/or laboratory criteria. The LCS was also low in recovery (See Section VII). Compounds 4,4'-DDT, endosulfan sulfate, and endrin aldehyde were rejected for the spiked sample based upon no recovery found. Compounds alpha chlordane, gamma chlordane, dieldrin, 4,4'-DDE, endrin, endrin ketone, endosulfan II, and methoxychlor were non-detect for the spiked sample and qualified estimated bias low "UL" for non-detects based upon low recoveries. Delta-BHC was qualified "UJ" for the spiked sample based upon the high RPD. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

- Sample 59SS06 (F51154-27) was used as the MS/MSD for the PCB analysis on 07/31/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

IX-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for chlorinated pesticides and PCBs. All chlorinated pesticides and PCBs target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for chlorinated pesticides and PCBs. All chlorinated pesticides and PCBs target compounds were non-detect, except for Aroclor 1254. PCB 1254 was detected at 41.1 µg/kg in the original sample and 75.6 µg/kg in the duplicate pair resulting in a RPD of 59.1%. PCB 1254 was qualified estimated "J" for the duplicate pair based upon the high RPD.

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for chlorinated pesticides and PCBs. All detected chlorinated pesticides and PCBs target compounds found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other chlorinated pesticides and PCBs target compounds were non-detect. alpha-Chlordane (88.4%), gamma-Chlordane (70.7%), and Aroclor 1260 (58.1%) were above criteria due to low concentration levels detected below the MRL and/or matrix effects. alpha-Chlordane, gamma-chlordane, and aroclor 1260 were qualified estimated "J" for the original and duplicate pair samples based upon these outliers. For all other compounds, all criteria were met.

Table 3 Field Precision Hits Analysis Summary for Chlorinated Pesticides and PCBs for Duplicate Pair LFSD01 (F51154-15) and TMSD01 (F51154-16)

Compound	Original Sample (µg/kg)	Duplicate Pair (µg/kg)	%RPD
Heptachlor epoxide	14U	1.7J	NA
alpha-Chlordane	13.7J	5.3	88.4
gamma-Chlordane	13.6J	6.5	70.7
Aroclor 1260	135	74.2	58.1

J = Estimated value <MRL and >MDL.
U = Non-detect as <MRL.
NA = Not Applicable

X-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. The difference between the calculated value and the reported value must be within 10% difference. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." All criteria were met.

- For sample 59SS07 (F51154-28), dieldrin (86.8%) and heptachlor epoxide (57.4%) were outside criteria. All other target compounds were within criteria. Dieldrin and heptachlor epoxide were qualified estimated "J" based upon the high %Ds.

- For sample 59SS08 (F51154-29), dieldrin (114%) and 4,4'-DDD (82.4%) were outside criteria. All other target compounds were within criteria. Dieldrin and 4,4'-DDD were qualified estimated "J" based upon the high %Ds.

- For all other samples with detected chlorinated pesticides and PCBs, the %D (average %D for multi-peak compounds) between the primary and secondary columns was within criteria.

Sample: LFSW01MS (F51154-17MS), alpha-chlordane

Conc. µg/L = (Amt * DF * Vt) / (CF * Vo)

where: Amt is the response on column (ng/mL) of the sample
CF = Calibration Factor (from initial calibration)
Vt is the volume of final extract (mL)
DF is the dilution factor
Vo is the volume of the sample extracted (mL)

Conc. µg/L = (9068815 ng/mL * 1 * 10 mL) / (212100 * 430 mL)
= 0.99 ng/mL = 0.99 µg/L

Reported Conc. = 0.99 µg/L
%D = 0.0%
Values were within 10% difference

Sample: LFSW01MS (F51154-17MS), Aroclor 1260

Conc. µg/L = (Ax * Vt * DF) / (CF * Vi * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (µL).
Vs = Volume of sample extracted (L).
DF = Dilution factor

Signal #1
Conc1 µg/L = (1118429 * 10000* 1) / (3120 *(1000000) * 1 * 0.44) = 8.15 µg/L
Conc2 µg/L = (1273241 * 10000* 1) / (3552 *(1000000) * 1 * 0.44) = 8.15 µg/L
Conc3 µg/L = (1179335 * 10000* 1) / (3200 *(1000000) * 1 * 0.44) = 8.38 µg/L
Conc4 µg/L = (944050 * 10000* 1) / (2782 *(1000000) * 1 * 0.44) = 8.07 µg/L
Conc5 µg/L = (2049224 * 10000* 1) / (5769 *(1000000) * 1 * 0.44) = 7.66 µg/L
Conc6 µg/L = (772955 * 10000* 1) / (2276 *(1000000) * 1 * 0.44) = 7.72 µg/L
Average concentration = 8.0 µg/L

Signal #2
Conc1 µg/L = (689475 * 10000* 1) / (1917 *(1000000) * 1 * 0.44) = 8.17 µg/L
Conc2 µg/L = (800449 * 10000* 1) / (2172 *(1000000) * 1 * 0.44) = 8.38 µg/L
Conc3 µg/L = (772763 * 10000* 1) / (2088 *(1000000) * 1 * 0.44) = 8.41 µg/L
Conc4 µg/L = (589063 * 10000* 1) / (1698 *(1000000) * 1 * 0.44) = 7.88 µg/L
Conc5 µg/L = (1340728 * 10000* 1) / (3820 *(1000000) * 1 * 0.44) = 7.98 µg/L
Conc6 µg/L = (504915 * 10000* 1) / (1482 *(1000000) * 1 * 0.44) = 7.74 µg/L
Average concentration = 8.1 µg/L

Reported Value = 8.0 µg/L (from signal #1)
% Difference = 0.0%
Values were within 10% difference.

Sample: LFSD01 (F51154-15), alpha-chlordane

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (mL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100 = 1.0 for Wet Weight
DF = Dilution factor

Conc. µg/kg = (166174 Area*10000µL*5) / (34180 Area/pg*(1000 pg/ng)*1 µL*30.7g*0.5790) = 13.7 µg/kg

Reported Value = 13.7 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: 49SS03 (F51154-24), Aroclor 1260

Conc. µg/kg = (Ax * Vt * DF) / (CF * Vi * Ws * D)

where: Conc. = Sample concentration in µg/kg
Ax = Area/response for compound being measured.
Vt = Volume of total extract, taking into account dilutions (i.e., a 1-to-10 dilution of a 1-mL extract will mean V(t) = 10000 µL.
CF = Ave calibration response factor for compound being measured from ICAL (Area/pg)
Vi = Volume of extract injected (µL).
W(s) = Weight of sample extracted or diluted in grams.
D = Percent dry weight (100 - % moisture in sample)/100 = 1.0 for Wet Weight
DF = Dilution factor

Signal #1
Conc1 µg/kg = (0*10000*2) / (8040*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc2 µg/kg = (0*10000*2) / (9920*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc3 µg/kg = (0*10000*2) / (9980*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc4 µg/kg = (685577*10000*2) / (7129*(1000)*1*29.9*0.9200) = 69.92 µg/kg
Conc5 µg/kg = (1484623*10000*2) / (16390*(1000)*1*29.9*0.9200) = 65.86 µg/kg
Conc6 µg/kg = (1094850*10000*2) / (9500*(1000)*1*29.9*0.9200) = 83.79 µg/kg
Average concentration = 73.2 µg/kg (Peaks 4 → 6)

Signal #2
Conc1 µg/kg = (0*10000*2) / (1276*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc2 µg/kg = (0*10000*2) / (1547*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc3 µg/kg = (0*10000*2) / (1420*(1000)*1*29.9*0.9200) = 0.00 µg/kg
Conc4 µg/kg = (171305*10000*2) / (1103*(1000)*1*29.9*0.9200) = 112.92 µg/kg
Conc5 µg/kg = (238470*10000*2) / (2556*(1000)*1*29.9*0.9200) = 67.83 µg/kg
Conc6 µg/kg = (141537*10000*2) / (1028*(1000)*1*29.9*0.9200) = 100.10 µg/kg
Average concentration = 93.6 µg/kg (Peaks 4 → 6)

Reported Value = 73.2 µg/kg (signal #1)
% Difference = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: KK20472.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20472.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.050	0.020	ug/l	
319-84-6	alpha-BHC	ND	0.050	0.015	ug/l	
319-85-7	beta-BHC	ND	0.050	0.020	ug/l	
319-86-8	delta-BHC	ND	0.050	0.020	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	0.015	ug/l	
5103-71-9	alpha-Chlordane	ND	0.050	0.015	ug/l	
5103-74-2	gamma-Chlordane	ND	0.050	0.015	ug/l	
60-57-1	Dieldrin	ND	0.050	0.015	ug/l	
72-54-8	4,4'-DDD	ND	0.10	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.10	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.10	0.020	ug/l	
72-20-8	Endrin	ND	0.10	0.040	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.10	0.040	ug/l	
53494-70-5	Endrin ketone	ND	0.10	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.050	0.015	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	0.020	ug/l	
76-44-8	Heptachlor	ND	0.050	0.020	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	0.015	ug/l	
72-43-5	Methoxychlor	ND	0.10	0.040	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		42-127%
2051-24-3	Decachlorobiphenyl	74%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022300.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022300.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UJ	0.50	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.50	0.40	ug/l	
11141-16-5	Aroclor 1232	ND	0.50	0.40	ug/l	
53469-21-9	Aroclor 1242	ND	0.50	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.50	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.50	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.50	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		38-127%
2051-24-3	Decachlorobiphenyl	78%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20473.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	940 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.053	0.021	ug/l	
319-84-6	alpha-BHC	ND	0.053	0.016	ug/l	
319-85-7	beta-BHC	ND	0.053	0.021	ug/l	
319-86-8	delta-BHC	ND	0.053	0.021	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.053	0.016	ug/l	
5103-71-9	alpha-Chlordane	ND	0.053	0.016	ug/l	
5103-74-2	gamma-Chlordane	ND	0.053	0.016	ug/l	
60-57-1	Dieldrin	ND	0.053	0.016	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.021	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.021	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.021	ug/l	
72-20-8	Endrin	ND	0.11	0.043	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.021	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.11	0.043	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.021	ug/l	
959-98-8	Endosulfan-I	ND	0.053	0.016	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.021	ug/l	
76-44-8	Heptachlor	ND	0.053	0.021	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.053	0.016	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.043	ug/l	
8001-35-2	Toxaphene	ND	2.7	1.3	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	76%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022301.D

Form I copy

Accutest Laboratories

Report of Analysis

3.7.3

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022301.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	940 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND VT	0.53	0.27	ug/l	
11104-28-2	Aroclor 1221	ND	0.53	0.43	ug/l	
11141-16-5	Aroclor 1232	ND	0.53	0.43	ug/l	
53469-21-9	Aroclor 1242	ND	0.53	0.27	ug/l	
12672-29-6	Aroclor 1248	ND	0.53	0.27	ug/l	
11097-69-1	Aroclor 1254	ND	0.53	0.27	ug/l	
11096-82-5	Aroclor 1260	ND	0.53	0.27	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	87%		38-127%
2051-24-3	Decachlorobiphenyl	81%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20474.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20474.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.049	0.020	ug/l	
319-84-6	alpha-BHC	ND	0.049	0.015	ug/l	
319-85-7	beta-BHC	ND	0.049	0.020	ug/l	
319-86-8	delta-BHC	ND	0.049	0.020	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.049	0.015	ug/l	
5103-71-9	alpha-Chlordane	ND	0.049	0.015	ug/l	
5103-74-2	gamma-Chlordane	ND	0.049	0.015	ug/l	
60-57-1	Dieldrin	ND	0.049	0.015	ug/l	
72-54-8	4,4'-DDD	ND	0.098	0.020	ug/l	
72-55-9	4,4'-DDE	ND	0.098	0.020	ug/l	
50-29-3	4,4'-DDT	ND	0.098	0.020	ug/l	
72-20-8	Endrin	ND	0.098	0.039	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.098	0.020	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.098	0.039	ug/l	
53494-70-5	Endrin ketone	ND	0.098	0.020	ug/l	
959-98-8	Endosulfan-I	ND	0.049	0.015	ug/l	
33213-65-9	Endosulfan-II	ND	0.098	0.020	ug/l	
76-44-8	Heptachlor	ND	0.049	0.020	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.049	0.015	ug/l	
72-43-5	Methoxychlor	ND	0.098	0.039	ug/l	
8001-35-2	Toxaphene	ND	2.5	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		42-127%
2051-24-3	Decachlorobiphenyl	76%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022302.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022302.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	1020 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UT	0.49	0.25	ug/l	
11104-28-2	Aroclor 1221	ND	0.49	0.39	ug/l	
11141-16-5	Aroclor 1232	ND	0.49	0.39	ug/l	
53469-21-9	Aroclor 1242	ND	0.49	0.25	ug/l	
12672-29-6	Aroclor 1248	ND	0.49	0.25	ug/l	
11097-69-1	Aroclor 1254	ND	0.49	0.25	ug/l	
11096-82-5	Aroclor 1260	ND	0.49	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		38-127%
2051-24-3	Decachlorobiphenyl	80%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08193.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08178.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	30.7 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	4.4	1.1	ug/kg	
319-84-6	alpha-BHC	ND	4.4	1.2	ug/kg	
319-85-7	beta-BHC	ND	4.4	1.1	ug/kg	
319-86-8	delta-BHC	ND	4.4	1.9	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	4.4	1.5	ug/kg	
5103-71-9	alpha-Chlordane	ND	4.4	0.88	ug/kg	
5103-74-2	gamma-Chlordane	ND	4.4	0.97	ug/kg	
60-57-1	Dieldrin	ND	4.4	0.97	ug/kg	
72-54-8	4,4'-DDD	ND	8.8	1.8	ug/kg	
72-55-9	4,4'-DDE	ND	8.8	1.8	ug/kg	
50-29-3	4,4'-DDT	ND [a] UJ	88	20	ug/kg	
72-20-8	Endrin	ND	8.8	1.8	ug/kg	
1031-07-8	Endosulfan sulfate	ND	8.8	2.9	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	8.8	2.6	ug/kg	
53494-70-5	Endrin ketone	ND	8.8	1.8	ug/kg	
959-98-8	Endosulfan-I	ND	4.4	0.97	ug/kg	
33213-65-9	Endosulfan-II	ND	8.8	1.3	ug/kg	
76-44-8	Heptachlor	ND [a]	44	12	ug/kg	
1024-57-3	Heptachlor epoxide	ND	4.4	0.88	ug/kg	
72-43-5	Methoxychlor	ND [a] UJ	88	18	ug/kg	
8001-35-2	Toxaphene	ND	220	110	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%	76%	46-122%
2051-24-3	Decachlorobiphenyl	78%	87%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64232.D

Fin I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64232.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	44	22	ug/kg	
11104-28-2	Aroclor 1221	ND	44	35	ug/kg	
11141-16-5	Aroclor 1232	ND	44	35	ug/kg	
53469-21-9	Aroclor 1242	ND	44	22	ug/kg	
12672-29-6	Aroclor 1248	ND	44	22	ug/kg	
11097-69-1	Aroclor 1254	ND	44	22	ug/kg	
11096-82-5	Aroclor 1260	ND	44	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%		44-126%
2051-24-3	Decachlorobiphenyl	57%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08194.D TT08179.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08194.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08179.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.0	0.48	ug/kg	
319-84-6	alpha-BHC	ND	2.0	0.56	ug/kg	
319-85-7	beta-BHC	ND	2.0	0.52	ug/kg	
319-86-8	delta-BHC	ND	2.0	0.88	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.0	0.68	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.0	0.40	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.0	0.44	ug/kg	
60-57-1	Dieldrin	ND	2.0	0.44	ug/kg	
72-54-8	4,4'-DDD	ND	4.0	0.80	ug/kg	
72-55-9	4,4'-DDE	ND	4.0	0.80	ug/kg	
50-29-3	4,4'-DDT	ND [a] VJ	40	9.2	ug/kg	
72-20-8	Endrin	ND	4.0	0.80	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.0	1.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	4.0	1.2	ug/kg	
53494-70-5	Endrin ketone	ND	4.0	0.80	ug/kg	
959-98-8	Endosulfan-I	ND	2.0	0.44	ug/kg	
33213-65-9	Endosulfan-II	ND	4.0	0.60	ug/kg	
76-44-8	Heptachlor	ND [a]	20	5.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.0	0.40	ug/kg	
72-43-5	Methoxychlor	ND [a] VJ	40	8.0	ug/kg	
8001-35-2	Toxaphene	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%	70%	46-122%
2051-24-3	Decachlorobiphenyl	79%	77%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64233.D

For I Cary

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64233.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	20	10	ug/kg	
11104-28-2	Aroclor 1221	ND	20	16	ug/kg	
11141-16-5	Aroclor 1232	ND	20	16	ug/kg	
53469-21-9	Aroclor 1242	ND	20	10	ug/kg	
12672-29-6	Aroclor 1248	ND	20	10	ug/kg	
11097-69-1	Aroclor 1254	ND	20	10	ug/kg	
11096-82-5	Aroclor 1260	ND	20	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		44-126%
2051-24-3	Decachlorobiphenyl	66%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08195.D TT08180.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08195.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08180.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2	30.2 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	2.1	0.50	ug/kg	
319-84-6	alpha-BHC	ND	2.1	0.59	ug/kg	
319-85-7	beta-BHC	ND	2.1	0.54	ug/kg	
319-86-8	delta-BHC	ND	2.1	0.92	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	2.1	0.71	ug/kg	
5103-71-9	alpha-Chlordane	ND	2.1	0.42	ug/kg	
5103-74-2	gamma-Chlordane	ND	2.1	0.46	ug/kg	
60-57-1	Dieldrin	ND	2.1	0.46	ug/kg	
72-54-8	4,4'-DDD	ND	4.2	0.84	ug/kg	
72-55-9	4,4'-DDE	ND	4.2	0.84	ug/kg	
50-29-3	4,4'-DDT	ND [a] UJ	42	9.6	ug/kg	
72-20-8	Endrin	ND	4.2	0.84	ug/kg	
1031-07-8	Endosulfan sulfate	ND	4.2	1.4	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	4.2	1.3	ug/kg	
53494-70-5	Endrin ketone	ND	4.2	0.84	ug/kg	
959-98-8	Endosulfan-I	ND	2.1	0.46	ug/kg	
33213-65-9	Endosulfan-II	ND	4.2	0.63	ug/kg	
76-44-8	Heptachlor	ND [a]	21	5.9	ug/kg	
1024-57-3	Heptachlor epoxide	ND	2.1	0.42	ug/kg	
72-43-5	Methoxychlor	ND [a] UJ	42	8.4	ug/kg	
8001-35-2	Toxaphene	ND	100	52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	77%	69%	46-122%
2051-24-3	Decachlorobiphenyl	78%	78%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64234.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64234.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	21	10	ug/kg	
11104-28-2	Aroclor 1221	ND	21	17	ug/kg	
11141-16-5	Aroclor 1232	ND	21	17	ug/kg	
53469-21-9	Aroclor 1242	ND	21	10	ug/kg	
12672-29-6	Aroclor 1248	ND	21	10	ug/kg	
11097-69-1	Aroclor 1254	ND	21	10	ug/kg	
11096-82-5	Aroclor 1260	ND	21	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		44-126%
2051-24-3	Decachlorobiphenyl	56%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08068.D KK20593.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08068.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20593.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	30.7 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	14	3.4	ug/kg	
319-84-6	alpha-BHC	ND	14	3.9	ug/kg	
319-85-7	beta-BHC	ND	14	3.7	ug/kg	
319-86-8	delta-BHC	ND	14	6.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	14	4.8	ug/kg	
5103-71-9	alpha-Chlordane	13.7 J	14	2.8	ug/kg	J
5103-74-2	gamma-Chlordane	13.6 J	14	3.1	ug/kg	J
60-57-1	Dieldrin	ND	14	3.1	ug/kg	
72-54-8	4,4'-DDD	ND	28	5.6	ug/kg	
72-55-9	4,4'-DDE	ND	28	5.6	ug/kg	
50-29-3	4,4'-DDT	ND [b]	56	13	ug/kg	
72-20-8	Endrin	ND	28	5.6	ug/kg	
1031-07-8	Endosulfan sulfate	ND	28	9.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	28	8.4	ug/kg	
53494-70-5	Endrin ketone	ND	28	5.6	ug/kg	
959-98-8	Endosulfan-I	ND	14	3.1	ug/kg	
33213-65-9	Endosulfan-II	ND	28	4.2	ug/kg	
76-44-8	Heptachlor	ND	14	3.9	ug/kg	
1024-57-3	Heptachlor epoxide	ND	14	2.8	ug/kg	
72-43-5	Methoxychlor	ND [b]	56	11	ug/kg	
8001-35-2	Toxaphene	ND	700	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%	70%	46-122%
2051-24-3	Decachlorobiphenyl	76%	57%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64235.D

Kow I Bay

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64235.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	28	14	ug/kg	
11104-28-2	Aroclor 1221	ND	28	23	ug/kg	
11141-16-5	Aroclor 1232	ND	28	23	ug/kg	
53469-21-9	Aroclor 1242	ND	28	14	ug/kg	
12672-29-6	Aroclor 1248	ND	28	14	ug/kg	
11097-69-1	Aroclor 1254	ND	28	14	ug/kg	
11096-82-5	Aroclor 1260	135 J	28	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		44-126%
2051-24-3	Decachlorobiphenyl	48%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20783.D KK20775.D

Form I OCs

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20783.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	KK20775.D	10	08/08/07	FS	07/27/07	OP21640	GKK761

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND VL	2.5	0.61	ug/kg	
319-84-6	alpha-BHC	ND VL	2.5	0.71	ug/kg	
319-85-7	beta-BHC	ND VL	2.5	0.66	ug/kg	
319-86-8	delta-BHC	ND VL	2.5	1.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND VL	2.5	0.86	ug/kg	
5103-71-9	alpha-Chlordane	5.3 J	2.5	0.50	ug/kg	
5103-74-2	gamma-Chlordane	6.5 J	2.5	0.55	ug/kg	
60-57-1	Dieldrin	ND VL	2.5	0.55	ug/kg	
72-54-8	4,4'-DDD	ND VL	5.0	1.0	ug/kg	
72-55-9	4,4'-DDE	ND VL	5.0	1.0	ug/kg	
50-29-3	4,4'-DDT	ND [b]	51	12	ug/kg	
72-20-8	Endrin	ND VL	5.0	1.0	ug/kg	
1031-07-8	Endosulfan sulfate	ND VL	5.0	1.7	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	5.0	1.5	ug/kg	
53494-70-5	Endrin ketone	ND VL	5.0	1.0	ug/kg	
959-98-8	Endosulfan-I	ND VL	2.5	0.55	ug/kg	
33213-65-9	Endosulfan-II	ND VL	5.0	0.76	ug/kg	
76-44-8	Heptachlor	ND [b]	25	7.1	ug/kg	
1024-57-3	Heptachlor epoxide	1.7 L	2.5	0.50	ug/kg	J
72-43-5	Methoxychlor	ND [b]	51	10	ug/kg	
8001-35-2	Toxaphene	ND VL	130	63	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	50%	62%	46-122%
2051-24-3	Decachlorobiphenyl	37% [c]	61%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2
(c) Outside control limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64236.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64236.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	25	13	ug/kg	
11104-28-2	Aroclor 1221	ND	25	20	ug/kg	
11141-16-5	Aroclor 1232	ND	25	20	ug/kg	
53469-21-9	Aroclor 1242	ND	25	13	ug/kg	
12672-29-6	Aroclor 1248	ND	25	13	ug/kg	
11097-69-1	Aroclor 1254	ND	25	13	ug/kg	
11096-82-5	Aroclor 1260	74.2 J	25	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	72%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20476.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20476.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	1040 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.048	0.019	ug/l	
319-84-6	alpha-BHC	ND	0.048	0.014	ug/l	
319-85-7	beta-BHC	ND	0.048	0.019	ug/l	
319-86-8	delta-BHC	ND	0.048	0.019	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.048	0.014	ug/l	
5103-71-9	alpha-Chlordane	ND	0.048	0.014	ug/l	
5103-74-2	gamma-Chlordane	ND	0.048	0.014	ug/l	
60-57-1	Dieldrin	ND	0.048	0.014	ug/l	
72-54-8	4,4'-DDD	ND	0.096	0.019	ug/l	
72-55-9	4,4'-DDE	ND	0.096	0.019	ug/l	
50-29-3	4,4'-DDT	ND	0.096	0.019	ug/l	
72-20-8	Endrin	ND	0.096	0.038	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.096	0.019	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.096	0.038	ug/l	
53494-70-5	Endrin ketone	ND	0.096	0.019	ug/l	
959-98-8	Endosulfan-I	ND	0.048	0.014	ug/l	
33213-65-9	Endosulfan-II	ND	0.096	0.019	ug/l	
76-44-8	Heptachlor	ND	0.048	0.019	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.048	0.014	ug/l	
72-43-5	Methoxychlor	ND	0.096	0.038	ug/l	
8001-35-2	Toxaphene	ND	2.4	1.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%		42-127%
2051-24-3	Decachlorobiphenyl	78%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022304.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022304.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	1040 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND VJ	0.48	0.24	ug/l	
11104-28-2	Aroclor 1221	ND	0.48	0.38	ug/l	
11141-16-5	Aroclor 1232	ND	0.48	0.38	ug/l	
53469-21-9	Aroclor 1242	ND	0.48	0.24	ug/l	
12672-29-6	Aroclor 1248	ND	0.48	0.24	ug/l	
11097-69-1	Aroclor 1254	ND	0.48	0.24	ug/l	
11096-82-5	Aroclor 1260	ND	0.48	0.24	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	82%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08066.D KK20586.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08066.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20586.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	30.8 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.4	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.4	2.6	ug/kg	
319-85-7	beta-BHC	ND	9.4	2.4	ug/kg	
319-86-8	delta-BHC	ND	9.4	4.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.4	3.2	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.4	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.4	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.4	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.8	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.8	ug/kg	
50-29-3	4,4'-DDT	ND [b]	37	8.6	ug/kg	
72-20-8	Endrin	ND	19	3.8	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.2	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	19	5.6	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.8	ug/kg	
959-98-8	Endosulfan-I	ND	9.4	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.8	ug/kg	
76-44-8	Heptachlor	ND	9.4	2.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.4	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b]	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	470	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%	70%	46-122%
2051-24-3	Decachlorobiphenyl	80%	72%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64237.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64237.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.4	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.4	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.4	ug/kg	
11097-69-1	Aroclor 1254 [b]	42.0 J	19	9.4	ug/kg	J
11096-82-5	Aroclor 1260 [b]	41.8 J	19	9.4	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	77%		44-126%
2051-24-3	Decachlorobiphenyl	79%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20479.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20479.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.057	0.023	ug/l	
319-84-6	alpha-BHC	ND	0.057	0.017	ug/l	
319-85-7	beta-BHC	ND	0.057	0.023	ug/l	
319-86-8	delta-BHC	ND	0.057	0.023	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.057	0.017	ug/l	
5103-71-9	alpha-Chlordane	ND	0.057	0.017	ug/l	
5103-74-2	gamma-Chlordane	ND	0.057	0.017	ug/l	
60-57-1	Dieldrin	ND	0.057	0.017	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.023	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.023	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.023	ug/l	
72-20-8	Endrin	ND	0.11	0.045	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.023	ug/l	
7421-93-4	Endrin aldehyde	ND VL	0.11	0.045	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.023	ug/l	
959-98-8	Endosulfan-I	ND	0.057	0.017	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.023	ug/l	
76-44-8	Heptachlor	ND	0.057	0.023	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.057	0.017	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.045	ug/l	
8001-35-2	Toxaphene	ND	2.8	1.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	82%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022307.D

Form I Org

Accutest Laboratories

Report of Analysis

3.2.0 3

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022307.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	880 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND UJ	0.57	0.28	ug/l	
11104-28-2	Aroclor 1221	ND	0.57	0.45	ug/l	
11141-16-5	Aroclor 1232	ND	0.57	0.45	ug/l	
53469-21-9	Aroclor 1242	ND	0.57	0.28	ug/l	
12672-29-6	Aroclor 1248	ND	0.57	0.28	ug/l	
11097-69-1	Aroclor 1254	ND	0.57	0.28	ug/l	
11096-82-5	Aroclor 1260	ND	0.57	0.28	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	80%		38-127%
2051-24-3	Decachlorobiphenyl	87%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08070.D KK20587.D

Form I corr

Accutest Laboratories

Report of Analysis

3.22
3

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08070.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20587.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.6	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.6	2.7	ug/kg	
319-85-7	beta-BHC	ND	9.6	2.5	ug/kg	
319-86-8	delta-BHC	ND	9.6	4.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.6	3.3	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.6	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.6	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.6	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.9	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.9	ug/kg	
50-29-3	4,4'-DDT	ND [b]	39	8.9	ug/kg	
72-20-8	Endrin	ND	19	3.9	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.4	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	19	5.8	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.9	ug/kg	
959-98-8	Endosulfan-I	ND	9.6	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.9	ug/kg	
76-44-8	Heptachlor	ND	9.6	2.7	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.6	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b]	39	7.7	ug/kg	
8001-35-2	Toxaphene	ND	480	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%	65%	46-122%
2051-24-3	Decachlorobiphenyl	80%	72%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64238.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64238.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	90.2	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		44-126%
2051-24-3	Decachlorobiphenyl	76%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08071.D KK20588.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08071.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20588.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.3	2.2	ug/kg	
319-84-6	alpha-BHC	ND	9.3	2.6	ug/kg	
319-85-7	beta-BHC	ND	9.3	2.4	ug/kg	
319-86-8	delta-BHC	ND	9.3	4.1	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.3	3.2	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.3	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.3	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.3	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.7	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.7	ug/kg	
50-29-3	4,4'-DDT	ND [b] VL	37	8.6	ug/kg	
72-20-8	Endrin	ND	19	3.7	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	19	5.6	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.7	ug/kg	
959-98-8	Endosulfan-I	ND	9.3	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.8	ug/kg	
76-44-8	Heptachlor	ND	9.3	2.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.3	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b] VL	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	470	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	53%	51%	46-122%
2051-24-3	Decachlorobiphenyl	59%	48% [c]	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2
(c) Outside control limits due to dilution.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022594.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XX022594.D	2	08/02/07	AC	07/27/07	OP21641	GXX189
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	37	19	ug/kg	
11104-28-2	Aroclor 1221	ND	37	30	ug/kg	
11141-16-5	Aroclor 1232	ND	37	30	ug/kg	
53469-21-9	Aroclor 1242	ND	37	19	ug/kg	
12672-29-6	Aroclor 1248	ND	37	19	ug/kg	
11097-69-1	Aroclor 1254	ND	37	37	ug/kg	
11096-82-5	Aroclor 1260	152	37	19	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	47%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08076.D KK20589.D

Form I Cpy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08076.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20589.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.1	2.2	ug/kg	
319-84-6	alpha-BHC	ND	9.1	2.5	ug/kg	
319-85-7	beta-BHC	ND	9.1	2.4	ug/kg	
319-86-8	delta-BHC	ND	9.1	4.0	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.1	3.1	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.1	1.8	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.1	2.0	ug/kg	
60-57-1	Dieldrin	ND	9.1	2.0	ug/kg	
72-54-8	4,4'-DDD	ND	18	3.6	ug/kg	
72-55-9	4,4'-DDE	ND	18	3.6	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	36	8.4	ug/kg	
72-20-8	Endrin	ND	18	3.6	ug/kg	
1031-07-8	Endosulfan sulfate	ND	18	6.0	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	18	5.5	ug/kg	
53494-70-5	Endrin ketone	ND	18	3.6	ug/kg	
959-98-8	Endosulfan-I	ND	9.1	2.0	ug/kg	
33213-65-9	Endosulfan-II	ND	18	2.7	ug/kg	
76-44-8	Heptachlor	ND [b]	18	5.1	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.1	1.8	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	36	7.3	ug/kg	
8001-35-2	Toxaphene	ND	450	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	64%	62%	46-122%
2051-24-3	Decachlorobiphenyl	67%	55%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64296.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64296.D	2	08/01/07	JB	07/27/07	OP21641	GST1698
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	36	18	ug/kg	
11104-28-2	Aroclor 1221	ND	36	29	ug/kg	
11141-16-5	Aroclor 1232	ND	36	29	ug/kg	
53469-21-9	Aroclor 1242	ND	36	18	ug/kg	
12672-29-6	Aroclor 1248	ND	36	18	ug/kg	
11097-69-1	Aroclor 1254 [b]	124 J	36	18	ug/kg	J
11096-82-5	Aroclor 1260 [b]	73.2 J	36	18	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	61%		44-126%
2051-24-3	Decachlorobiphenyl	62%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Estimated value due to the presence of multiple overlapping Aroclor patterns.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08196.D TT08182.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	TT08196.D	1	08/06/07	FS	07/27/07	OP21640	GTT278
Run #2	TT08182.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2	30.6 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND VJ	1.9	0.82	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND VL	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND VL	1.9	0.41	ug/kg	
60-57-1	Dieldrin	ND VL	1.9	0.41	ug/kg	
72-54-8	4,4'-DDD	ND	3.7	0.75	ug/kg	
72-55-9	4,4'-DDE	ND VL	3.7	0.75	ug/kg	
50-29-3	4,4'-DDT	ND [a] VJ	37	8.6	ug/kg	
72-20-8	Endrin	ND VL	3.7	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND VL	3.7	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND VL	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND [a]	19	5.2	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND [a] VJ	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	93	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	76%	70%	46-122%
2051-24-3	Decachlorobiphenyl	68%	77%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64243.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64243.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.3	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.3	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.3	ug/kg	
11097-69-1	Aroclor 1254	10.9 J	19	9.3	ug/kg	J
11096-82-5	Aroclor 1260	ND	19	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	67%		44-126%
2051-24-3	Decachlorobiphenyl	65%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08075.D KK20590.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08075.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20590.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2	30.3 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.6	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.6	2.7	ug/kg	
319-85-7	beta-BHC	ND	9.6	2.5	ug/kg	
319-86-8	delta-BHC	ND	9.6	4.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.6	3.3	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.6	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.6	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.6	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.8	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.8	ug/kg	
50-29-3	4,4'-DDT	ND [b] VJ	38	8.8	ug/kg	
72-20-8	Endrin	ND	19	3.8	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.3	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	19	5.8	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.8	ug/kg	
959-98-8	Endosulfan-I	ND	9.6	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.9	ug/kg	
76-44-8	Heptachlor	ND [b]	19	5.4	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.6	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b] VJ	38	7.7	ug/kg	
8001-35-2	Toxaphene	ND	480	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%	72%	46-122%
2051-24-3	Decachlorobiphenyl	87%	72%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64244.D

Form I copy

Accutest Laboratories

Report of Analysis

3.2.6

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64244.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.6	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.6	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.6	ug/kg	
11097-69-1	Aroclor 1254	41.1 J	19	9.6	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		44-126%
2051-24-3	Decachlorobiphenyl	68%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20778.D TT08181.D

Form I Copy

Accutest Laboratories

Report of Analysis

3.27
3

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20778.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08181.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2	30.8 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.42	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.49	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.78	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.60	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.35	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	ND	1.8	0.39	ug/kg	
72-54-8	4,4'-DDD	ND	3.5	0.71	ug/kg	
72-55-9	4,4'-DDE	ND	3.5	0.71	ug/kg	
50-29-3	4,4'-DDT	ND [a]	35	8.1	ug/kg	
72-20-8	Endrin	ND	3.5	0.71	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.5	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND vL	3.5	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.5	0.71	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.5	0.53	ug/kg	
76-44-8	Heptachlor	ND [a]	18	4.9	ug/kg	
1024-57-3	Heptachlor epoxide	0.48 J	1.8	0.35	ug/kg	J
72-43-5	Methoxychlor	ND [a]	35	7.1	ug/kg	
8001-35-2	Toxaphene	ND	88	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	110%	70%	46-122%
2051-24-3	Decachlorobiphenyl	88%	78%	50-133%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64245.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64245.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	18	8.8	ug/kg	
11104-28-2	Aroclor 1221	ND	18	14	ug/kg	
11141-16-5	Aroclor 1232	ND	18	14	ug/kg	
53469-21-9	Aroclor 1242	ND	18	8.8	ug/kg	
12672-29-6	Aroclor 1248	ND	18	8.8	ug/kg	
11097-69-1	Aroclor 1254	11.1 J	18	8.8	ug/kg	J
11096-82-5	Aroclor 1260	ND	18	8.8	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20779.D TT08185.D

Form I COA

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20779.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08185.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2	30.8 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.8	0.43	ug/kg	
319-84-6	alpha-BHC	ND	1.8	0.50	ug/kg	
319-85-7	beta-BHC	ND	1.8	0.46	ug/kg	
319-86-8	delta-BHC	ND	1.8	0.78	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.8	0.60	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.8	0.35	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.8	0.39	ug/kg	
60-57-1	Dieldrin	0.75 J	1.8	0.39	ug/kg	J
72-54-8	4,4'-DDD	ND	3.5	0.71	ug/kg	
72-55-9	4,4'-DDE	ND	3.5	0.71	ug/kg	
50-29-3	4,4'-DDT	ND [b]	35	8.2	ug/kg	
72-20-8	Endrin	ND	3.5	0.71	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.5	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.5	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.5	0.71	ug/kg	
959-98-8	Endosulfan-I	ND	1.8	0.39	ug/kg	
33213-65-9	Endosulfan-II	ND	3.5	0.53	ug/kg	
76-44-8	Heptachlor	ND [b]	18	5.0	ug/kg	
1024-57-3	Heptachlor epoxide	0.46 J	1.8	0.35	ug/kg	J
72-43-5	Methoxychlor	ND [b]	35	7.1	ug/kg	
8001-35-2	Toxaphene	ND	89	44	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	75%	67%	46-122%
2051-24-3	Decachlorobiphenyl	62%	70%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64248.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64248.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result		RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND		18	8.9	ug/kg	
11104-28-2	Aroclor 1221	ND		18	14	ug/kg	
11141-16-5	Aroclor 1232	ND		18	14	ug/kg	
53469-21-9	Aroclor 1242	ND		18	8.9	ug/kg	
12672-29-6	Aroclor 1248	ND		18	8.9	ug/kg	
11097-69-1	Aroclor 1254 [b]	21.0	J	18	8.9	ug/kg	
11096-82-5	Aroclor 1260	ND		18	8.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	74%		44-126%
2051-24-3	Decachlorobiphenyl	59%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Aroclor pattern appears to be weathered.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20780.D TT08186.D

Form I COR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20780.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08186.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2	30.1 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.9	0.45	ug/kg	
319-84-6	alpha-BHC	ND	1.9	0.52	ug/kg	
319-85-7	beta-BHC	ND	1.9	0.49	ug/kg	
319-86-8	delta-BHC	ND	1.9	0.82	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.9	0.63	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.9	0.37	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.9	0.41	ug/kg	
60-57-1	Dieldrin	0.44 J	1.9	0.41	ug/kg	J
72-54-8	4,4'-DDD	1.0 J	3.7	0.75	ug/kg	J
72-55-9	4,4'-DDE	ND	3.7	0.75	ug/kg	
50-29-3	4,4'-DDT	ND [b]	37	8.6	ug/kg	
72-20-8	Endrin	ND	3.7	0.75	ug/kg	
1031-07-8	Endosulfan sulfate	ND	3.7	1.2	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.7	1.1	ug/kg	
53494-70-5	Endrin ketone	ND	3.7	0.75	ug/kg	
959-98-8	Endosulfan-I	ND	1.9	0.41	ug/kg	
33213-65-9	Endosulfan-II	ND	3.7	0.56	ug/kg	
76-44-8	Heptachlor	ND [b]	19	5.2	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.9	0.37	ug/kg	
72-43-5	Methoxychlor	ND [b]	37	7.5	ug/kg	
8001-35-2	Toxaphene	ND	93	47	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	120%	77%	46-122%
2051-24-3	Decachlorobiphenyl	100%	78%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64249.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64249.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.3	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.3	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.3	ug/kg	
11097-69-1	Aroclor 1254 [b]	24.7 J	19	9.3	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	73%		44-126%
2051-24-3	Decachlorobiphenyl	66%		39-157%

(a) All hits confirmed by dual column analysis.
(b) Aroclor pattern appears to be weathered.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20781.D TT08189.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20781.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08189.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2	30.5 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.7	0.41	ug/kg	
319-84-6	alpha-BHC	ND	1.7	0.48	ug/kg	
319-85-7	beta-BHC	ND	1.7	0.45	ug/kg	
319-86-8	delta-BHC	ND	1.7	0.76	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.7	0.59	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.7	0.34	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.7	0.38	ug/kg	
60-57-1	Dieldrin	ND	1.7	0.38	ug/kg	
72-54-8	4,4'-DDD	ND	3.4	0.69	ug/kg	
72-55-9	4,4'-DDE	ND	3.4	0.69	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	34	7.9	ug/kg	
72-20-8	Endrin	ND	3.4	0.69	ug/kg	
1031-07-8	Endosulfan sulfate	7.1	3.4	1.1	ug/kg	
7421-93-4	Endrin aldehyde	ND VL	3.4	1.0	ug/kg	
53494-70-5	Endrin ketone	ND	3.4	0.69	ug/kg	
959-98-8	Endosulfan-I	ND	1.7	0.38	ug/kg	
33213-65-9	Endosulfan-II	ND	3.4	0.52	ug/kg	
76-44-8	Heptachlor	ND [b]	17	4.8	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.7	0.34	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	34	6.9	ug/kg	
8001-35-2	Toxaphene	ND	86	43	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	66%	69%	46-122%
2051-24-3	Decachlorobiphenyl	73%	80%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64250.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64250.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	17	8.6	ug/kg	
11104-28-2	Aroclor 1221	ND	17	14	ug/kg	
11141-16-5	Aroclor 1232	ND	17	14	ug/kg	
53469-21-9	Aroclor 1242	ND	17	8.6	ug/kg	
12672-29-6	Aroclor 1248	ND	17	8.6	ug/kg	
11097-69-1	Aroclor 1254	ND	17	8.6	ug/kg	
11096-82-5	Aroclor 1260	ND	17	8.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		44-126%
2051-24-3	Decachlorobiphenyl	72%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20782.D TT08190.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK20782.D	1	08/08/07	FS	07/27/07	OP21640	GKK761
Run #2	TT08190.D	10	08/06/07	FS	07/27/07	OP21640	GTT278

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2	31.7 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	1.7	0.41	ug/kg	
319-84-6	alpha-BHC	ND	1.7	0.48	ug/kg	
319-85-7	beta-BHC	ND	1.7	0.44	ug/kg	
319-86-8	delta-BHC	ND	1.7	0.75	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	1.7	0.58	ug/kg	
5103-71-9	alpha-Chlordane	ND	1.7	0.34	ug/kg	
5103-74-2	gamma-Chlordane	ND	1.7	0.37	ug/kg	
60-57-1	Dieldrin	ND	1.7	0.37	ug/kg	
72-54-8	4,4'-DDD	ND	3.4	0.68	ug/kg	
72-55-9	4,4'-DDE	ND	3.4	0.68	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	33	7.6	ug/kg	
72-20-8	Endrin	ND	3.4	0.68	ug/kg	
1031-07-8	Endosulfan sulfate	2.1 J	3.4	1.1	ug/kg	J
7421-93-4	Endrin aldehyde	ND UL	3.4	1.0	ug/kg	
53494-70-5	Endrin ketone	ND	3.4	0.68	ug/kg	
959-98-8	Endosulfan-I	ND	1.7	0.37	ug/kg	
33213-65-9	Endosulfan-II	ND	3.4	0.51	ug/kg	
76-44-8	Heptachlor	ND [b]	16	4.6	ug/kg	
1024-57-3	Heptachlor epoxide	ND	1.7	0.34	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	33	6.6	ug/kg	
8001-35-2	Toxaphene	ND	85	43	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	55%	80%	46-122%
2051-24-3	Decachlorobiphenyl	57%	81%	50-133%

(a) All hits confirmed by dual column analysis.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64251.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST64251.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	17	8.5	ug/kg	
11104-28-2	Aroclor 1221	ND	17	14	ug/kg	
11141-16-5	Aroclor 1232	ND	17	14	ug/kg	
53469-21-9	Aroclor 1242	ND	17	8.5	ug/kg	
12672-29-6	Aroclor 1248	ND	17	8.5	ug/kg	
11097-69-1	Aroclor 1254	ND	17	8.5	ug/kg	
11096-82-5	Aroclor 1260	ND	17	8.5	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		44-126%
2051-24-3	Decachlorobiphenyl	80%		39-157%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: TT08074.D KK20592.D

Form I OV

Accutest Laboratories

Report of Analysis

3.3.2

3

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8081A SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	TT08074.D	5	07/31/07	FS	07/27/07	OP21640	GTT274
Run #2	KK20592.D	10	08/02/07	FS	07/27/07	OP21640	GKK756

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2	29.9 g	10.0 ml

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	9.7	2.3	ug/kg	
319-84-6	alpha-BHC	ND	9.7	2.7	ug/kg	
319-85-7	beta-BHC	ND	9.7	2.5	ug/kg	
319-86-8	delta-BHC	ND	9.7	4.2	ug/kg	
58-89-9	gamma-BHC (Lindane)	ND	9.7	3.3	ug/kg	
5103-71-9	alpha-Chlordane	ND	9.7	1.9	ug/kg	
5103-74-2	gamma-Chlordane	ND	9.7	2.1	ug/kg	
60-57-1	Dieldrin	ND	9.7	2.1	ug/kg	
72-54-8	4,4'-DDD	ND	19	3.9	ug/kg	
72-55-9	4,4'-DDE	ND	19	3.9	ug/kg	
50-29-3	4,4'-DDT	ND [b] UJ	39	8.9	ug/kg	
72-20-8	Endrin	ND	19	3.9	ug/kg	
1031-07-8	Endosulfan sulfate	ND	19	6.4	ug/kg	
7421-93-4	Endrin aldehyde	ND UL	19	5.8	ug/kg	
53494-70-5	Endrin ketone	ND	19	3.9	ug/kg	
959-98-8	Endosulfan-I	ND	9.7	2.1	ug/kg	
33213-65-9	Endosulfan-II	ND	19	2.9	ug/kg	
76-44-8	Heptachlor	ND [b]	19	5.4	ug/kg	
1024-57-3	Heptachlor epoxide	ND	9.7	1.9	ug/kg	
72-43-5	Methoxychlor	ND [b] UJ	39	7.7	ug/kg	
8001-35-2	Toxaphene	ND	480	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%	69%	46-122%
2051-24-3	Decachlorobiphenyl	86%	75%	50-133%

(a) Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: ST64254.D

Form I OR-1

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8082 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	ST64254.D	1	07/31/07	JB	07/27/07	OP21641	GST1697
Run #2							

	Initial Weight	Final Volume
Run #1	29.9 g	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	19	9.7	ug/kg	
11104-28-2	Aroclor 1221	ND	19	15	ug/kg	
11141-16-5	Aroclor 1232	ND	19	15	ug/kg	
53469-21-9	Aroclor 1242	ND	19	9.7	ug/kg	
12672-29-6	Aroclor 1248	ND	19	9.7	ug/kg	
11097-69-1	Aroclor 1254	75.6 J	19	9.7	ug/kg	
11096-82-5	Aroclor 1260	ND	19	9.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	65%		44-126%
2051-24-3	Decachlorobiphenyl	70%		39-157%

(a) All hits confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: KK20475.D

For I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8081A SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK20475.D	1	07/26/07	FS	07/24/07	OP21578	GKK752
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

Pesticide TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.054	0.022	ug/l	
319-84-6	alpha-BHC	ND	0.054	0.016	ug/l	
319-85-7	beta-BHC	ND	0.054	0.022	ug/l	
319-86-8	delta-BHC	ND	0.054	0.022	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.054	0.016	ug/l	
5103-71-9	alpha-Chlordane	ND	0.054	0.016	ug/l	
5103-74-2	gamma-Chlordane	ND	0.054	0.016	ug/l	
60-57-1	Dieldrin	ND	0.054	0.016	ug/l	
72-54-8	4,4'-DDD	ND	0.11	0.022	ug/l	
72-55-9	4,4'-DDE	ND	0.11	0.022	ug/l	
50-29-3	4,4'-DDT	ND	0.11	0.022	ug/l	
72-20-8	Endrin	ND	0.11	0.043	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	0.022	ug/l	
7421-93-4	Endrin aldehyde	ND	0.11	0.043	ug/l	
53494-70-5	Endrin ketone	ND	0.11	0.022	ug/l	
959-98-8	Endosulfan-I	ND	0.054	0.016	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	0.022	ug/l	
76-44-8	Heptachlor	ND	0.054	0.022	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.054	0.016	ug/l	
72-43-5	Methoxychlor	ND	0.11	0.043	ug/l	
8001-35-2	Toxaphene	ND	2.7	1.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	78%		42-127%
2051-24-3	Decachlorobiphenyl	71%		27-127%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: XX022303.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8082 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XX022303.D	1	07/26/07	AC	07/24/07	OP21577	GXX184
Run #2							

	Initial Volume	Final Volume
Run #1	920 ml	10.0 ml
Run #2		

PCB List

CAS No.	Compound	Result	RL	MDL	Units	Q
12674-11-2	Aroclor 1016	ND	0.54	0.27	ug/l	
11104-28-2	Aroclor 1221	ND	0.54	0.43	ug/l	
11141-16-5	Aroclor 1232	ND	0.54	0.43	ug/l	
53469-21-9	Aroclor 1242	ND	0.54	0.27	ug/l	
12672-29-6	Aroclor 1248	ND	0.54	0.27	ug/l	
11097-69-1	Aroclor 1254	ND	0.54	0.27	ug/l	
11096-82-5	Aroclor 1260	ND	0.54	0.27	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	87%		38-127%
2051-24-3	Decachlorobiphenyl	75%		25-137%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Perchlorate
Datachem Laboratories, Inc. SDG 07E-0644-01
(Accutest Laboratories, Inc., SDG F51154)

DATE: September 27, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. The aqueous samples were analyzed for perchlorate analysis using liquid chromatography mass spectroscopy (LC/MS) SW-846 method LC-MS-CLO4/6850 in selective ion monitoring (SIM) mode. A total of five aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	LFSW01	F51154-17
41SW09	F51154-7	TMSW01	F51154-20
41SW10	F51154-8		

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006), *DoD Perchlorate Handbook August, Rev1, Change 1, 2007* (DoD, 2007), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Check
X		Initial and Continuing Calibration
	X	Blank Analysis
	X	Internal Standards
	X	Laboratory Control Sample (LCS)
	X	Matrix Spike (MS) and Spike Duplicate (MSD)
	X	Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/27/07
Date

RFAAP VALIDATION REPORT
PERCHLORATE REVIEW
SDG 07E-0644-01 (F51154)

I-Holding Times and Preservation

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. For perchlorate analysis, aqueous samples are received and stored at cool @4°C±2°C with a maximum holding time of 28 days from collection (DoD Perchlorate Handbook criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 07/18/07 and 07/19/07. The aqueous perchlorate samples were prepped on 08/06/07 and analyzed on 08/06/07 and 08/07/07. All holding time criteria were met. No qualifiers were applied.

II-Instrument Performance Check

GC/MS instrument performance checks are performed to ensure mass resolution, identification and, to some degree, sensitivity. The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, $^{35}Cl^{16}O_3$, met the mass calibration criteria. No qualification was applied.

III-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

Perchlorate:	1- blank (<1/2MRL DoD Perchlorate Handbook)
	5 – standards (r≥0.995 DoD Perchlorate Handbook)
	ICV (±10%D DoD Perchlorate Handbook)
	CCV/ICS (±30%D DoD Perchlorate Handbook)
	LODV (±30%D DoD Perchlorate Handbook)

- The perchlorate samples were analyzed on 08/06/07 and 08/07/07 for the aqueous samples. Perchlorate was calibrated second order for on 08/06/07 with a coefficient of 0.9995. Perchlorate for LODV2 (100%) and CCV2 (10.7%D) were above criteria, probably due to baseline noise. All other ICV/CCV/ICS/LODV standards were within criteria. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were bracketed by LODV2; therefore, were qualified as estimated "J" for detects and "UJ" for non-detects based upon the high %D. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) were bracketed by CCV2; therefore, were qualified as estimated "J" for detects and "UJ" for non-detects based upon the high %D. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this calibration.

IV-Blanks

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be detected in any of the associated blanks >MDL. The DoD Perchlorate Handbook criterion specifies all concentrations should be less than ½ MRL for method blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5X) the maximum amount for target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
08/06/07	Perchlorate	BL-258879-1	<½MRL	NA	None
09/18/07	Perchlorate	RB083007	<½MRL	NA	None

MRL = Method Reporting Limit.
NA = Not Applicable.

V-Internal Standards

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Internal standard area counts for samples and blanks must not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The DoD Handbook specifies retention times (RT) 1.0 ± 2% of last calibration standard and the ratio of RT of sample to standard should be 3.06 and fall between 2.3 and 3.8. The laboratory 83:85 mass ratio limit range is 2.12 to 3.94. The internal standard peak area responses should fall between 50% to 150% recoveries.

- All criteria were met. No qualifiers were applied.

VI-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. DoD Perchlorate Handbook and laboratory aqueous limits are 85-115%.

- Sample QC-258879-1 was used as aqueous LCS for perchlorate analysis dated 08/06/07 and 08/07/07. All criteria were met. No qualifiers were applied.

VII-Matrix Spike (MS) and Spike Duplicate (MSD)

MS and MSD are generated to determine long-term accuracy and precision of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. MS/MSD recoveries and relative percent differences between MS recoveries should be within the specified limits. DoD Perchlorate Handbook aqueous limits are 75-125%; RPD≤20%. The laboratory limits are 80-120%; RPD≤15%.

- Sample LFSW01 (F51154-17) was used for the MS/MSD analysis for the 08/06/07 and 08/07/07 perchlorate analysis. All criteria were met. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD sample.

VIII-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for perchlorate. The original sample was detected at 1.28 µg/L and the field duplicate was detected at 1.15 µg/L, resulting in a RPD of 10.7%. All criteria were met. No qualifiers were applied.

IX-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, "J." The following calculations were performed for verification.

Sample: LFSW01 (F51154-17), Perchlorate

y (area ratio) = (Sample Area/Area EIC89) = (18400.4/52754.7) = 0.348792 = ax^2 + bx + c

Setting y = 0,
x = [-b ± SQRT(b^2-4ac)] / (2a)

where: x is the amount ratio

a = 0.0167903 b = 1.41217 (set to zero = c-y) c = - 0.0152267 - 0.348792 = -0.3640187

amount ratio ={-1.41217± [SQRT{(1.41217^2) – (4*0.0167903*-0.3640187)}] / (2*0.0167903)
= (-1.41217±1.4208) / (0.0335806)
= 0.256987

Conc. µg/L = (Amount ratio * Is * DF)

where: Conc. = Sample concentration in ug/L
I_s = Amount of internal standard (µg/L).
DF = Dilution factor

Conc. µg/L = (Amount ratio * Is * DF)
= (0.256987* 5 µg/L * 1) = 1.28 µg/L

Reported concentration = 1.28 µg/L
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I Copy

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
08080715501460
Page 3

S076Q00M

Date Printed.....: 08-AUG-07 15:50

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F51154
Release Number.....: Not Provided

Date Received.....: 21-JUL-07 00:00

Client Sample Name: F51154-6
DCL Sample Name...: 07M03738
DCL Report Group..: 07M-0644-01

Matrix.....: WATER
Date Sampled.....: 18-JUL-07 10:40
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 06-AUG-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G077500T
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPFX250
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	06-AUG-07 23:43	0.112	0.168	J	J	1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Form I copy

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
08080715501460

Date Printed.....: 08-AUG-07 15:50

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F51154
Release Number.....: Not Provided

Date Received.....: 21-JUL-07 00:00

Client Sample Name: F51154-7
DCL Sample Name...: 07E03739
DCL Report Group..: 07E-0644-01

Matrix.....: WATER
Date Sampled.....: 18-JUL-07 11:05
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 06-AUG-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G077500T
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	07-AUG-07 00:03	0.112	0.142	J	J	1	0.200

07

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Form I Copy

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
08080715501460
Page 5

S076Q00P

Date Printed.....: 08-AUG-07 15:50

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F51154
Release Number.....: Not Provided

Date Received.....: 21-JUL-07 00:00

Client Sample Name: F51154-8
DCL Sample Name...: 07E03740
DCL Report Group..: 07E-0644-01

Matrix.....: WATER
Date Sampled.....: 18-JUL-07 11:45
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 06-AUG-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G077500T
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	07-AUG-07 00:22	0.112	0.135	J	J	1	0.200

08

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Form I Copy

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
08080715501460

8076Q00R

Date Printed.....: 08-AUG-07 15:50

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: F51154
Release Number.....: Not Provided

Date Received.....: 21-JUL-07 00:00

Client Sample Name: F51154-17
DCL Sample Name...: 07M03742
DCL Report Group..: 07M-0644-01

Matrix.....: WATER
Date Sampled.....: 18-JUL-07 11:20
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 06-AUG-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G077500T
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	07-AUG-07 01:02	0.112	1.28	J		1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Form I copy

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
08080715501460
Page 8

8076Q00V

Date Printed.....: 08-AUG-07 15:50

Client Name.....: ACCUTEST Laboratories
Client Ref Number....: Not Provided
Sampling Site.....: FS1154
Release Number.....: Not Provided

Date Received.....: 21-JUL-07 00:00

Client Sample Name: FS1154-20
DCL Sample Name...: 07M03743
DCL Report Group..: 07M-0644-01

Matrix.....: WATER
Date Sampled.....: 19-JUL-07 11:20
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: Not Applicable
Date Prepared.....: 06-AUG-07 00:00
Preparation Method...: 6850
Aliquot Weight/Volume: Not Applicable
Net Weight/Volume....: Not Required

DCL Analysis Group: G077500T
Analysis Method...: 6850
Instrument Type...: LC/MS
Instrument ID.....: LCMS02
Column Type.....: KP-RPPX250
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	PQL
Perchlorate	07-AUG-07 02:01	0.112	1.15	J		1	0.200

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – TAL Metals
Accutest Laboratories, Inc., SDG F51154

DATE: September 25, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. Aqueous samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3010A/6010B for ICP metals and SW-846 7470A for mercury. Solid samples were analyzed for target analyte list (TAL) metals using USEPA SW-846 3050B/6010B for ICP metals and SW-846 7471A for mercury. A total of five aqueous samples and seventeen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	41SD11	F51154-22
41SW09	F51154-7	49SS02	F51154-23
41SW10	F51154-8	49SS03	F51154-24
41SD08	F51154-9	49SS04	F51154-25
41SD09	F51154-10	49SS05	F51154-26
41SD10	F51154-11	59SS06	F51154-27
LFSD01	F51154-15	59SS07	F51154-28
TMSD01	F51154-16	59SS08	F51154-29
LFSW01	F51154-17	59SS09	F51154-30
APSD01	F51154-18	59SS10	F51154-31
TMSW01	F51154-20	TMSS05	F51154-32

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICP Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Sample Duplicate
X		Matrix Spike and Spike Duplicate
X		ICP Serial Dilution
X		Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/25/07
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG F51154

I-Holding Times

The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: For aqueous matrices, the samples are shipped cool @4°C±2°C and preserved to pH<2 with HNO_3 with a maximum holding time is 180 days for ICP metals and 28 days for mercury. For solid matrices, the samples are shipped cool @4°C±2°C with a maximum holding time is 180 days for ICP metals and 28 days for mercury.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: Samples were collected 07/18/07 and 07/19/07 for metals analysis. For aqueous samples collected 07/18/07 and 07/19/07, they were digested on 07/26/07 and analyzed on 07/27/07 for ICP metals. For solid samples collected 07/18/07 and 07/19/07, they were digested on 07/25/07 and 07/26/07 and analyzed on 07/25/07, 07/26/07, and 07/27/07 (Mn & Zn) for ICP metals. For aqueous samples collected 07/18/07 and 07/19/07, they were digested on 07/25/07 and analyzed on 07/25/07 for mercury. For solid samples collected 07/18/07 and 07/19/07, they were digested on 07/26/07 and analyzed on 07/26/07 for mercury (two runs). All criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration

Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICP:	1- blank (DoD QSM <½ MRL)	Hg:	1 – blank (DoD QSM <½ MRL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (DoD QSM 90-110%)		ICV/CCV (80-120%)(DoD QSM ICV 90-110% & CCV 80-120%)
	MRL (70-130%) (DoD QSM 80-120%)		MRL (80-120%) (DoD QSM 80-120%)
	High Std. (95-105%)		High Std. (95-105%)

- The aqueous samples were analyzed for ICP metals on 07/27/07. The solid samples were analyzed for ICP metals on 07/25/07, 07/26/07, and 07/27/07 (Mn & Zn). Mercury was analyzed for the aqueous samples on 07/25/07 with a correlation coefficient of 0.9998. Mercury was analyzed for the solid samples on 07/26/07 with a correlation coefficient of 0.9998. Mercury was analyzed for the solid samples on 07/26/07 (second run) with a correlation coefficient of 0.9991. For 07/26/07 ICP run, zinc (CCV5=110.5%) was outside criteria; however, no samples were bracketed by this CCV for zinc. No qualifiers were applied based upon this outlier. For 07/27/07 ICP run, zinc (CCV14=88.5% and CCV18=89.5%) were outside criteria; however, no samples were bracketed by these CCVs for zinc. No qualifiers were applied based upon these outliers. All other ICV/CCV/High Standard criteria were met for all other metals and runs. **Table 2** summarizes the MRL standard analysis. Samples with concentrations detected less than two times the MRL with out of criteria MRL recovery were qualified.

Table 2 MRL Analysis Summary

Analysis Date	Analysis	MRL (µg/L)	MRL %Recovery	Qualified samples @ <2xMRL	Validation Qualifiers
07/25/07	Hg	1.0	65.0%	41SW08, 41SW09, 41SW10, LFSW01, TMSW01	L, UL
07/26/07	ICP-Al	200	71.0%	41SW08, 41SW09, 41SW10, TMSW01	L, UL
07/26/07	ICP-As	10	121%	None	K
07/26/07	ICP-Pb	10	126%	TMSW01	K
07/26/07	ICP-Se	10	126%	None	K
Analysis Date	**Analysis**	**MRL (mg/kg)**	**MRL %Recovery**	**Qualified samples @ <2xMRL**	**Validation Qualifiers**
07/25/07	ICP-Sb	3.0	32.0%	41SD08, 41SD09, 41SD10, 41SD11, 49SS02, 49SS03, 49SS04, 49SS05, 59SS06, 59SS07, 59SS08, 59SS09, 59SS10, APSD01, LFSD01, TMSD01, TMSS05	L, UL
07/25/07	ICP-As	0.4	123%	None	K
07/25/07	ICP-Pb	5.0	130%	41SD08, 41SD09, 41SD10, 49SS04, 49SS05, 59SS06, 59SS07, 59SS08, 59SS09, 59SS10, TMSS05	K
07/25/07	ICP-Se	5.0	130%; 122%	41SD08, 41SD09, 41SD10, 41SD11, 49SS02, 49SS03, 49SS04, 49SS05, 59SS06, 59SS07, 59SS08, 59SS09, 59SS10, APSD01, LFSD01, TMSD01, TMSS05	K
07/25/07	ICP-Tl	0.50	79.0%	41SD08, 41SD09, 41SD10, 49SS02, 49SS03, 49SS04, 49SS05, 59SS06, 59SS07, 59SS08, 59SS09, 59SS10, APSD01, LFSD01, TMSD01, TMSS05	L, UL
07/27/07	Mn & Zn	0.74 & 1.0	All within criteria	None	None
07/26/07	Hg	0.083	48.0%	41SD08, 41SD09, 41SD10, 41SD11, 49SS02, 49SS04, 49SS05, 59SS06, 59SS07, APSD01, LFSD01, TMSD01	L, UL
07/26/07	Hg	0.083	All within criteria	None	None

III-Blanks

Blanks (preparation and calibration blanks) are assessed to determine the existence and magnitude of contamination problems. No contaminants should be detected (i.e. <MDL) in any of the associated blanks. DoD QSM limits are <½MRL for the method blank and <2*MDL for the calibration blanks. Samples are qualified "B" when they are less than 5x the absolute value of the maximum blank concentration. **Table 3** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 10 for ICP and Hg = 12) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 3 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples
07/26/07	Aluminum	ICB/CCBs	39.0J	195	41SW09, TMSW01
07/26/07	Antimony	ICB/CCBs	7.3	36.5	None
07/26/07	Copper	ICB/CCBs	1.9J	9.5	41SW10
07/26/07	Iron	ICB/CCBs	30.7J	154	41SW08, 41SW10
07/26/07	Magnesium	ICB/CCBs	10.5J	52.5	None
07/26/07	Nickel	ICB/CCBs	4.2J	21.0	41SW08, 41SW10
07/26/07	Potassium	ICB/CCBs	1740J	8700	41SW08, 41SW09, 41SW10, LFSW01, TMSW01
07/26/07	Selenium	ICB/CCBs	5.4J	27.0	None
07/26/07	Sodium	ICB/CCBs	2080J	10400	None
07/26/07	Thallium	ICB/CCBs	9.2J	46.0	None
07/25/07	Mercury	ICB/CCBs	0.19J	0.95	None
07/25/07	Mercury	MP12560-MB	<2*MDL	NA	None
07/27/07	Iron	MP12581-MB	25.7J	129	41SW08, 41SW10
07/27/07	Potassium	MP12581-MB	1700J	8500	41SW08, 41SW09, 41SW10, LFSW01, TMSW01
07/27/07	Sodium	MP12581-MB	2020J	10100	None
09/17/07	Potassium	RB083007	1740J	8700	41SW08, 41SW09, 41SW10, LFSW01, TMSW01
09/17/07	Sodium	RB083007	1860J	9300	None
09/05/07	Mercury	RB083007	<2*MDL	NA	None
Analysis Date	**Analysis**	**QC Blank ID**	**Max Conc. mg/kg**	**Action Level mg/kg**	**B qualified samples**
07/25/07	Antimony	ICB/CCBs	0.62	3.1	41SD09, 41SD10, 41SD11, 49SS02, 49SS03, 49SS04, 49SS05, 59SS06, 59SS07, 59SS08, 59SS09, 59SS10, APSD01, LFSD01, TMSD01, TMSS05
07/25/07	Copper	ICB/CCBs	0.22J	1.1	None
07/25/07	Lead	ICB/CCBs	0.43J	2.2	None
07/25/07	Nickel	ICB/CCBs	0.76J	3.8	None
07/25/07	Potassium	ICB/CCBs	171J	855	41SD08, 41SD09, 41SD10, 49SS02, 49SS03, 49SS05, 59SS06, 59SS07, 59SS09, 59SS10, LFSD01, TMSD01, TMSS05
07/25/07	Selenium	ICB/CCBs	0.52J	2.6	41SD08, 41SD10, 59SS09
07/25/07	Sodium	ICB/CCBs	190J	950	41SD08, 41SD09, 41SD10, 49SS02, 49SS03, 59SS06, 59SS07, 59SS08, 59SS10, APSD01, LFSD01, TMSD01
07/25/07	Thallium	ICB/CCBs	0.59J	3.0	41SD11
07/25/07	Zinc	ICB/CCBs	0.27J	1.4	None
07/27/07	Mn & Zn	ICB/CCBs	<2*MDL	NA	None
07/26/07	Mercury	ICB/CCBs	<2*MDL	NA	None
07/26/07	Mercury	ICB/CCBs	0.0208J	0.10	41SD08, 41SD09, 41SD10, 41SD11, 49SS04, 49SS05, 59SS06, 59SS07, APSD01, LFSD01, TMSD01
07/25/07	Lead	MP12567-MB	0.25J	1.3	None
07/25/07	Potassium	MP12567-MB	85.1J	426	59SS09
07/25/07	Sodium	MP12567-MB	112	560	41SD08, 41SD09, 41SD10, 49SS02, 49SS03, 59SS06, 59SS07, 59SS08, APSD01, LFSD01, TMSD01
07/25/07	Thallium	MP12567-MB	0.61J	3.1	41SD11
07/26/07	Mercury	MP12573-MB	0.016	0.080	41SD08, 41SD09, 41SD10, 41SD11, 49SS04, 49SS05, 59SS06, 59SS07, APSD01, LFSD01, TMSD01
07/26/07	Mercury	MP12574-MB	<2*MDL	NA	None
07/26/07	Copper	MP12577-MB	0.14J	0.70	None
07/26/07	Potassium	MP12577-MB	83.8J	419	59SS10
07/26/07	Sodium	MP12577-MB	113J	565	59SS10
07/26/07	Thallium	MP12577-MB	0.51J	2.6	None

Table 3 Blank Contamination Analysis Summary, Continued

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/kg	Action Level mg/kg	B qualified samples
07/27/07	Potassium	RB071807	177J	885	41SD08, 41SD09, 41SD10, 41SD11, LFSD01, TMSD01
07/27/07	Sodium	RB071807	206J	1030	41SD08, 41SD09, 41SD10, APSD01, LFSD01, TMSD01
07/27/07	Zinc	RB071807	0.19J	0.95	None
07/25/07	Mercury	RB071807	<2*MDL	NA	None
07/31/07	Lead	072407R	0.21J	1.1	None
07/31/07	Magnesium	072407R	0.53J	2.7	None
07/31/07	Potassium	072407R	176J	880	49SS02, 49SS03, 49SS05, 59SS06, 59SS07, 59SS09, 59SS10, TMSS05
07/28/07	Sodium	072407R	192J	960	49SS02, 49SS03, 59SS06, 59SS07, 59SS08, 59SS10
07/28/07	Mercury	072407R	<2*MDL	NA	None
07/28/07	Potassium	072507R	177J	885	49SS02, 49SS03, 49SS05, 59SS06, 59SS07, 59SS09, 59SS10, TMSS05
07/28/07	Sodium	072507R	213J	1065	49SS02, 49SS03, 59SS06, 59SS07, 59SS08, 59SS10
07/28/07	Mercury	072507R	<2*MDL	NA	None

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".

IV-ICP Interference Check Sample (ICS)

The ICP interference check sample (ICS) verifies interelement and background correction factors. ICP Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met. No qualifiers were applied.

V-Laboratory Control Samples (LCS)

The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. All aqueous LCS results must fall within the control limits. The DoD QSM aqueous LCS recovery limits are specified in Table D-18 of the DoD QSM (DoD, 2006). The DoD QSM solid LCS recovery limits are specified in Table D-19 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample MP12581-BS was used as aqueous LCS for ICP metals analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample MP12567-BS was used as solid LCS for ICP metals analysis on 07/25/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), and 59SS09 (F51154-30) apply to this LCS.

- Sample MP12577-BS was used as solid LCS for ICP metals analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 59SS10 (F51154-31) and TMSS05 (F51154-32) apply to this LCS.

- Sample MP12560-BS was used as aqueous LCS for mercury analysis performed on 07/25/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample MP12573-BS was used as solid LCS for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), and 59SS07 (F51154-28) apply to this LCS.

- Sample MP12574-BS was used as solid LCS for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

VI-Laboratory Duplicate Sample Analysis

Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analyses are also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. DoD QSM limits for metals are 20% RPD for ICP metals and mercury.

- Sample LFSW01 (F51154-17) was used as aqueous laboratory duplicate for ICP metals analysis on 07/27/07. Chromium (200%), manganese (23.7%), nickel (200%), and vanadium (200%) were above criteria. Chromium, manganese, nickel, and vanadium were outside due to low sample concentrations (i.e. <MRL); therefore, no qualifiers were applied based upon this outlier. All other metals were within criteria. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this laboratory duplicate.

- Sample F51150-6 was used as soil laboratory duplicate for ICP metals analysis on 07/25/07. This sample is not a RFAAP site sample; therefore, it was not evaluated. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), and 59SS09 (F51154-30) apply to this laboratory duplicate.

- Sample 59SS10 (F51154-31) was used as solid laboratory duplicate for ICP metals analysis on 07/26/07. Silver (200%) was above criteria. Silver was outside due to low sample concentrations (i.e. <MRL); therefore, no qualifiers were applied based upon this outlier. All other metals were within criteria. No qualifiers were applied. Samples 59SS10 (F51154-31) and TMSS05 (F51154-32) apply to this laboratory duplicate.

- Sample LFSW01 (F51154-17) was used as aqueous laboratory duplicate for mercury analysis on 06/25/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this laboratory duplicate.

- Sample F51240-2 was used as soil laboratory duplicate for mercury analysis on 07/26/07. This sample is not a RFAAP site sample; therefore, it was not evaluated. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), and 59SS07 (F51154-28) apply to this laboratory duplicate.

- Sample 59SS08 (F51154-29) was used as solid laboratory duplicate for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this laboratory duplicate.

VII-Matrix Spike/Spike Duplicate

MS/MSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike and matrix spike duplicate samples at a frequency of one MS and MSD per 20 samples of similar matrix. MS and MSD recoveries and relative percent differences between MS and MSD recoveries should be within the specified limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-18 of the DoD QSM (DoD, 2006). DoD QSM solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-19 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used. Post digestion spikes limits are 75-125% for ICP metals and mercury.

- Sample LFSW01 (F51154-17) was used as aqueous laboratory MS/MSD for ICP metals analysis on 07/27/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample F51150-6 was used as laboratory solid MS/MSD for ICP metals analysis on 07/25/07. This sample is not a RFAAP site sample; therefore, it was not evaluated. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), and 59SS09 (F51154-30) apply to this MS/MSD.

- Sample 59SS10 (F51154-31) was used as solid laboratory MS/MSD for ICP metals analysis on 07/26/07. Aluminum (138%), antimony (17.5%, 12.5%; RPD=31.0%), arsenic (78.4%, 74.5%), cadmium (78.9%), calcium (79.6%), chromium (55.5%, 64.1%), iron (33.9%), manganese (-23%, 1064%; RPD=57.1%), nickel (79.3%), potassium (78.8%, 79.6%), selenium (77.3%, 71.8%), silver (78.9%), sodium (79.7%), thallium (75.9%), and vanadium (75.0%, 75.3%) were outside criteria. The sample concentration was >4 times the spike added for iron and manganese; therefore, no qualifiers were applied based upon these outliers. Antimony, arsenic, cadmium, calcium, chromium, nickel, potassium, selenium, silver, sodium, thallium, and vanadium were qualified bias low "L" for detects and "UL" for non-detects based upon the low recoveries. Aluminum was qualified bias high "K" for detects and no qualifier for non-detects based upon the high recovery. All other metals were within criteria. Samples 59SS10 (F51154-31) and TMSS05 (F51154-32) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used as laboratory aqueous MS/MSD for mercury analysis on 06/25/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample F51240-2 was used as solid MS/MSD for mercury analysis on 07/26/07. This sample is not a RFAAP site sample; therefore, it was not evaluated. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), and 59SS07 (F51154-28) apply to this MS/MSD.

- Sample 59SS08 (F51154-29) was used as solid MS/MSD for mercury analysis on 07/26/07. All criteria were met. No qualifiers were applied. Samples 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

VIII-ICP Serial Dilution
An ICP serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 50 above MDL.

- The serial dilution for ICP metals was analyzed on 07/27/07 using aqueous sample LFSW01 (F51154-17). Lead (100%), potassium (147%), sodium (29.7%), and zinc (100%) were outside of criteria limits. Sample concentrations were <50 times MDL for lead, sodium, and zinc; therefore, no qualifiers were applied based upon these outliers. For potassium, all detects were qualified estimated "J" and non-detects no qualifier based upon this outlier. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this serial dilution.

- The serial dilution for total ICP metals was analyzed using solid sample F51150-6 on 07/25/07. This sample is not a RFAAP site sample; therefore, it was not evaluated. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), and 59SS09 (F51154-30) apply to this serial dilution.

- The serial dilution for ICP metals was analyzed on 07/26/07 using solid sample 59SS10 (F51154-31). Antimony (100%), arsenic (15.2%), beryllium (17.9%), calcium (15.4%), chromium (13.5%), cobalt (16.4%), iron (14.5%), lead (19.0%), magnesium (14.3%), manganese (16.5%), nickel (13.5%), potassium (83.6%), selenium (24.4%), sodium (532%), vanadium (11.8%), and zinc (15.6%) were outside of criteria limits. Sample concentrations were <50 times MDL for antimony, beryllium, selenium, and sodium; therefore, no qualifiers were applied based upon these outliers. For arsenic, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc, all detects were qualified estimated "J" and non-detects no qualifier based upon these outliers. Samples 59SS10 (F51154-31) and TMSS05 (F51154-32) apply to this serial dilution.

- The serial dilution for mercury was analyzed using aqueous sample LFSW01 (F51154-17) on 07/25/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this serial dilution.

- The serial dilution for mercury was analyzed using solid sample F51240-2 on 07/26/07. This sample is not a RFAAP site sample; therefore, it was not evaluated. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), and 59SS07 (F51154-28) apply to this serial dilution.

- The serial dilution for mercury was analyzed using solid sample 59SS08 (F51154-29) on 07/26/07. Mercury (34.5%) was above criteria. Sample concentration was <50 times MDL for mercury; therefore, no qualifiers were applied based upon this outlier. Samples 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this serial dilution.

IX-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 35% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for TAL metals. All detected TAL metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 4**. All other TAL metals target compounds were non-detect. Manganese (86.2%) and zinc (69.5%) were above criteria due to low concentration levels detected below the MRL. Manganese and zinc were qualified estimated "J" for the original and duplicate pair samples based upon these outliers. For all other metals, all criteria were met.

Table 4 Field Precision Hits Analysis Summary for TAL Metals for Duplicate Pair LFSW01 (F51154-17) and TMSW01 (F51154-20)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
Aluminum	18.0U	50.7J	NA
Lead	3.4U	3.4J	NA
Magnesium	30100	30900	2.6
Manganese	3.3J	8.3J	86.2
Potassium	4320J	4450J	3.0
Sodium	24100	24800	2.9
Barium	103J	108J	4.7
Chromium	0.6U	0.99J	NA
Zinc	7.6J	15.7J	69.5
Calcium	79600	81600	2.5

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
U = Non-detect as <MDL.
NA = Not Applicable

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for TAL metals. All detected TAL metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 5**. All other TAL metals target compounds were non-detect. Barium (49.3%) was above criteria probably due to sample non-homogeneity. Mercury (51.2%) was above criteria due to low concentration levels detected below the MRL. Barium and mercury were qualified estimated "J" for the original and duplicate pair samples based upon these outliers. For all other metals, all criteria were met.

Table 5 Field Precision Hits Analysis Summary for TAL Metals for Duplicate Pair LFSD01 (F51154-15) and TMSD01 (F51154-16)

Compound	Original Sample (mg/kg)	Duplicate Pair (mg/kg)	%RPD
Aluminum	10100	8710	14.8
Iron	29000	23200	22.2
Lead	195	143	30.8
Magnesium	2970	2910	2.0
Nickel	11.7	9.7	18.7
Potassium	1180	996	16.9
Silver	0.076U	0.081J	NA
Sodium	222J	200J	10.4
Antimony	1.8J	1.3J	32.3
Arsenic	3.4	2.9	15.9
Barium	167	101	49.3
Beryllium	1.1	0.94	15.7
Chromium	24.9	18.5	29.5
Cobalt	11.8	9.1	25.8
Copper	22.1	19.9	10.5
Vanadium	28	22	24.0
Calcium	2480	3100	22.2
Selenium	9.6	7.5	24.6
Manganese	1600	1190	29.4
Zinc	682	512	28.5
Mercury	0.076J	0.045J	51.2

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
U = Non-detect as <MDL.
NA = Not Applicable

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for TAL metals. All detected TAL metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 6**. All other TAL metals target compounds were non-detect. All criteria were met. No qualifiers were applied.

Table 6 Field Precision Hits Analysis Summary for TAL Metals for Duplicate Pair 49SS05 (F51154-26) and TMSS05 (F51154-32)

Compound	Original Sample (mg/kg)	Duplicate Pair (mg/kg)	%RPD
Aluminum	15500	15900	2.6
Iron	17900	18300	2.2
Lead	20.5	20.3	1.0
Magnesium	863	872	1.0
Nickel	7.4	7.9	6.5
Potassium	776	791	1.9
Antimony	0.73J	0.89J	19.8
Arsenic	3.2	3.5	9.0
Barium	69.8	67.0	4.1
Beryllium	0.61	0.59	3.3
Chromium	14.9	17.6	16.6
Cobalt	3.7	4.0	7.8
Copper	12.8	13.0	1.6
Vanadium	37.7	37.6	0.3
Zinc	44.5	46.2	3.8
Calcium	1450	1420	2.1
Selenium	6.4	6.6	3.1
Manganese	358	356	0.6
Mercury	0.072J	0.093J	25.5

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".

X-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J." The following calculations were performed for verification.

ICP Sample: 41SW08 (F51154-6), Barium

Conc. (µg/L) = (conc. µg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (64.9 µg/L)*(50 mL)*(1) / (50 mL) = 64.9 µg/L

Reported concentration = 64.9 µg/L
%D = 0.0%
Values were within 10% difference.

CVAA Sample: LFSW01MS (F51154-17MS), Mercury

Conc. (µg/L) = (conc. µg/L) *(Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (2.95 µg/L)*(50 mL)*(1) / (50 mL) = 3.0 µg/L

Reported concentration = 3.0 µg/L
%D = 0.0%.
Values were within 10% difference.

ICP Sample: 41SD08 (F51154-9), Barium

Conc. (mg/kg) = {(conc. µg/L)*(Final Volume L)*(DF)} / {(Weight Sample g)*(Fraction Solids)}

Conc. (mg/kg) = {(985.6 µg/L)*(0.050 L)*(1)} / {(1.00 g)*(0.3690)} = 134 µg/g = 134 mg/kg

Reported concentration = 134 mg/kg
%D = 0.0%
Values were within 10% difference.

Hg Sample: 41SD08 (F51154-9), Mercury

Conc. (mg/kg) = {(conc. µg/L)*(Final Volume L)*(DF)} / {(Weight Sample g)*(Fraction Solids)}

Conc. (mg/kg) = {(0.471 µg/L)*(0.050 L)*(1)} / {(0.63 g)*(0.3690)} = 0.10 µg/g = 0.10 mg/kg

Reported concentration = 0.10 mg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

D = Indicates sample was analyzed at a dilution.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

N (Metals) = Laboratory spike sample recovery not within control limits.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

form I CRA

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	208 L	200	18	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	6.0	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	64.9 J J	200	5.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	50100	1000	42	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.60 U	10	0.60	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.0 U	25	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	88.1 J B	300	15	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead [a]	3.4 U	10	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	23800	5000	4.3	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	61.9	15	1.5	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U UL	1.0	0.10	ug/l	1	07/25/07	07/25/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.2 J B	40	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	4300 J B	10000	100	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	14300	10000	500	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U	10	2.9	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 J J	50	1.1	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	5.5 J J	20	1.6	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5873
(2) Instrument QC Batch: MA5878
(3) Prep QC Batch: MP12560
(4) Prep QC Batch: MP12581

(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

from I Chg

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	170 J B	200	18	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	6.0	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	62.6 J J	200	5.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	52700	1000	42	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.60 U	10	0.60	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.0 U	25	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	300	15	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead [a]	3.4 U	10	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	28100	5000	4.3	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	21.1	15	1.5	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U UL	1.0	0.10	ug/l	1	07/25/07	07/25/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.0 U	40	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	4020 J B	10000	100	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	15900	10000	500	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U	10	2.9	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.4 J J	50	1.1	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	6.7 J J	20	1.6	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5873
(2) Instrument QC Batch: MA5878
(3) Prep QC Batch: MP12560
(4) Prep QC Batch: MP12581

(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Only

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	235 L	200	18	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	6.0	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	63.3 J J	200	5.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	53000	1000	42	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.60 U	10	0.60	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.2 J B	25	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	52.7 J B	300	15	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead [a]	3.4 U	10	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	30200	5000	4.3	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	39.5	15	1.5	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U UL	1.0	0.10	ug/l	1	07/25/07	07/25/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.1 J B	40	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	4060 J B	10000	100	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	16600	10000	500	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U	10	2.9	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.3 J J	50	1.1	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	2.6 J J	20	1.6	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5873
(2) Instrument QC Batch: MA5878
(3) Prep QC Batch: MP12560
(4) Prep QC Batch: MP12581

(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
		Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	13300	27	3.0	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Antimony	0.72 U VL	8.1	0.72	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Arsenic	5.2	1.1	0.53	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	134	27	0.68	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Beryllium	0.88	0.68	0.14	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	0.14 U	0.54	0.14	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Calcium	25600	680	7.7	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	15.5	1.4	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Cobalt	10.4	6.8	0.14	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Copper	24.8	3.4	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	18200	14	1.6	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	20.1 K	14	0.27	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Magnesium	6440	680	1.0	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	299	2.0	0.081	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	0.10 J B	0.22	0.017	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [4]
Nickel	17.7	5.4	0.14	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Potassium	1890 B	1400	14	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Selenium	3.3 J B	14	0.27	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	0.12 U	1.4	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Sodium	475 J B	1400	110	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Thallium [a]	1.2 U VL	5.6	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Vanadium	23.3	6.8	0.081	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Zinc	89.5	2.7	0.18	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Prep QC Batch: MP12567
(4) Prep QC Batch: MP12573

(a) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
		Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	10000	12	1.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	1.4 J B	3.5	0.31	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	5.9	0.46	0.23	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	102	12	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.76	0.29	0.058	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium [a]	0.58 U	1.2	0.58	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	5590	290	3.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	13.6	0.58	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	13.4	2.9	0.058	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	20.0	1.4	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	24900	5.8	0.69	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	10.4 K	5.8	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	4900	290	0.43	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	854	4.3	0.17	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.030 J B	0.091	0.0072	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	24.0	2.3	0.058	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	939 B	580	5.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	7.7 K	5.8	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.052 U	0.58	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	173 J B	580	48	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [b]	0.52 U VL	2.3	0.52	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	15.4	2.9	0.035	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	81.5	1.2	0.075	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.
(b) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I OR

Accutest Laboratories

Report of Analysis

3-11

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
		Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	6170	13	1.4	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	0.50 J B	3.8	0.33	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	3.7	0.51	0.25	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	63.0	13	0.32	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.54	0.32	0.063	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium	0.063 U	0.25	0.063	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	10200	320	3.6	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	9.6	0.63	0.057	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	6.9	3.2	0.063	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	12.7	1.6	0.057	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	12500	6.3	0.76	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	15.4 K	6.3	0.13	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	3680	320	0.47	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	547	4.7	0.19	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.027 J B	0.093	0.0074	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	10.0	2.5	0.063	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	731 B	630	6.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	2.9 J B	6.3	0.13	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.072 J J	0.63	0.057	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	199 J B	630	52	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	0.60 U VL	2.5	0.60	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	12.1	3.2	0.038	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	57.9	1.3	0.082	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

for I only

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
		Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	10100	17	1.9	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Antimony	1.8 J B	5.1	0.45	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Arsenic	3.4	0.68	0.33	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Barium	167 J	17	0.42	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Beryllium	1.1	0.42	0.085	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Cadmium	0.085 U	0.34	0.085	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Calcium	2480	420	4.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Chromium	24.9	0.85	0.076	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Cobalt	11.8	4.2	0.085	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Copper	22.1	2.1	0.076	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Iron	29000	8.5	1.0	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Lead	195	8.5	0.17	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Magnesium	2970	420	0.63	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Manganese	1600	6.3	0.25	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.076 J B	0.14	0.012	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [6]
Nickel	11.7	3.4	0.085	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Potassium	1180 B	850	8.5	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Selenium	9.6 K	8.5	0.17	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Silver	0.076 U	0.85	0.076	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Sodium	222 J B	850	70	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Thallium [a]	7.6 U VL	17	7.6	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Vanadium	28.0	4.2	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Zinc	682	8.5	0.55	mg/kg	5	07/25/07	07/27/07	RS	SW846 6010B [4]	SW846 3050B [5]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Instrument QC Batch: MA5883
(5) Prep QC Batch: MP12567
(6) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Only

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
		Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8710	15	1.6	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Antimony	1.3 J B	4.4	0.39	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Arsenic	2.9	0.59	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Barium	101 J	15	0.37	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Beryllium	0.94	0.37	0.073	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Cadmium	0.073 U	0.29	0.073	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Calcium	3100	370	4.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Chromium	18.5	0.73	0.066	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Cobalt	9.1	3.7	0.073	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Copper	19.9	1.8	0.066	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Iron	23200	7.3	0.88	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Lead	143	7.3	0.15	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Magnesium	2910	370	0.54	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Manganese	1190	5.5	0.22	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.045 J B	0.13	0.010	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [6]
Nickel	9.7	2.9	0.073	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Potassium	996 B	730	7.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Selenium	7.5 K	7.3	0.15	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Silver	0.081 J J	0.73	0.066	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Sodium	200 J B	730	60	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Thallium [a]	6.8 U VL	15	6.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Vanadium	22.0	3.7	0.044	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Zinc	512	7.3	0.48	mg/kg	5	07/25/07	07/27/07	RS	SW846 6010B [4]	SW846 3050B [5]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Instrument QC Batch: MA5883
(5) Prep QC Batch: MP12567
(6) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

from I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18 U	200	18	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	6.0	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	103 J J	200	5.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	79600	1000	42	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.60 U	10	0.60	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.0 U	25	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	300	15	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead [a]	3.4 U	10	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	30100	5000	4.3	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	3.3 J J	15	1.5	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U UL	1.0	0.10	ug/l	1	07/25/07	07/25/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.0 U	40	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	4320 J B	10000	100	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	24100	10000	500	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U	10	2.9	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U	50	1.1	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	7.6 J J	20	1.6	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5873
(2) Instrument QC Batch: MA5878
(3) Prep QC Batch: MP12560
(4) Prep QC Batch: MP12581

(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
		Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	8300	11	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Antimony	0.88 J B	3.3	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Arsenic	1.5	0.44	0.22	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Barium	132	11	0.28	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Beryllium	0.84	0.28	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Cadmium	0.064 J J	0.22	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Calcium	1260	280	3.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Chromium	13.4	0.55	0.050	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Cobalt	10.1	2.8	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Copper	9.8	1.4	0.050	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Iron	19500	5.5	0.66	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Lead	125	5.5	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Magnesium	1810	280	0.41	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Manganese	1470	8.3	0.33	mg/kg	10	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.038 J B	0.093	0.0074	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [6]
Nickel	9.0	2.2	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Potassium	1060	550	5.5	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Selenium	6.4 K	5.5	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Silver	0.050 U	0.55	0.050	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Sodium	111 J B	550	46	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Thallium [a]	6.5 U VL	11	6.5	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Vanadium	19.1	2.8	0.033	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [5]
Zinc	504	11	0.72	mg/kg	10	07/25/07	07/27/07	RS	SW846 6010B [4]	SW846 3050B [5]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Instrument QC Batch: MA5883
(5) Prep QC Batch: MP12567
(6) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Corp

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	50.7 J B	200	18	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	6.0	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	108 J J	200	5.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	81600	1000	42	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.99 J J	10	0.60	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.0 U	25	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	300	15	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead [a]	3.4 J K	10	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	30900	5000	4.3	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	8.3 J J	15	1.5	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U VL	1.0	0.10	ug/l	1	07/25/07	07/25/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.0 U	40	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	4450 J B	10000	100	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	24800	10000	500	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U	10	2.9	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U	50	1.1	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	15.7 J J	20	1.6	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5873
(2) Instrument QC Batch: MA5878
(3) Prep QC Batch: MP12560
(4) Prep QC Batch: MP12581

(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	14300	11	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	1.1 J B	3.4	0.30	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	16.6	0.45	0.22	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	219	11	0.28	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	1.0	0.28	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium	0.056 U	0.23	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	20100	280	3.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	20.4	0.56	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	13.4	2.8	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	38.4	1.4	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	25900	5.6	0.68	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	59.3	5.6	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	12500	280	0.42	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	2800	17	0.68	mg/kg	20	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.056 J B	0.083	0.0067	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	13.4	2.3	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	1010 B	560	5.6	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	5.4 J K	5.6	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.051 U	0.56	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	2150	560	47	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	1.1 J B	2.2	0.52	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	33.0	2.8	0.034	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	108	1.1	0.073	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated RL/MDL due to negative bias of Method Blank.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result > = MDL but < RL

Form I Corr

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	10300	11	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	0.86 J B	3.3	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	6.2	0.44	0.21	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	80.8	11	0.27	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.52	0.27	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium	0.055 U	0.22	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	997	270	3.1	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	13.5	0.55	0.049	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	3.2	2.7	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	17.6	1.4	0.049	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	13800	5.5	0.66	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	71.6	5.5	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	706	270	0.40	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	299	4.1	0.16	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.17 L	0.089	0.0071	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	5.8	2.2	0.055	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	597 B	550	5.5	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	5.2 J K	5.5	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.049 U	0.55	0.049	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	78.4 J B	550	45	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	5.2 U VL	11	5.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	25.6	2.7	0.033	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	56.5	1.1	0.071	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Bmw I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	9220	10	1.1	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	0.63 J B	3.1	0.28	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	8.2	0.42	0.20	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	67.7	10	0.26	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.55	0.26	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium [a]	0.26 U	0.42	0.26	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	524	260	3.0	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	11.8	0.52	0.047	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	3.1	2.6	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	14.4	1.3	0.047	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	13800	5.2	0.63	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	50.3	5.2	0.10	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	518	260	0.39	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	293	3.9	0.16	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.31	0.086	0.0069	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	5.9	2.1	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	538 B	520	5.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	5.4 K	5.2	0.10	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.047 U	0.52	0.047	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	73.4 J B	520	43	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	4.8 U VL	10	4.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	24.3	2.6	0.031	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	45.8	1.0	0.068	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Cpy

Accutest Laboratories

Report of Analysis

3.2.5

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	22700	11	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Antimony	1.5 J B	3.3	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Arsenic	2.3	0.44	0.21	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	57.5	11	0.27	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Beryllium	0.69	0.27	0.054	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium [a]	0.54 U	0.88	0.54	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Calcium	770	270	3.1	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	20.7	0.54	0.049	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Cobalt	4.0	2.7	0.054	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Copper	15.9	1.4	0.049	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	26900	5.4	0.65	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	13.4 K	5.4	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Magnesium	1120	270	0.40	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	165	0.82	0.033	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	0.058 J B	0.092	0.0074	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [4]
Nickel	9.6	2.2	0.054	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Potassium	1060	540	5.4	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Selenium	9.4 K	5.4	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	0.049 U	0.54	0.049	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Sodium	45 U	540	45	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Thallium [a]	13 U VL	22	13	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Vanadium	56.3	2.7	0.033	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Zinc	49.1	1.1	0.071	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Prep QC Batch: MP12567
(4) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I 03

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	15500	12	1.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	0.73 J B	3.5	0.31	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	3.2	0.47	0.23	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	69.8	12	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.61	0.29	0.058	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium [a]	0.29 U	0.46	0.29	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	1450	290	3.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	14.9	0.58	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	3.7	2.9	0.058	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	12.8	1.5	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	17900	5.8	0.70	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	20.5 K	5.8	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	863	290	0.43	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	358	4.4	0.17	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.072 J B	0.087	0.0070	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	7.4	2.3	0.058	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	776 B	580	5.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	6.4 K	5.8	0.12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.052 U	0.58	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	48 U	580	48	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	5.2 U UL	12	5.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	37.7	2.9	0.035	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	44.5	1.2	0.076	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I rev

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	13100	11	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	1.2 J B	3.2	0.28	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	2.9	0.43	0.21	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	62.8	11	0.27	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.61	0.27	0.053	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium [a]	0.53 U	0.84	0.53	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	2550	270	3.0	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	21.1	0.53	0.048	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	5.1	2.7	0.053	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	7.5	1.3	0.048	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	18500	5.3	0.64	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	17.0 K	5.3	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	1910	270	0.39	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	367	4.0	0.16	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.047 J B	0.082	0.0066	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	5.8	2.1	0.053	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	693 B	530	5.3	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	6.3 K	5.3	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.048 U	0.53	0.048	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	76.5 J B	530	44	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	4.8 U VL	11	4.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	35.8	2.7	0.032	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	34.3	1.1	0.069	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I Corr

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	12300	10	1.1	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	0.73 J B	3.1	0.28	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	2.8	0.42	0.20	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	67.5	10	0.26	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.63	0.26	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium [a]	0.26 U	0.42	0.26	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	2270	260	3.0	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	14.3	0.52	0.047	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	5.5	2.6	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	7.7	1.3	0.047	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	15000	5.2	0.62	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	17.3 K	5.2	0.10	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	1640	260	0.38	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	473	3.9	0.16	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.027 J B	0.091	0.0073	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	6.2	2.1	0.052	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	735 B	520	5.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	5.0 J K	5.2	0.10	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.047 U	0.52	0.047	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	74.5 J B	520	43	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	4.8 U VL	10	4.8	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	30.5	2.6	0.031	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	33.2	1.0	0.068	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5877
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12573

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I copy

Accutest Laboratories

Report of Analysis

3-28
3

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	16200	11	1.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Antimony	0.98 J B	3.4	0.30	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Arsenic	4.4	0.45	0.22	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Barium	71.9	11	0.28	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Beryllium	0.63	0.28	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cadmium [a]	0.56 U	0.88	0.56	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Calcium	1100	280	3.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Chromium	18.8	0.56	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Cobalt	5.0	2.8	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Copper	10.5	1.4	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Iron	19700	5.6	0.67	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Lead	17.1 K	5.6	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Magnesium	1230	280	0.42	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Manganese	276	4.2	0.17	mg/kg	5	07/25/07	07/26/07	RS	SW846 6010B [3]	SW846 3050B [4]
Mercury	0.068 J J	0.081	0.0065	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [5]
Nickel	7.7	2.2	0.056	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Potassium	1070	560	5.6	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Selenium	7.0 K	5.6	0.11	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Silver	0.051 U	0.56	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Sodium	56.8 J B	560	46	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Thallium [a]	5.2 U VL	11	5.2	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Vanadium	39.3	2.8	0.034	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]
Zinc	44.9	1.1	0.073	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [4]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5876
(3) Instrument QC Batch: MA5878
(4) Prep QC Batch: MP12567
(5) Prep QC Batch: MP12574

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Area I Corp

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	4430	10	1.1	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Antimony	0.39 J B	3.1	0.27	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Arsenic	5.6	0.41	0.20	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	160	10	0.26	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Beryllium	0.85	0.26	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	0.051 U	0.20	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Calcium	718	260	2.9	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	7.5	0.51	0.046	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Cobalt	4.8	2.6	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Copper	15.3	1.3	0.046	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	6660	5.1	0.61	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	5.9 K	5.1	0.10	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Magnesium	410	260	0.38	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	104	0.77	0.031	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	0.40	0.086	0.0069	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [2]	SW846 7471A [4]
Nickel	8.5	2.0	0.051	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Potassium	441 J B	510	5.1	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Selenium	2.7 J B	5.1	0.10	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	0.046 U	0.51	0.046	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Sodium	42 U	510	42	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Thallium [a]	12 U VL	20	12	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Vanadium	17.6	2.6	0.031	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]
Zinc	15.9	1.0	0.066	mg/kg	1	07/25/07	07/25/07	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5875
(2) Instrument QC Batch: MA5876
(3) Prep QC Batch: MP12567
(4) Prep QC Batch: MP12574

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	5020 K	10	1.1	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.64 J B	3.1	0.27	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	24.1 J	0.41	0.20	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	99.7	10	0.26	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.85	0.26	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.051 U VL	0.20	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	730 J	260	2.9	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	9.5 J	0.51	0.046	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	3.6 J	2.6	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	10.6	1.3	0.046	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	9530 J	5.1	0.61	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	9.2 J	5.1	0.10	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	334 J	260	0.38	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	414 J	3.8	0.15	mg/kg	5	07/26/07	07/27/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.34	0.083	0.0066	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	6.6 J	2.0	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	431 J B	510	5.1	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	4.8 J K	5.1	0.10	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.046 U VL	0.51	0.046	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	69.8 J B	510	42	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	4.8 U VL	10	4.8	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	18.3 J	2.6	0.031	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	13.0 J	1.0	0.067	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5878
(3) Instrument QC Batch: MA5883
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12577

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
		Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	15900 K	11	1.2	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Antimony	0.89 J B	3.4	0.30	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Arsenic	3.5 J	0.45	0.22	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Barium	67.0	11	0.28	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Beryllium	0.59	0.28	0.057	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cadmium	0.057 U VL	0.23	0.057	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Calcium	1420 J	280	3.2	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Chromium	17.6 J	0.57	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Cobalt	4.0 J	2.8	0.057	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Copper	13.0	1.4	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Iron	18300 J	5.7	0.68	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Lead	20.3 J	5.7	0.11	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Magnesium	872 J	280	0.42	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Manganese	356 J	4.2	0.17	mg/kg	5	07/26/07	07/27/07	RS	SW846 6010B [3]	SW846 3050B [5]
Mercury	0.093 J J	0.095	0.0076	mg/kg	1	07/26/07	07/26/07	MS	SW846 7471A [1]	SW846 7471A [4]
Nickel	7.9 J	2.3	0.057	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Potassium	791 B	570	5.7	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Selenium	6.6 K	5.7	0.11	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Silver	0.051 U VL	0.57	0.051	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Sodium	47 U VL	570	47	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Thallium [a]	5.2 U VL	11	5.2	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Vanadium	37.6 J	2.8	0.034	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]
Zinc	46.2 J	1.1	0.074	mg/kg	1	07/26/07	07/26/07	RS	SW846 6010B [2]	SW846 3050B [5]

(1) Instrument QC Batch: MA5876
(2) Instrument QC Batch: MA5878
(3) Instrument QC Batch: MA5883
(4) Prep QC Batch: MP12574
(5) Prep QC Batch: MP12577

(a) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Form I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
		Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	18 U	200	18	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Antimony	3.4 U	6.0	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Arsenic	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	5.0 U	200	5.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Beryllium	1.0 U	4.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	1.0 U	5.0	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Calcium	42 U	1000	42	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	0.60 U	10	0.60	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Cobalt	1.0 U	50	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Copper	1.0 U	25	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	15 U	300	15	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Lead [a]	3.4 U	10	3.4	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Magnesium	4.3 U	5000	4.3	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	1.5 U	15	1.5	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.10 U	1.0	0.10	ug/l	1	07/25/07	07/25/07	MS	SW846 7470A [1]	SW846 7470A [3]
Nickel	1.0 U	40	1.0	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Potassium	1770 J J	10000	100	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Selenium	2.8 U	10	2.8	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	0.90 U	10	0.90	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Sodium	2060 J J	10000	500	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Thallium	2.9 U	10	2.9	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Vanadium	1.1 U	50	1.1	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]
Zinc	1.9 J J	20	1.6	ug/l	1	07/26/07	07/27/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5873
(2) Instrument QC Batch: MA5878
(3) Prep QC Batch: MP12560
(4) Prep QC Batch: MP12581

(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
J = Indicates a result >= MDL but < RL

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I RFAAP Project Manager

FROM: Eric Malarek, Shaw E&I RFAAP Project Chemist

SUBJECT: Radford Army Ammunition Plant (RFAAP) Data Validation – Herbicides
Accutest Laboratories, Inc., SDG F51154

DATE: September 25, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. Aqueous samples were analyzed for chlorinated herbicides using USEPA SW846 Method 3510C/8151A. Solid samples were analyzed for chlorinated herbicides using USEPA SW846 Method 3550B/8151A. A total of five aqueous samples and seventeen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	41SD11	F51154-22
41SW09	F51154-7	49SS02	F51154-23
41SW10	F51154-8	49SS03	F51154-24
41SD08	F51154-9	49SS04	F51154-25
41SD09	F51154-10	49SS05	F51154-26
41SD10	F51154-11	59SS06	F51154-27
LFSD01	F51154-15	59SS07	F51154-28
TMSD01	F51154-16	59SS08	F51154-29
LFSW01	F51154-17	59SS09	F51154-30
APSD01	F51154-18	59SS10	F51154-31
TMSW01	F51154-20	TMSS05	F51154-32

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times
X		Initial Calibration
X		Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
X		Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/25/07
Date

RFAAP VALIDATION REPORT
CHLORINATED HERBICIDES REVIEW
SDG F51154

I-Holding Times

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For aqueous samples, chlorinated herbicides compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. For solid samples, chlorinated herbicides compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous and solid samples were collected on 07/18/07 and 07/19/07. For aqueous samples collected 07/18/07 and 07/19/07, the herbicides were extracted on 07/24/07 and analyzed on 07/25/07. For solid samples collected 07/18/07 and 07/19/07, the herbicides were extracted on 07/24/07 and analyzed on 07/27/07 and 07/28/07. All criteria were met. No qualifiers were applied.

II-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The DoD QSM specifies that the percent relative standard deviation (%RSD) for a 5-point standard calibration should be ≤20% for each target compound.

- No initial calibration was provided for MCPP and MCPA on instrument GC-GG. During discussions with the laboratory, they indicated that they perform a daily single point calibration rather than a five point calibration. All samples were non-detect and qualified estimated "UJ" based upon this outlier. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), TMSW01 (F51154-20), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this single point calibration.

- For initial calibration performed on 07/25/07 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), TMSW01 (F51154-20), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this initial calibration.

III-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for semivolatile target compounds. Continuing calibration establishes the response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The DoD QSM specifies that the percent difference (%D) between the initial calibration CF and the continuing calibration CF must be ≤20%.

- A single point calibration was provided for MCPP and MCPA on instrument GC-GG for 07/25/07 run. The calibration standard indicated adequate response for MCPP and MCPA. However, since a five point calibration was not performed, %D calculation could not be verified. All samples were non-detect and qualified estimated "UJ" based upon this outlier. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), TMSW01 (F51154-20), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this single point calibration.

- For continuing calibration performed on 07/25/07 @11:38 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this continuing calibration.

- For continuing calibration performed on 07/25/07 @17:37 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 07/25/07 @19:25 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 07/27/07 @12:05 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), and 49SS04 (F51154-25) apply to this continuing calibration.

- For continuing calibration performed on 07/27/07 @18:56 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this continuing calibration.

- For continuing calibration performed on 07/27/07 @23:27 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. Samples 49SS02 (F51154-23), 49SS03 (F51154-24) apply to this continuing calibration.

- For continuing calibration performed on 07/28/07 @02:08 on instrument GC-GG, all criteria were met for signal #1 and signal #2 for all target compounds, except MCPP and MCPA. No qualifiers were applied. No samples reported apply to this continuing calibration.

IV-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field or laboratory activities. No contaminants should be detected in any of the associated blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are qualified "B" if the concentration of the analyte is ≤ five times (5x) the absolute maximum blank concentration. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 33) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
07/25/07	OP7755-MB	All target compounds <½MRL	NA	NA	None
09/10/07	RB083007	All target compounds <½MRL	NA	NA	None
Analysis Date	**QC Blank ID**	**Compound**	**Max Conc. µg/kg**	**Action Level µg/kg**	**B qualified samples**
07/27/07	OP7756-MB	All target compounds <½MRL	NA	NA	None
07/25/07	RB071807	All target compounds <½MRL	NA	NA	None
08/03/07	072407R	All target compounds <½MRL	NA	NA	None
08/03/07	072507R	All target compounds <½MRL	NA	NA	None

V-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. Spike recoveries must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Control Limit: 2,4-DCAA (34-179%)
Solid Control Limit: 2,4-DCAA (34-179%)

- For sample 49SS02 (F51154-23), surrogate 2,4-DCAA was above criteria limits due to double spiking (lab error). The surrogate adjusted (145%) and within criteria. No qualifiers were applied based upon this outlier.

- For sample 49SS03 (F51154-24), surrogate 2,4-DCAA was above criteria limits due to double spiking (lab error). The surrogate adjusted (137%) and within criteria. No qualifiers were applied based upon this outlier.

- For sample 59SS10 (F51154-31), surrogate 2,4-DCAA (338%) was above criteria limits. The sample was non-detect for all target compounds; therefore, no qualifiers were applied based upon this outlier.

- For all other samples, all criteria were met.

VI-Laboratory Control Samples
Data for laboratory control samples (LCS) are generated to determine long-term precision and accuracy of the analytical method. Percent recoveries must be within the specified control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-8 of the DoD QSM (DoD, 2006). DoD QSM solid LCS recovery limits are specified in Table D-2 and Table D-9 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP7755-BS was used as the aqueous LCS for the 07/25/07 run. Dinoseb (98%) was above DoD QSM criteria and within laboratory criteria. All samples were non-detect for dinoseb; therefore, no qualifiers were applied based upon this outlier. All other herbicides were within criteria. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP7756-BS was used as the solid LCS for the 07/27/07 run. Dicamba (150%) and dinoseb (55%) were above DoD QSM criteria and/or laboratory criteria. All samples were non-detect for dinoseb; therefore, no qualifiers were applied based upon this outlier. Dicamba was qualified estimated bias high "K" for detects and no qualifier for non-detects based upon the high recovery. All other herbicides were within criteria. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-8 of the DoD QSM (DoD, 2006). DoD QSM solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-9 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample LFSW01 (F51154-17) was used for the aqueous MS/MSD analysis on 07/25/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample TMSS05 (F51154-32) was used as the solid MS/MSD for the 07/27/07 run. 2,4-D (142%), 2,4,5-TP (149%; RPD=30%), dinoseb (RPD=40%), and dalapon (147%) were above DoD QSM criteria and/or laboratory criteria. All samples were non-detect for 2,4-D, 2,4,5-TP, dinoseb, and dalapon; therefore, no qualifiers were applied based upon these outliers. All other herbicides were within criteria. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for chlorinated herbicides. All chlorinated herbicides target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for chlorinated herbicides. All chlorinated herbicides target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for chlorinated herbicides. All chlorinated herbicides target compounds were non-detect. All criteria were met. No qualifiers were applied.

IX-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters. Percent difference (%D) between the calculated value and the reported value must be within 10%. All positive values must have less than or equal to 40% %D between the primary and secondary columns. Any sample value >MDL and <MRL is qualified as estimated, "J." All criteria were met. No qualifiers were applied.

- The %D between the primary and secondary columns was within criteria for all detected chlorinated herbicides.

Sample: LFSW01MS (F51154-17MS), 2,4-DB

Conc. µg/L = (Amt * DF * Vt) / (CF * Vo)

where: Amt = the response on column (ng/mL) of the sample
CF = Calibration Factor (from initial calibration)
Vt = volume of final extract (mL)
DF = dilution factor
Vo = volume of the sample extracted (mL)

Conc. µg/L = (1734556 ng/mL * 1 * 10 mL) / (4558* 1000 mL)
= 3.8 ng/mL = 3.8 µg/L

Reported Conc. = 3.8 µg/L
%D = 0.0%
Values were within 10% difference

Sample: 49SS03 (F51154-24), 2,4-DB

Conc. µg/kg = (Amt * Ve * DF) / (CF * Ws * D)

where: Amt = the response on column (µg/mL) of the sample
CF = Calibration Factor (from initial calibration)
Ve = Final Volume of extract (mL)
DF = Dilution factor
W(s) = Weight of sample in grams.
D = Percent dry weight (100 - % moisture in sample)/100

Conc. µg/kg = (1158430 * 10 * 1) / (4558* 30.0 * 0.920) = 92.1 µg/kg

Reported value = 92.1 µg/kg
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

A (Dioxins) = MDL is based upon the signal-to-noise measurement.

B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics and Dioxins) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

D (Organics) = Indicates sample was analyzed at a dilution.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

E (Dioxins) = Reported value is estimated because of the presence of ether interferences.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/F ions is outside accepted ranges. The detected PCDD/F is reported as an estimated maximum possible concentration (EMPC).

I (Dioxins) = Reported value is estimated because of the incorrect isotope rations were obtained.

J (All) = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, (2) estimating a concentration <MRL and ≥ MDL, or estimating a concentration below the calibration range.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

U (All) = ND = BQL = Not detected. The associated number indicates the compound reporting limit for the sample.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: GG36347.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36347.D	1	07/25/07	ATX	07/24/07	T:OP7755	T:GGG1135
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND UJ	50		ug/l	
94-74-6	MCPA	ND UJ	50		ug/l	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	105%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GC36348.D

For I Cpy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36348.D	1	07/25/07	ATX	07/24/07	T:OP7755	T:GGG1135
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND UJ	50		ug/l	
94-74-6	MCPA	ND UJ	50		ug/l	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	109%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36349.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36349.D	1	07/25/07	ATX	07/24/07	T:OP7755	T:GGG1135
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND VJ	50		ug/l	
94-74-6	MCPA	ND VJ	50		ug/l	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	104%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36366.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36366.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	90	36	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	36	32	ug/kg	
93-76-5	2,4,5-T	ND	18	9.0	ug/kg	
1918-00-9	Dicamba	ND	18	14	ug/kg	
88-85-7	Dinoseb	ND	18	12	ug/kg	
75-99-0	Dalapon	ND	90	63	ug/kg	
120-36-5	Dichloroprop	ND	90	24	ug/kg	
94-82-6	2,4-DB	ND	180	150	ug/kg	
93-65-2	MCPP	ND UJ	450		ug/kg	
94-74-6	MCPA	ND UJ	450		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	87%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36367.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36367.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	40	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	8.1	4.0	ug/kg	
1918-00-9	Dicamba	ND	8.1	6.1	ug/kg	
88-85-7	Dinoseb	ND	8.1	5.3	ug/kg	
75-99-0	Dalapon	ND	40	28	ug/kg	
120-36-5	Dichloroprop	ND	40	11	ug/kg	
94-82-6	2,4-DB	ND	81	66	ug/kg	
93-65-2	MCPP	ND UJ	200		ug/kg	
94-74-6	MCPA	ND UJ	200		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	85%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36368.D

For I 00Pz

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36368.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	42	17	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	17	15	ug/kg	
93-76-5	2,4,5-T	ND	8.4	4.2	ug/kg	
1918-00-9	Dicamba	ND	8.4	6.3	ug/kg	
88-85-7	Dinoseb	ND	8.4	5.5	ug/kg	
75-99-0	Dalapon	ND	42	29	ug/kg	
120-36-5	Dichloroprop	ND	42	11	ug/kg	
94-82-6	2,4-DB	ND	84	69	ug/kg	
93-65-2	MCPP	ND UJ	210		ug/kg	
94-74-6	MCPA	ND UJ	210		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	105%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36369.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36369.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	58	23	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	23	20	ug/kg	
93-76-5	2,4,5-T	ND	12	5.8	ug/kg	
1918-00-9	Dicamba	ND	12	8.6	ug/kg	
88-85-7	Dinoseb	ND	12	7.5	ug/kg	
75-99-0	Dalapon	ND	58	40	ug/kg	
120-36-5	Dichloroprop	ND	58	16	ug/kg	
94-82-6	2,4-DB	ND	120	94	ug/kg	
93-65-2	MCPP	ND VJ	290		ug/kg	
94-74-6	MCPA	ND VJ	290		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	105%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36370.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	51	21	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	21	18	ug/kg	
93-76-5	2,4,5-T	ND	10	5.1	ug/kg	
1918-00-9	Dicamba	ND	10	7.7	ug/kg	
88-85-7	Dinoseb	ND	10	6.7	ug/kg	
75-99-0	Dalapon	ND	51	36	ug/kg	
120-36-5	Dichloroprop	ND	51	14	ug/kg	
94-82-6	2,4-DB	ND	100	84	ug/kg	
93-65-2	MCPP	ND UJ	260		ug/kg	
94-74-6	MCPA	ND UJ	260		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	62%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36351.D

For I Cor

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36351.D	1	07/25/07	ATX	07/24/07	T:OP7755	T:GGG1135
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND UJ	50		ug/l	
94-74-6	MCPA	ND UJ	50		ug/l	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	108%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36371.D

Form I OR4

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36371.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	
1918-00-9	Dicamba	14.5 K	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	113%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36352.D

Form I GC

Accutest Laboratories

Report of Analysis

3.2D
3

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36352.D	1	07/25/07	ATX	07/24/07	T:OP7755	T:GGG1135
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND VJ	50		ug/l	
94-74-6	MCPA	ND VJ	50		ug/l	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	146%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Run I 08

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36372.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.7	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.7	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	77	63	ug/kg	
93-65-2	MCPP	ND VJ	190		ug/kg	
94-74-6	MCPA	ND VJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	111%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36387.D

for I OM

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36387.D	1	07/28/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.4	3.7	ug/kg	
1918-00-9	Dicamba	ND	7.4	5.6	ug/kg	
88-85-7	Dinoseb	ND	7.4	4.8	ug/kg	
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	10	ug/kg	
94-82-6	2,4-DB	ND	74	61	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	145% [b]		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Surrogate was adjusted due to double spiking

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36388.D

For I Cm

Accutest Laboratories

Report of Analysis

3.24

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36388.D	1	07/28/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	13	ug/kg	
93-76-5	2,4,5-T	ND	7.2	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.2	5.4	ug/kg	
88-85-7	Dinoseb	ND	7.2	4.7	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.8	ug/kg	
94-82-6	2,4-DB	92.1	72	59	ug/kg	
93-65-2	MCPP	ND UJ	180		ug/kg	
94-74-6	MCPA	ND UJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	137% [b]		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Surrogate was adjusted due to double spiking.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36373.D

Form I Copy

Accutest Laboratories

Report of Analysis

3.2.5

3

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36373.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.6	3.8	ug/kg	
1918-00-9	Dicamba	ND	7.6	5.7	ug/kg	
88-85-7	Dinoseb	ND	7.6	5.0	ug/kg	
75-99-0	Dalapon	ND	38	27	ug/kg	
120-36-5	Dichloroprop	ND	38	10	ug/kg	
94-82-6	2,4-DB	ND	76	62	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	109%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36376.D

Form I OR

Accutest Laboratories

Report of Analysis

3.2.6 3

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36376.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	39	16	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	16	14	ug/kg	
93-76-5	2,4,5-T	ND	7.8	3.9	ug/kg	
1918-00-9	Dicamba	ND	7.8	5.8	ug/kg	
88-85-7	Dinoseb	ND	7.8	5.0	ug/kg	
75-99-0	Dalapon	ND	39	27	ug/kg	
120-36-5	Dichloroprop	ND	39	10	ug/kg	
94-82-6	2,4-DB	ND	78	63	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	91%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Run 1 copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36377.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	13	ug/kg	
93-76-5	2,4,5-T	ND	7.2	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.2	5.4	ug/kg	
88-85-7	Dinoseb	ND	7.2	4.7	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.8	ug/kg	
94-82-6	2,4-DB	ND	72	59	ug/kg	
93-65-2	MCPP	ND UJ	180		ug/kg	
94-74-6	MCPA	ND UJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	151%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36378.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36378.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	36	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.3	3.6	ug/kg	
1918-00-9	Dicamba	ND	7.3	5.5	ug/kg	
88-85-7	Dinoseb	ND	7.3	4.7	ug/kg	
75-99-0	Dalapon	ND	36	25	ug/kg	
120-36-5	Dichloroprop	ND	36	9.8	ug/kg	
94-82-6	2,4-DB	ND	73	59	ug/kg	
93-65-2	MCPP	ND UJ	180		ug/kg	
94-74-6	MCPA	ND UJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	143%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36379.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	37	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	15	13	ug/kg	
93-76-5	2,4,5-T	ND	7.5	3.7	ug/kg	
1918-00-9	Dicamba	ND	7.5	5.6	ug/kg	
88-85-7	Dinoseb	ND	7.5	4.9	ug/kg	
75-99-0	Dalapon	ND	37	26	ug/kg	
120-36-5	Dichloroprop	ND	37	10	ug/kg	
94-82-6	2,4-DB	ND	75	61	ug/kg	
93-65-2	MCPP	ND UJ	190		ug/kg	
94-74-6	MCPA	ND UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	79%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36380.D

For 1 only

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36380.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	35	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	12	ug/kg	
93-76-5	2,4,5-T	ND	7.0	3.5	ug/kg	
1918-00-9	Dicamba	ND	7.0	5.3	ug/kg	
88-85-7	Dinoseb	ND	7.0	4.6	ug/kg	
75-99-0	Dalapon	ND	35	25	ug/kg	
120-36-5	Dichloroprop	ND	35	9.5	ug/kg	
94-82-6	2,4-DB	ND	70	57	ug/kg	
93-65-2	MCPP	ND VJ	180		ug/kg	
94-74-6	MCPA	ND VJ	180		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	134%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36381.D

Form I OR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36381.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	35	14	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND	14	12	ug/kg	
93-76-5	2,4,5-T	ND	7.0	3.5	ug/kg	
1918-00-9	Dicamba	ND	7.0	5.2	ug/kg	
88-85-7	Dinoseb	ND	7.0	4.5	ug/kg	
75-99-0	Dalapon	ND	35	24	ug/kg	
120-36-5	Dichloroprop	ND	35	9.4	ug/kg	
94-82-6	2,4-DB	ND	70	57	ug/kg	
93-65-2	MCPP	ND UJ	170		ug/kg	
94-74-6	MCPA	ND UJ	170		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	338% [b]		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Outside control limits due to matrix interference.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36382.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8151 SW846 3550B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36382.D	1	07/27/07	ATX	07/24/07	T:OP7756	T:GGG1136
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result		RL	MDL	Units	Q
94-75-7	2,4-D	ND		38	15	ug/kg	
93-72-1	2,4,5-TP (Silvex)	ND		15	13	ug/kg	
93-76-5	2,4,5-T	ND		7.7	3.8	ug/kg	
1918-00-9	Dicamba	ND		7.7	5.8	ug/kg	
88-85-7	Dinoseb	ND		7.7	5.0	ug/kg	
75-99-0	Dalapon	ND		38	27	ug/kg	
120-36-5	Dichloroprop	ND		38	10	ug/kg	
94-82-6	2,4-DB	ND		77	63	ug/kg	
93-65-2	MCPP	ND	UJ	190		ug/kg	
94-74-6	MCPA	ND	UJ	190		ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	174%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG36350.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8151 SW846 3510C	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG36350.D	1	07/25/07	ATX	07/24/07	T:OP7755	T:GGG1135
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2		

Herbicide List

CAS No.	Compound	Result	RL	MDL	Units	Q
94-75-7	2,4-D	ND	1.5	0.80	ug/l	
93-72-1	2,4,5-TP (Silvex)	ND	0.20	0.15	ug/l	
93-76-5	2,4,5-T	ND	0.20	0.12	ug/l	
1918-00-9	Dicamba	ND	0.20	0.080	ug/l	
88-85-7	Dinoseb	ND	0.20	0.090	ug/l	
75-99-0	Dalapon	ND	1.0	1.0	ug/l	
120-36-5	Dichloroprop	ND	1.0	0.51	ug/l	
94-82-6	2,4-DB	ND	2.0	1.9	ug/l	
93-65-2	MCPP	ND	50		ug/l	
94-74-6	MCPA	ND	50		ug/l	
87-86-5	Pentachlorophenol	ND	0.050	0.040	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
19719-28-9	2,4-DCAA	92%		34-179%

(a) Analysis performed at Accutest Laboratories, Houston, TX.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Explosives, PETN, & Nitroglycerin
Accutest Laboratories, Inc., SDG F51154

DATE: September 25, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. Aqueous samples were analyzed for explosives, nitroglycerin, and PETN using USEPA SW-846 3535A/8330A. Solid samples were analyzed for explosives, nitroglycerin, and PETN using USEPA SW-846 8330B/8330A. A total of five aqueous samples and seventeen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	41SD11	F51154-22
41SW09	F51154-7	49SS02	F51154-23
41SW10	F51154-8	49SS03	F51154-24
41SD08	F51154-9	49SS04	F51154-25
41SD09	F51154-10	49SS05	F51154-26
41SD10	F51154-11	59SS06	F51154-27
LFSD01	F51154-15	59SS07	F51154-28
TMSD01	F51154-16	59SS08	F51154-29
LFSW01	F51154-17	59SS09	F51154-30
APSD01	F51154-18	59SS10	F51154-31
TMSW01	F51154-20	TMSS05	F51154-32

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Initial Calibration
	X	Continuing Calibration
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike/Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable.

Eric Malarek

Eric Malarek, Chemist

9/25/07

Date

RFAAP VALIDATION REPORT
EXPLOSIVES REVIEW
SDG F51154

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For aqueous samples, explosive compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 7 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis. For solid samples, explosive compounds are shipped cooled (@4°C ± 2°C) with a maximum holding time of 14 days from sample collection to preparative extraction and 40 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous and solid samples were collected on 07/18/07 and 07/19/07. For the aqueous samples collected 07/18/07 and 07/19/07, the explosives were extracted on 07/25/07 and analyzed on 07/27/07. For the solid samples collected 07/18/07 and 07/19/07, the explosives were extracted on 08/01/07 and analyzed on 08/03/07. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 10) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
07/27/07	OP21593-MB	All target explosives <½MRL	NA	NA	None
07/27/07	OP21593-MB	All target explosives <½MRL	NA	NA	None
07/27/07	OP21593-MB	PETN & NG <½MRL	NA	NA	None
07/27/07	OP21593-MB	PETN & NG <½MRL	NA	NA	None
09/11/07	RB083007	All target explosives <½MRL	NA	NA	None
09/07/07	RB083007	PETN & NG <½MRL	NA	NA	None
Analysis Date	**QC Blank ID**	**Compound**	**Max Conc. µg/kg**	**Action Level µg/kg**	**B qualified samples**
08/03/07	OP21693-MB	All target explosives <½MRL	NA	NA	None
08/03/07	OP21693-MB	PETN & NG <½MRL	NA	NA	None
07/27/07	RB071807	All target explosives <½MRL	NA	NA	None
07/27/07	RB071807	PETN & NG <½MRL	NA	NA	None
08/01/07	072407R	All target explosives <½MRL	NA	NA	None
08/01/07	072407R	PETN & NG <½MRL	NA	NA	None
08/01/07	072507R	All target explosives <½MRL	NA	NA	None
08/01/07	072507R	PETN & NG <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

III-Initial Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. The initial 5-point calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. The DoD QSM specifies that the correlation coefficient must be ≥0.995 and/or the percent relative standard deviation (%RSD) must be ≤20%. All detects were qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- For the explosives initial calibration performed on 10/18/06 on instrument G1315B, all criteria were met for target explosives compounds. All compounds were determined using calibration factors with RSDs ≤20%. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this initial calibration.

- For the explosives initial calibration performed on 10/20/06 on instrument G1315B, all criteria were met for target explosives compounds. All compounds were determined using calibration factors with RSDs ≤20%. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this initial calibration.

- For the PETN and nitroglycerine initial calibration performed on 03/15/07 on instrument G1315B, all criteria were met for target compounds. All compounds were determined using calibration factors with RSDs ≤20%. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), TMSW01 (F51154-20), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the target compounds. Continuing calibration standards are analyzed after every 10 injections, and at the end of the analysis sequence. The DoD QSM specifies that the percent difference (%D) from initial calibration should be no greater than ±20%. All detects were qualified as estimated "J" for where there were exceeding %Ds, and all non-detects were qualified as estimated "UJ" for where there were grossly exceeding recoveries. Grossly exceeding is defined as twice the established criteria limits.

- For explosives initial calibration verification performed on 10/18/06 @17:39 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives initial calibration verification performed on 10/19/06 @13:44 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives initial calibration verification performed on 10/20/06 @14:03 on instrument G1315B, nitrobenzene (20.5%) was outside criteria. All samples were non-detect for this compound. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives initial calibration verification performed on 10/20/06 @15:10 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this initial verification calibration.

- For explosives continuing calibration performed on 07/27/07 @10:31 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SW08 (F51154-6) and 41SW09 (F51154-7) apply to this continuing calibration.

- For explosives continuing calibration performed on 07/27/07 @14:11 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this continuing calibration.

- For explosives continuing calibration performed on 07/27/07 @16:57 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For explosives continuing calibration performed on 07/27/07 @18:36 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this continuing calibration.

- For explosives continuing calibration performed on 07/27/07 @20:33 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples apply to this continuing calibration.

- For explosives continuing calibration performed on 08/02/07 @22:39 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), and APSD01 (F51154-18) apply to this continuing calibration.

- For explosives continuing calibration performed on 08/03/07 @04:11 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) apply to this continuing calibration.

- For explosives continuing calibration performed on 08/03/07 @09:41 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample TMSS05 (F51154-32) applies to this continuing calibration.

- For explosives continuing calibration performed on 08/03/07 @15:37 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PETN and nitroglycerin initial calibration verification performed on 03/15/07 @12:35 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 07/27/07 @13:19 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 07/27/07 @15:29 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/03/07 @09:24 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), and APSD01 (F51154-18) apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/03/07 @10:59 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Samples 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) apply to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/03/07 @12:41 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. Sample TMSS05 (F51154-32) applies to this continuing calibration.

- For PETN and nitroglycerin continuing calibration performed on 08/03/07 @13:33 on instrument G1315B, all criteria were met for target compounds. No qualifiers were applied. No samples reported apply to this continuing calibration.

V-System Monitoring Compound (Surrogates)
Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria: 3,4-dinitrotoluene (70-136%)
Solid Criteria: 3,4-dinitrotoluene (72-145%)

- All criteria were met for explosives, PETN, and nitroglycerin. No qualifiers were applied.

VI-Laboratory Control Sample
Laboratory control samples (LCS) are used to monitor long-term accuracy of the analytical method. The analysis is performed at a frequency of 1 per analytical batch. The percent recoveries (%Rs) must be within the laboratory control limits. DoD QSM aqueous LCS recovery limits are specified in Table D-12 of the DoD QSM (DoD, 2006). DoD QSM solid LCS recovery limits are specified in Table D-2 and Table D-13 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample OP21593-BS was used as aqueous LCS for explosives analyzed on 07/27/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21593-BS was used as aqueous LCS for explosives analyzed on 07/27/07. HMX (136%) was outside DoD QSM criteria and within laboratory criteria. All samples were non-detect HMX; therefore, no qualifiers were applied based upon this outlier. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21693-BS was used as solid LCS for explosives analyzed on 08/02/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

- Sample OP21593-BS2 was used as aqueous LCS for PETN and nitroglycerin analyzed on 07/27/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this LCS.

- Sample OP21693-BS2 was used as solid LCS for PETN and nitroglycerin analyzed on 08/03/07. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the laboratory control limits. DoD QSM aqueous MS/MSD recovery limits follow the LCS criteria and are specified in Table D-12 of the DoD QSM (DoD, 2006). DoD QSM solid MS/MSD recovery limits follow the LCS criteria and are specified in Table D-2 and Table D-13 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample 41SW09 (F51154-7) was used as the aqueous MS/MSD for the explosive analysis on 07/27/07. HMX (121%, 118%) was outside DoD QSM criteria and within laboratory criteria. All samples were non-detect HMX; therefore, no qualifiers were applied based upon these outliers. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample APSD01 (F51154-18) was used as the solid MS/MSD for the explosive analysis on 08/03/07. 2,6-Dinitrotoluene (RPD=18%), 2,4-dinitrotoluene (131%, RPD=20%), 2-amino-4,6-dinitrotoluene (126%), and 4-amino-2,6-dinitrotoluene (RPD=19%) were outside DoD QSM criteria and/or laboratory criteria. All associated samples were non-detect for these compounds; therefore, no qualifiers were applied based upon these outliers. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

- Sample LFSW01 (F51154-17) was used as the aqueous MS/MSD for the PETN and nitroglycerin analysis on 07/27/07. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- Sample TMSD01 (F51154-16) was used as the solid MS/MSD for the PETN and nitroglycerin analysis on 07/02-03/07. Nitroglycerin (RPD=27%) was above lab criteria. For PETN, all criteria were met. All associated samples were non-detect for nitroglycerin; therefore, no qualifiers were applied based upon this outlier. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for explosives, nitroglycerin, and PETN. All explosives, nitroglycerin, and PETN target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for explosives, nitroglycerin, and PETN. All explosives, nitroglycerin, and PETN target compounds were non-detect. All criteria were met. No qualifiers were applied.

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for explosives, nitroglycerin, and PETN. All explosives, nitroglycerin, and PETN target compounds were non-detect. All criteria were met. No qualifiers were applied.

IX-Quantitation Verification

The accuracy of analytical results was verified through the calculation of several parameters. The calculation was based calibration factors. The absolute percent difference (%D) between the calculated and the reported value must be within 10% difference. All values >MDL and <MRL or <3*MDL (whichever was greater) were qualified as estimated "J".

- The %D between the primary and secondary columns was within criteria for all detected explosives, PETN, and nitroglycerin.

Sample: 41SW08 (F51154-6), 2-amino-4,6-dinitrotoluene

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL).
DF = Dilution factor

Conc. µg/L = (199179 * 10 * 1) / (7177 * 1010) = 0.27 µg/L (Signal #1)

Reported Value = 0.27 µg/L
% Difference = 0.0%
Values were within 10% difference

Sample: LFSW01MS (F51154-17MS), nitroglycerin

Conc. µg/L = (Ax * Vt * DF) / (CF * Vs)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
Vs = Volume of sample extracted (mL).
DF = Dilution factor

Conc. µg/L = (3198546 * 10 * 1) / (1228 * 430) = 60.6 µg/L (Signal #1)

Reported Value = 60.6 µg/L
% Difference = 0.0%
Values were within 10% difference

Sample: APSD01MS (F51154-18MS), nitrobenzene

Conc. mg/kg = (Ax * Vt * DF) / (CF * Ws * D)

where: Conc. = Sample concentration in mg/kg
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
W(s) = Weight of sample in kilograms.
D = Percent dry weight (100 - % moisture in sample)/100
DF = Dilution factor

Conc. mg/kg = (4241037 * 20 * 1) / (7223 * 2.45 * 1) = 4970 µg/kg (Signal #1)
Reported Value = 4970 µg/kg
% Difference = 0.0%
Values were within 10% difference

Sample: TMSD01MS (F51154-16MS), nitroglycerin

Conc. mg/kg = (Ax * Vt * DF) / (CF * Ws * D)

where: Conc. = Sample concentration in mg/kg
Ax = Area of characteristic ion for compound being measured.
Vt = Volume of total extract (mL).
CF = Average relative calibration factor for compound being measured (from ICAL)
W(s) = Weight of sample in kilograms.
D = Percent dry weight (100 - % moisture in sample)/100
DF = Dilution factor

Conc. mg/kg = (3248217 * 20 * 1) / (1228 * 2.68 * 1) = 19700 µg/kg (Signal #1)
Reported Value = 19700 µg/kg
% Difference = 0.0%
Values were within 10% difference

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Raw Data: GG022998.D PP021775.D GG023013.D

Form I Cmy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW08		
Lab Sample ID:	F51154-6	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG022998.D	1	07/27/07	MRE	07/25/07	OP21593	GGG987
Run #2	PP021775.D	1	07/27/07	MRE	07/25/07	OP21593	GPP751
Run #3 [b]	GG023013.D	1	07/27/07	MRE	07/25/07	OP21593	GGG988

	Initial Volume	Final Volume
Run #1	1010 ml	10.0 ml
Run #2	1010 ml	10.0 ml
Run #3	1010 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.059	ug/l	
121-82-4	RDX	ND	0.20	0.074	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.069	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.064	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.074	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	0.27	0.20	0.069	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	0.87	0.20	0.079	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.059	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.059	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.074	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.074	ug/l	
479-45-8	Tetryl	ND	0.20	0.074	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.094	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.079	ug/l	
55-63-0	Nitroglycerine	ND [c]	2.0	0.69	ug/l	
78-11-5	PETN	ND [c]	2.0	0.69	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	102%	103%	101%	70-136%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG022999.D PP021776.D GG023014.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW09		
Lab Sample ID:	F51154-7	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG022999.D	1	07/27/07	MRE	07/25/07	OP21593	GGG987
Run #2	PP021776.D	1	07/27/07	MRE	07/25/07	OP21593	GPP751
Run #3 [b]	GG023014.D	1	07/27/07	MRE	07/25/07	OP21593	GGG988

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml
Run #3	1000 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.060	ug/l	
121-82-4	RDX	ND	0.20	0.075	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.070	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.065	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.075	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	0.76	0.20	0.070	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	1.7	0.20	0.080	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.060	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.060	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.075	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.075	ug/l	
479-45-8	Tetryl	ND	0.20	0.075	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.095	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.20	0.080	ug/l	
55-63-0	Nitroglycerine	ND [c]	2.0	0.70	ug/l	
78-11-5	PETN	ND [c]	2.0	0.70	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	97%	96%	101%	70-136%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023004.D PP021777.D GG023015.D

Form I Corr

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SW10		
Lab Sample ID:	F51154-8	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	GG023004.D	1	07/27/07	MRE	07/25/07	OP21593	GGG987
Run #2	PP021777.D	1	07/27/07	MRE	07/25/07	OP21593	GPP751
Run #3 [b]	GG023015.D	1	07/27/07	MRE	07/25/07	OP21593	GGG988

	Initial Volume	Final Volume
Run #1	1000 ml	10.0 ml
Run #2	1000 ml	10.0 ml
Run #3	1000 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.20	0.060	ug/l	
121-82-4	RDX	ND	0.20	0.075	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.20	0.070	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.20	0.065	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.20	0.075	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	1.1	0.20	0.070	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	2.5	0.20	0.080	ug/l	
98-95-3	Nitrobenzene	ND	0.20	0.060	ug/l	
88-72-2	o-Nitrotoluene	ND	0.20	0.060	ug/l	
99-08-1	m-Nitrotoluene	ND	0.20	0.075	ug/l	
99-99-0	p-Nitrotoluene	ND	0.20	0.075	ug/l	
479-45-8	Tetryl	ND	0.20	0.075	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.20	0.095	ug/l	
118-96-7	2,4,6-Trinitrotoluene	1.3	0.20	0.080	ug/l	
55-63-0	Nitroglycerine	ND [c]	2.0	0.70	ug/l	
78-11-5	PETN	ND [c]	2.0	0.70	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
610-39-9	3,4-Dinitrotoluene	97%	102%	104%	70-136%

(a) All hits confirmed by reanalysis on a dissimilar column.
(b) Confirmation run.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023079.D PP021960.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD08		
Lab Sample ID:	F51154-9	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	36.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023079.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021960.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.37 g	20.0 ml
Run #2	2.37 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	44	ug/kg	
121-82-4	RDX	ND	210	42	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	42	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	75	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	42	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	42	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	46	ug/kg	
98-95-3	Nitrobenzene	ND	210	60	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	65	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	87	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	58	ug/kg	
479-45-8	Tetryl	ND	420	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	50	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	42	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	630	ug/kg	
78-11-5	PETN	ND [a]	1700	630	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene		107%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023080.D PP021961.D

Form I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD09		
Lab Sample ID:	F51154-10	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	82.4
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023080.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021961.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.45 g	20.0 ml
Run #2	2.45 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	200	42	ug/kg	
121-82-4	RDX	ND	200	41	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	200	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	73	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	41	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	200	41	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	200	44	ug/kg	
98-95-3	Nitrobenzene	ND	200	58	ug/kg	
88-72-2	o-Nitrotoluene	ND	200	63	ug/kg	
99-08-1	m-Nitrotoluene	ND	200	84	ug/kg	
99-99-0	p-Nitrotoluene	ND	200	56	ug/kg	
479-45-8	Tetryl	ND	410	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	200	48	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	200	41	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1600	610	ug/kg	
78-11-5	PETN	ND [a]	1600	610	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	102%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023081.D PP021962.D

Form I Corg

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD10		
Lab Sample ID:	F51154-11	Date Sampled:	07/18/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	79.2
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023081.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021962.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.22 g	20.0 ml
Run #2	2.22 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	47	ug/kg	
121-82-4	RDX	ND	230	45	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	45	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	80	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	45	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	45	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	49	ug/kg	
98-95-3	Nitrobenzene	ND	230	64	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	69	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	93	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	62	ug/kg	
479-45-8	Tetryl	ND	450	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	53	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	45	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	680	ug/kg	
78-11-5	PETN	ND [a]	1800	680	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	104%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023005.D PP021778.D

for I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	RB071807		
Lab Sample ID:	F51154-12	Date Sampled:	07/18/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023005.D	1	07/27/07	MRE	07/25/07	OP21593	GGG987
Run #2	PP021778.D	1	07/27/07	MRE	07/25/07	OP21593	GPP751

	Initial Volume	Final Volume
Run #1	1040 ml	10.0 ml
Run #2	1040 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.19	0.058	ug/l	
121-82-4	RDX	ND	0.19	0.072	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.19	0.067	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.19	0.062	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.19	0.072	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.19	0.067	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.19	0.077	ug/l	
98-95-3	Nitrobenzene	ND	0.19	0.058	ug/l	
88-72-2	o-Nitrotoluene	ND	0.19	0.058	ug/l	
99-08-1	m-Nitrotoluene	ND	0.19	0.072	ug/l	
99-99-0	p-Nitrotoluene	ND	0.19	0.072	ug/l	
479-45-8	Tetryl	ND	0.19	0.072	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.19	0.091	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.19	0.077	ug/l	
55-63-0	Nitroglycerine	ND [a]	1.9	0.67	ug/l	
78-11-5	PETN	ND [a]	1.9	0.67	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	103%	113%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023082.D PP021963.D

Form I Corr

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSD01		
Lab Sample ID:	F51154-15	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	57.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023082.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021963.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.46 g	20.0 ml
Run #2	2.46 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	200	42	ug/kg	
121-82-4	RDX	ND	200	41	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	200	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	200	72	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	200	41	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	200	41	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	200	44	ug/kg	
98-95-3	Nitrobenzene	ND	200	58	ug/kg	
88-72-2	o-Nitrotoluene	ND	200	63	ug/kg	
99-08-1	m-Nitrotoluene	ND	200	84	ug/kg	
99-99-0	p-Nitrotoluene	ND	200	56	ug/kg	
479-45-8	Tetryl	ND	410	110	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	200	48	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	200	41	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1600	610	ug/kg	
78-11-5	PETN	ND [a]	1600	610	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	110%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023083.D PP021964.D

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSD01		
Lab Sample ID:	F51154-16	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	65.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023083.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021964.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.62 g	20.0 ml
Run #2	2.62 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	190	40	ug/kg	
121-82-4	RDX	ND	190	38	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	190	38	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	68	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	38	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	190	38	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	190	41	ug/kg	
98-95-3	Nitrobenzene	ND	190	54	ug/kg	
88-72-2	o-Nitrotoluene	ND	190	59	ug/kg	
99-08-1	m-Nitrotoluene	ND	190	79	ug/kg	
99-99-0	p-Nitrotoluene	ND	190	53	ug/kg	
479-45-8	Tetryl	ND	380	110	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	190	45	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	190	38	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1500	570	ug/kg	
78-11-5	PETN	ND [a]	1500	570	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	105%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	LFSW01		
Lab Sample ID:	F51154-17	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023006.D	1	07/27/07	MRE	07/25/07	OP21593	GGG987
Run #2	PP021779.D	1	07/27/07	MRE	07/25/07	OP21593	GPP751

	Initial Volume	Final Volume
Run #1	860 ml	10.0 ml
Run #2	860 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.23	0.070	ug/l	
121-82-4	RDX	ND	0.23	0.087	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.23	0.081	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.23	0.076	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.23	0.087	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.23	0.081	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.23	0.093	ug/l	
98-95-3	Nitrobenzene	ND	0.23	0.070	ug/l	
88-72-2	o-Nitrotoluene	ND	0.23	0.070	ug/l	
99-08-1	m-Nitrotoluene	ND	0.23	0.087	ug/l	
99-99-0	p-Nitrotoluene	ND	0.23	0.087	ug/l	
479-45-8	Tetryl	ND	0.23	0.087	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.23	0.11	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.23	0.093	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.3	0.81	ug/l	
78-11-5	PETN	ND [a]	2.3	0.81	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	100%	106%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023084.D PP021967.D

Form I COM

Accutest Laboratories

Report of Analysis

Client Sample ID:	APSD01		
Lab Sample ID:	F51154-18	Date Sampled:	07/19/07
Matrix:	SO - Sediment	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023084.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021967.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.70 g	20.0 ml
Run #2	2.70 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	190	39	ug/kg	
121-82-4	RDX	ND	190	37	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	190	37	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	190	66	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	190	37	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	190	37	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	190	40	ug/kg	
98-95-3	Nitrobenzene	ND	190	53	ug/kg	
88-72-2	o-Nitrotoluene	ND	190	57	ug/kg	
99-08-1	m-Nitrotoluene	ND	190	76	ug/kg	
99-99-0	p-Nitrotoluene	ND	190	51	ug/kg	
479-45-8	Tetryl	ND	370	100	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	190	44	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	190	37	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1500	560	ug/kg	
78-11-5	PETN	ND [a]	1500	560	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	107%	104%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023007.D PP021782.D

Form I Org

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSW01		
Lab Sample ID:	F51154-20	Date Sampled:	07/19/07
Matrix:	AQ - Surface Water	Date Received:	07/19/07
Method:	SW846 8330A SW846 3535A	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023007.D	1	07/27/07	MRE	07/25/07	OP21593	GGG987
Run #2	PP021782.D	1	07/27/07	MRE	07/25/07	OP21593	GPP751

	Initial Volume	Final Volume
Run #1	850 ml	10.0 ml
Run #2	850 ml	10.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	0.24	0.071	ug/l	
121-82-4	RDX	ND	0.24	0.088	ug/l	
99-65-0	1,3-Dinitrobenzene	ND	0.24	0.082	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	0.24	0.076	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	0.24	0.088	ug/l	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.24	0.082	ug/l	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.24	0.094	ug/l	
98-95-3	Nitrobenzene	ND	0.24	0.071	ug/l	
88-72-2	o-Nitrotoluene	ND	0.24	0.071	ug/l	
99-08-1	m-Nitrotoluene	ND	0.24	0.088	ug/l	
99-99-0	p-Nitrotoluene	ND	0.24	0.088	ug/l	
479-45-8	Tetryl	ND	0.24	0.088	ug/l	
99-35-4	1,3,5-Trinitrobenzene	ND	0.24	0.11	ug/l	
118-96-7	2,4,6-Trinitrotoluene	ND	0.24	0.094	ug/l	
55-63-0	Nitroglycerine	ND [a]	2.4	0.82	ug/l	
78-11-5	PETN	ND [a]	2.4	0.82	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	99%	110%	70-136%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Form I OBZ

Accutest Laboratories

Report of Analysis

Client Sample ID:	41SD11		
Lab Sample ID:	F51154-22	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	86.8
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023089.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021970.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.43 g	20.0 ml
Run #2	2.43 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	43	ug/kg	
121-82-4	RDX	ND	210	41	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	73	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	41	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	41	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	44	ug/kg	
98-95-3	Nitrobenzene	ND	210	58	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	63	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	85	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	57	ug/kg	
479-45-8	Tetryl	ND	410	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	49	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	41	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1600	620	ug/kg	
78-11-5	PETN	ND [a]	1600	620	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	110%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023090.D PP021971.D

Form I COA

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS02		
Lab Sample ID:	F51154-23	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	89.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023090.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021971.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.39 g	20.0 ml
Run #2	2.39 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	44	ug/kg	
121-82-4	RDX	ND	210	42	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	42	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	74	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	42	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	42	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	45	ug/kg	
98-95-3	Nitrobenzene	ND	210	59	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	64	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	86	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	58	ug/kg	
479-45-8	Tetryl	ND	420	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	49	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	42	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	630	ug/kg	
78-11-5	PETN	ND [a]	1700	630	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	109%	109%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023091.D PP021972.D

Run 1 only

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS03		
Lab Sample ID:	F51154-24	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023091.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021972.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.42 g	20.0 ml
Run #2	2.42 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	43	ug/kg	
121-82-4	RDX	ND	210	41	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	41	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	74	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	41	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	41	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	45	ug/kg	
98-95-3	Nitrobenzene	ND	210	59	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	64	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	85	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	57	ug/kg	
479-45-8	Tetryl	ND	410	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	49	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	41	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	620	ug/kg	
78-11-5	PETN	ND [a]	1700	620	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	111%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023092.D PP021973.D

Form I Copy

Accutest Laboratories

Report of Analysis

3.2.5

Client Sample ID:	49SS04		
Lab Sample ID:	F51154-25	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	87.5
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023092.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021973.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.12 g	20.0 ml
Run #2	2.12 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	240	49	ug/kg	
121-82-4	RDX	ND	240	47	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	240	47	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	240	84	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	240	47	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	240	47	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	240	51	ug/kg	
98-95-3	Nitrobenzene	ND	240	67	ug/kg	
88-72-2	o-Nitrotoluene	ND	240	73	ug/kg	
99-08-1	m-Nitrotoluene	ND	240	97	ug/kg	
99-99-0	p-Nitrotoluene	ND	240	65	ug/kg	
479-45-8	Tetryl	ND	470	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	240	56	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	240	47	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	710	ug/kg	
78-11-5	PETN	ND [a]	1900	710	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	112%	112%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023093.D PP021974.D

Run I OA

Accutest Laboratories

Report of Analysis

Client Sample ID:	49SS05		
Lab Sample ID:	F51154-26	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	85.9
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023093.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021974.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.27 g	20.0 ml
Run #2	2.27 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	220	46	ug/kg	
121-82-4	RDX	ND	220	44	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	220	44	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	78	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	220	44	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	220	44	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	220	48	ug/kg	
98-95-3	Nitrobenzene	ND	220	63	ug/kg	
88-72-2	o-Nitrotoluene	ND	220	68	ug/kg	
99-08-1	m-Nitrotoluene	ND	220	91	ug/kg	
99-99-0	p-Nitrotoluene	ND	220	61	ug/kg	
479-45-8	Tetryl	ND	440	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	220	52	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	220	44	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	660	ug/kg	
78-11-5	PETN	ND [a]	1800	660	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	111%	108%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023094.D PP021975.D

Form I copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS06		
Lab Sample ID:	F51154-27	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	92.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023094.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021975.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.25 g	20.0 ml
Run #2	2.25 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	220	46	ug/kg	
121-82-4	RDX	ND	220	44	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	220	44	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	79	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	220	44	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	220	44	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	220	48	ug/kg	
98-95-3	Nitrobenzene	ND	220	63	ug/kg	
88-72-2	o-Nitrotoluene	ND	220	68	ug/kg	
99-08-1	m-Nitrotoluene	ND	220	92	ug/kg	
99-99-0	p-Nitrotoluene	ND	220	61	ug/kg	
479-45-8	Tetryl	ND	440	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	220	52	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	220	44	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1800	670	ug/kg	
78-11-5	PETN	ND [a]	1800	670	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	114%	116%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023095.D PP021976.D

Form I Copy

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS07		
Lab Sample ID:	F51154-28	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	91.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023095.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021976.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.37 g	20.0 ml
Run #2	2.37 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	44	ug/kg	
121-82-4	RDX	ND	210	42	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	42	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	75	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	42	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	42	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	46	ug/kg	
98-95-3	Nitrobenzene	ND	210	60	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	65	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	87	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	58	ug/kg	
479-45-8	Tetryl	ND	420	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	50	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	42	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	630	ug/kg	
78-11-5	PETN	ND [a]	1700	630	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	119%	118%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023096.D PP021977.D

Form I CVR

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS08		
Lab Sample ID:	F51154-29	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	89.0
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023096.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021977.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.33 g	20.0 ml
Run #2	2.33 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	45	ug/kg	
121-82-4	RDX	ND	210	43	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	43	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	76	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	43	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	43	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	46	ug/kg	
98-95-3	Nitrobenzene	ND	210	61	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	66	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	88	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	59	ug/kg	
479-45-8	Tetryl	ND	430	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	51	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	43	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	640	ug/kg	
78-11-5	PETN	ND [a]	1700	640	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	102%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023097.D PP021978.D

Form I OV

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS09		
Lab Sample ID:	F51154-30	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	95.1
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023097.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021978.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.16 g	20.0 ml
Run #2	2.16 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	230	48	ug/kg	
121-82-4	RDX	ND	230	46	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	230	46	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	230	82	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	230	46	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	230	46	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	230	50	ug/kg	
98-95-3	Nitrobenzene	ND	230	66	ug/kg	
88-72-2	o-Nitrotoluene	ND	230	71	ug/kg	
99-08-1	m-Nitrotoluene	ND	230	95	ug/kg	
99-99-0	p-Nitrotoluene	ND	230	64	ug/kg	
479-45-8	Tetryl	ND	460	130	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	230	55	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	230	46	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1900	690	ug/kg	
78-11-5	PETN	ND [a]	1900	690	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	104%	111%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023098.D PP021979.D

Form I OP

Accutest Laboratories

Report of Analysis

Client Sample ID:	59SS10		
Lab Sample ID:	F51154-31	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	95.7
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023098.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021979.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.30 g	20.0 ml
Run #2	2.30 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	220	45	ug/kg	
121-82-4	RDX	ND	220	43	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	220	43	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	220	77	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	220	43	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	220	43	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	220	47	ug/kg	
98-95-3	Nitrobenzene	ND	220	62	ug/kg	
88-72-2	o-Nitrotoluene	ND	220	67	ug/kg	
99-08-1	m-Nitrotoluene	ND	220	90	ug/kg	
99-99-0	p-Nitrotoluene	ND	220	60	ug/kg	
479-45-8	Tetryl	ND	430	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	220	51	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	220	43	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	650	ug/kg	
78-11-5	PETN	ND [a]	1700	650	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	106%	107%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: GG023101.D PP021982.D

Form I COC

Accutest Laboratories

Report of Analysis

Client Sample ID:	TMSS05		
Lab Sample ID:	F51154-32	Date Sampled:	07/19/07
Matrix:	SO - Soil	Date Received:	07/19/07
Method:	SW846 8330A SW846 8330B	Percent Solids:	86.6
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG023101.D	1	08/03/07	NAF	08/01/07	OP21693	GGG991
Run #2	PP021982.D	1	08/03/07	NAF	08/01/07	OP21693	GPP759

	Initial Weight	Final Volume
Run #1	2.38 g	20.0 ml
Run #2	2.38 g	20.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
2691-41-0	HMX	ND	210	44	ug/kg	
121-82-4	RDX	ND	210	42	ug/kg	
99-65-0	1,3-Dinitrobenzene	ND	210	42	ug/kg	
606-20-2	2,6-Dinitrotoluene	ND	210	75	ug/kg	
121-14-2	2,4-Dinitrotoluene	ND	210	42	ug/kg	
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	210	42	ug/kg	
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	210	45	ug/kg	
98-95-3	Nitrobenzene	ND	210	60	ug/kg	
88-72-2	o-Nitrotoluene	ND	210	65	ug/kg	
99-08-1	m-Nitrotoluene	ND	210	87	ug/kg	
99-99-0	p-Nitrotoluene	ND	210	58	ug/kg	
479-45-8	Tetryl	ND	420	120	ug/kg	
99-35-4	1,3,5-Trinitrobenzene	ND	210	50	ug/kg	
118-96-7	2,4,6-Trinitrotoluene	ND	210	42	ug/kg	
55-63-0	Nitroglycerine	ND [a]	1700	630	ug/kg	
78-11-5	PETN	ND [a]	1700	630	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	116%	113%	72-145%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, Maryland
410-612-6350
FAX: 410-612-6351

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
SGS Paradigm Analytical Laboratories, Inc. SDGs G383-583
(Accutest SDG F51154)

DATE: September 26, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for a RFI/CMS Nine Sites on July 18, 2007 and July 19, 2007. The samples were analyzed for Dioxin Furan compounds using USEPA SW-846 Method 8290 High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of five aqueous samples and seventeen solid samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
41SW08	F51154-6	41SD11	F51154-22
41SW09	F51154-7	49SS02	F51154-23
41SW10	F51154-8	49SS03	F51154-24
41SD08	F51154-9	49SS04	F51154-25
41SD09	F51154-10	49SS05	F51154-26
41SD10	F51154-11	59SS06	F51154-27
LFSD01	F51154-15	59SS07	F51154-28
TMSD01	F51154-16	59SS08	F51154-29
LFSW01	F51154-17	59SS09	F51154-30
APSD01	F51154-18	59SS10	F51154-31
TMSW01	F51154-20	TMSS05	F51154-32

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
X		Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
X		Matrix Spike and Spike Duplicate
X		Field Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

9/26/07
Date

RFAAP VALIDATION REPORT
DIOXIN FURAN REVIEW
SDGs G383-583
(Accutest SDG F51154)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For aqueous samples, dioxin and furans are shipped cooled (@4°C ± 2°C) with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis. For solid samples, dioxin and furans are shipped cooled (@4°C ± 2°C) with a maximum holding time of 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 07/18/07 and 07/19/07, the coolers were received by the primary laboratory (Accutest) on 07/20/07 at 4.0°C, 4.0°C, 4.6°C, 4.6°C, 4.8°C, 5.0°C, 5.0°C, and 5.8°C. The herbicides were subcontracted to Accutest TX and were received the samples at 4.2°C, 4.0°C, and 3.6°C. The perchlorate subcontract laboratory (Datachem Laboratories, Inc.) received the aqueous samples at 3.0°C. The dioxin subcontract laboratory (SGS Paradigm Analytical Laboratories, Inc.) received the samples at 5.5°C and 5.2°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous and soil samples were collected on 07/18/07 and 07/19/07. For samples collected 07/18/07, the dioxins and furans were extracted on 07/26/07 and 07/29/07 and analyzed on 07/28/07, 07/30/07, and 07/31/07. For samples collected 07/19/07, the dioxins and furans were extracted on 07/26/07, 07/29/07, 07/30/07, and 07/31/07 and analyzed on 07/31/07 and 08/01/07. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL (estimated detection limit). The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants OCDD and OCDF) and <2EDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one and for solid matrices were converted to soil values (soil conversion factor = 100) if needed. Rinse blank RB083007 (F52208-1) (low-flow pump) applies to the groundwater "GW" samples in this SDG. The surface water "SW" samples were collected directly into the laboratory bottles; therefore, no rinse blank applies for the SW samples. Rinse blanks 072407R (F51275-1) and 072507R (F51300-31) apply to the surface soil "SS" and subsurface soil "SB" samples in this SDG. Rinse blank RB071807 (F51154-12) applies to the sediment "SD" samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. ng/L	Action Level ng/L	B qualified samples
07/28/07	LMB14381	All congeners <EDL	NA	NA	None
09/09/07	RB083007	All congeners <EDL	NA	NA	None
Analysis Date	**QC Blank ID**	**Compound**	**Max Conc. pg/g**	**Action Level pg/g**	**B qualified samples**
07/30/07	LMB14383	OCDD	0.640J	6.40	None
07/30/07	LMB14383	2,3,7,8-TCDF	0.0940J	0.47	None
07/30/07	LMB14383	1,2,3,4,7,8-HxCDF	0.186J	0.93	None
07/30/07	LMB14383	1,2,3,4,6,7,8-HpCDF	0.776J	3.88	None
07/30/07	LMB14383	OCDF	1.57J	15.7	None
07/30/07	LMB14383	Total TCDFs	0.0940J	0.47	None
07/30/07	LMB14383	Total HxCDFs	0.186J	0.93	None
07/30/07	LMB14383	Total HpCDFs	0.776J	3.88	None
07/31/07	LMB14385	1,2,3,4,6,7,8-HpCDD	0.374J	1.87	None
07/31/07	LMB14385	OCDD	1.31J	13.1	None
07/31/07	LMB14385	2,3,7,8-TCDF	0.174J	0.87	41SD11, APSD01
07/31/07	LMB14385	1,2,3,4,7,8-HxCDF	0.256J	1.28	41SD11, APSD01
07/31/07	LMB14385	1,2,3,4,6,7,8-HpCDF	1.79J	8.95	41SD11
07/31/07	LMB14385	OCDF	3.80J	19.0	41SD11
07/31/07	LMB14385	Total HpCDDs	0.374J	1.87	None
07/31/07	LMB14385	Total TCDFs	0.174J	0.87	None
07/31/07	LMB14385	Total HxCDFs	0.444J	2.22	None
07/31/07	LMB14385	Total HpCDFs	1.79J	8.95	None
08/01/07	LMB14389	OCDD	0.702J	7.02	None
08/01/07	LMB14389	2,3,7,8-TCDF	0.122J	0.61	49SS04, 59SS06, 59SS07, 59SS08, 59SS09, 59SS10
08/01/07	LMB14389	2,3,4,7,8-PeCDF	0.0680J, EMPC	0.34	49SS04, 59SS09, 59SS10
08/01/07	LMB14389	1,2,3,4,6,7,8-HpCDF	0.650J	3.25	None
08/01/07	LMB14389	OCDF	1.12J	11.2	None
08/01/07	LMB14389	Total TCDFs	0.122J	0.61	None
08/01/07	LMB14389	Total PeCDFs	0.0680J	0.34	None
08/01/07	LMB14389	Total HxCDFs	0.0940J	0.47	None
08/01/07	LMB14389	Total HpCDFs	0.650J	3.25	None
07/28/07	RB071807	All congeners <EDL	NA	NA	None
08/03/07	072407R	All congeners <EDL	NA	NA	None
08/08/07	072507R	1,2,3,4,6,7,8-HpCDF	0.849J	4.25	None
08/08/07	072507R	OCDF	1.42J	14.2	None
08/08/07	072507R	Total HpCDFs	0.849J	4.25	None

J = Estimated value <MRL and >EDL.
EMPC = Estimated Maximum Possible Concentration.

III-Instrument Performance Check

Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

- The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±30%;
- The signal to noise ratio ≥10% for all target ions;
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- For initial calibration performed on 07/10/07 for all target compounds on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), LFSW01 (F51154-17), APSD01 (F51154-18), TMSW01 (F51154-20), 41SD11 (F51154-22), 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

- The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
- The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
- Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- For continuing calibration performed on 07/28/07 @02:22 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 07/28/07 @13:44 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this continuing calibration.

- For continuing calibration performed on 07/28/07 @23:29 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 07/30/07 @17:04 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), and 41SD11 (F51154-22) apply to this continuing calibration.

- For continuing calibration performed on 07/31/07 @04:20 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples LFSW01 (F51154-17), TMSW01 (F51154-20), 49SS02 (F51154-23), and 49SS03 (F51154-24) apply to this continuing calibration.

- For continuing calibration performed on 07/31/07 @13:17 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/01/07 @00:39 on instrument HRMS1, all criteria were met. No qualifiers were applied. Samples 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), and 59SS10 (F51154-31) apply to this continuing calibration.

- For continuing calibration performed on 08/01/07 @10:25 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/01/07 @14:32 on instrument HRMS1, all criteria were met. No qualifiers were applied. Sample TMSS05 (F51154-32) applies to this continuing calibration.

- For continuing calibration performed on 08/02/07 @01:54 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/02/07 @12:28 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/02/07 @16:03 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/03/07 @03:24 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 08/03/07 @14:47 on instrument HRMS1, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DOD QSM and method criteria, acceptable performance is determined by:

1. Recoveries of the isotopically-labeled extraction standards to fall within 40-135% control limits for the tetra- through octachlorinated congeners, or as stated in the data package;

2. Recoveries (accuracy) of the unlabeled compounds should be within ±35% when spiked at the method quantitation limit and within ±30% when spiked above 20 times the method quantitation limit, or as stated in the data package;

3. When duplicate OPR are required, the relative percent difference (RPD) of the unlabeled analytes concentrations should be within 30% when spiked at the method quantitation limit and within ±20% when spiked above 20 times the method quantitation limit.

- Sample OPR14381 was used as LCS and LCSD on 07/28/07 analytical run. All criteria were met. No qualifiers were applied. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), and 41SW10 (F51154-8) apply to this LCS.

- Sample OPR14383 was used as LCS and LCSD on 07/30/07 analytical run. All criteria were met. No qualifiers were applied. Samples 41SD08 (F51154-9), 41SD09 (F51154-10), 41SD10 (F51154-11), LFSD01 (F51154-15), TMSD01 (F51154-16), APSD01 (F51154-18), and 41SD11 (F51154-22) apply to this LCS.

- Sample OPR14385 was used as LCS and LCSD on 07/31/07 analytical run. All criteria were met. No qualifiers were applied. Samples LFSW01 (F51154-17), TMSW01 (F51154-20), 49SS02 (F51154-23), and 49SS03 (F51154-24) apply to this LCS.

- Sample OPR14389 was used as LCS and LCSD on 08/01/07 analytical run. All criteria were met. No qualifiers were applied. Samples 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), 59SS09 (F51154-30), 59SS10 (F51154-31), and TMSS05 (F51154-32) apply to this LCS.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. Per DoD QSM, MS/MSD recoveries must be within in-house laboratory limits (75-125%) and RPD ≤20%.

- Sample LFSW01 (F51154-17) was used for the aqueous MS/MSD analysis on 07/31/07. OCDD (147%, 167%) and 2,3,4,7,8-PeCDF (RPD=21%) were outside lab criteria. For all other congeners, all criteria were met. OCDD was qualified estimated bias high "K" for detects for the spiked sample based upon the high recoveries. The associated LCS was within criteria limits. Samples 41SW08 (F51154-6), 41SW09 (F51154-7), 41SW10 (F51154-8), LFSW01 (F51154-17), and TMSW01 (F51154-20) apply to this MS/MSD.

- No project specific solid matrix MS/MSD was performed; therefore, it was not evaluated.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field surface water sample duplicate pair LFSW01 (F51154-17) and TMSW01 (F51154-20) was collected for dioxin and furans. All detected dioxin and furans found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other dioxin and furans target compounds were non-detect. Total HpCDDs (71.7%) was above criteria due to low concentration levels detected below the MRL and were reported as estimated maximum possible concentration (EMPC). Total HpCDDs was qualified estimated "J" for the original and duplicate pair samples based upon these outliers. For all other dioxin and furans, all criteria were met.

Table 3 Field Precision Hits Analysis Summary for Dioxin and Furans for Duplicate Pair LFSW01 (F51154-17) and TMSW01 (F51154-20)

Compound	Original Sample (ng/L)	Duplicate Pair (ng/L)	%RPD
1,2,3,4,6,7,8-HpCDD	0.00503J, EMPC	0.00448J	11.6
OCDD	0.0423J	0.0295J	35.7
1,2,3,7,8-PeCDF	0.00593U	0.00178J	NA
1,2,3,4,6,7,8-HpCDF	0.00205J	0.00609U	NA
OCDF	0.00586J	0.0122U	NA
Total HpCDDs	0.00949J, EMPC	0.00448	71.7
Total TCDFs	0.00622J, EMPC	0.00200U	NA
Total HpCDFs	0.00422J, EMPC	0.00609U	NA
Total PeCDFs	0.00202U	0.00373J, EMPC	NA

U = Value non-detect as <EDL.
J = Estimated value <MRL and >EDL. Data point qualified was estimated "J".
NA = Not Applicable.
EMPC = Estimated Maximum Possible Concentration

- Field sediment sample duplicate pair LFSD01 (F51154-15) and TMSD01 (F51154-16) was collected for dioxin and furans. All detected dioxin and furans found in the sample and its duplicate pair and associated %RPD are noted in **Table 4**. All other dioxin and furans target compounds were non-detect. 2,3,7,8-TCDF (59.5%), 1,2,3,7,8-PeCDF (59.9%), 2,3,4,7,8-PeCDF (93.8%), 1,2,3,6,7,8-HxCDF (59.5%), 2,3,4,6,7,8-HxCDF (86.9%), 1,2,3,7,8,9-HxCDF (72.4%), Total TCDFs (84.2%), and Total PeCDFs (90.4%) was above criteria probably due to sample non-homogeneity and/or low sample concentration levels detected below the MRL. 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, Total TCDFs, and Total PeCDFs were qualified estimated "J" for the original and duplicate pair samples based upon these outliers. For all other dioxin and furans, all criteria were met.

Table 4 Field Precision Hits Analysis Summary for Dioxin and Furans for Duplicate Pair LFSD01 (F51154-15) and TMSD01 (F51154-16)

Compound	Original Sample (pg/g)	Duplicate Pair (pg/g)	%RPD
2,3,7,8-TCDD	2.38	1.72	32.2
1,2,3,7,8-PeCDD	7.55J	5.77J	26.7
1,2,3,4,7,8-HxCDD	7.83J	6.23	22.8
1,2,3,6,7,8-HxCDD	19.0	18.8	1.1
1,2,3,7,8,9-HxCDD	17.5	16.2	7.7
1,2,3,4,6,7,8-HpCDD	571	734	25.0
OCDD	5030	6660E	27.9
2,3,7,8-TCDF	5.58	3.02	59.5
1,2,3,7,8-PeCDF	5.73J	3.09J	59.9
2,3,4,7,8-PeCDF	10.6	3.83J	93.8
1,2,3,4,7,8-HxCDF	19.8	15.8	22.5
1,2,3,6,7,8-HxCDF	10.8	5.85J	59.5
2,3,4,6,7,8-HxCDF	11.7	4.61J	86.9
1,2,3,7,8,9-HxCDF	2.39J	1.12J	72.4
1,2,3,4,6,7,8-HpCDF	132	139	5.2
1,2,3,4,7,8,9-HpCDF	5.24J	4.97J	5.3
OCDF	385	416	7.7
Total TCDDs	37.9	27.8	30.8
Total PeCDDs	69.9	57.4	19.6
Total HxCDDs	200	186	7.3
Total HpCDDs	1060	1310	21.1
Total TCDFs	132	53.8	84.2
Total PeCDFs	137	51.7	90.4
Total HxCDFs	158	113	33.2
Total HpCDFs	328	333	1.5

E = Value exceeded calibration range. Data point qualified was estimated "J".
J = Estimated value <MRL and >EDL. Data point qualified was estimated "J".

- Field surface soil sample duplicate pair 49SS05 (F51154-26) and TMSS05 (F51154-32) was collected for dioxin and furans. All detected dioxin and furans found in the sample and its duplicate pair and associated %RPD are noted in **Table 5**. All other dioxin and furans target compounds were non-detect. All criteria were met. No qualifiers were applied.

Table 5 Field Precision Hits Analysis Summary for Dioxin and Furans for Duplicate Pair 49SS05 (F51154-26) and TMSS05 (F51154-32)

Compound	Original Sample (pg/g)	Duplicate Pair (pg/g)	%RPD
2,3,7,8-TCDD	0.333J, EMPC	0.241J, EMPC	32.1
1,2,3,7,8-PeCDD	2.89J	3.04J	5.1
1,2,3,4,7,8-HxCDD	9.00	10.8	18.2
1,2,3,6,7,8-HxCDD	36.5	27.8	27.1
1,2,3,7,8,9-HxCDD	21.0	19.2	9.0
1,2,3,4,6,7,8-HpCDD	946	950	0.4
OCDD	9640E	10300E	6.6
2,3,7,8-TCDF	0.938J	0.917J	2.3
1,2,3,7,8-PeCDF	0.567J	0.593J	4.5
2,3,4,7,8-PeCDF	1.04J	0.996J	4.3
1,2,3,4,7,8-HxCDF	4.61J	6.93J	40.2
1,2,3,6,7,8-HxCDF	3.71J	6.14	49.3
2,3,4,6,7,8-HxCDF	6.00	5.34J	11.6
1,2,3,7,8,9-HxCDF	0.839J	0.635J	27.7
1,2,3,4,6,7,8-HpCDF	138	132	4.4
1,2,3,4,7,8,9-HpCDF	10.2	8.10	23.0
OCDF	367	397	7.9
Total TCDDs	4.08J, EMPC	6.23J, EMPC	41.7
Total PeCDDs	13.2J, EMPC	15.9	18.6
Total HxCDDs	137	134J, EMPC	2.2
Total HpCDDs	1400	1420	1.4
Total TCDFs	8.68J, EMPC	10.4J, EMPC	18.0
Total PeCDFs	25.3J, EMPC	22.0J, EMPC	14.0
Total HxCDFs	138	129	6.7
Total HpCDFs	418	420	0.5

E = Value exceeded calibration range. Data point qualified was estimated "J".
J = Estimated value <MRL and >EDL. Data point qualified was estimated "J".
EMPC = Estimated Maximum Possible Concentration

XI-Quantitation Verification

The accuracy of analytical results was verified through the calculation of at least one the several parameters such as the %D, %RSD, % recovery, and/or compound concentration. Values were found to be within 10%. Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria (*-lab flag), the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". For where presence of quantitation interference (Q-lab flag), the date was flagged estimated "J" for detects and "UJ" for non-detects.

- For sample 41SW08 (F51154-6), 1,2,3,7,8-PeCDD, 2,3,4,7,8-PeCDF, Total PeCDDs, and Total PeCDFs were qualified estimated non-detect "UJ" based upon the presence of quantitation interference.

- For sample 59SS09 (F51154-30), Total TCDFs was qualified estimated non-detect "J" based upon the presence of quantitation interference.

- OCDD exceeded upper calibration limit for samples 49SS02 (F51154-23), 49SS03 (F51154-24), 49SS04 (F51154-25), 49SS05 (F51154-26), 59SS06 (F51154-27), 59SS07 (F51154-28), 59SS08 (F51154-29), TMSD01 (F51154-16), and TMSS05 (F51154-32). OCDD was qualified estimated "J" for all associated samples based upon these outliers.

Sample: 41SW08 (F51154-6), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
W = weight, in g, of the sample (solid or organic liquid) as dry weight, or volume in mL of an aqueous sample; and
Avg. RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/L)} = \frac{(A(x)) * Q(is) * 1000}{A(is) * W * \text{Avg. RRF}} = \frac{(214000+222000) * 4.0 * 1000}{(36700000+40800000) * 953 * 1.0783} = 0.0219 \text{ ng/L}$$

Reported Value = 0.0219 ng/L
% Difference = 0.0%
Values were within 10% difference

Sample: 41SD09 (F51154-10), OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;

A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;

Q(is) = quantity, in pg, of the internal standard added to the sample before extraction; Here need to multiply concentration (pg/uL) by final extract volume (uL).

W = weight, in g, of the sample (solid or organic liquid) as dry weight, or volume in mL of an aqueous sample; and

Avg. RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/kg)} = \frac{(A(x)) * Q(is)}{A(is) * W * \text{Avg. RRF}} = \frac{(56400000+63100000) * 4.0 * 1000}{(26300000+29500000) * (12.20 * 0.7270) * 1.0783} =$$
$$= 896 \text{ ng/kg} = 896 \text{ pg/g}$$

Reported Value = 897 pg/g
% Difference = 0.1%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥ EDL and <MRL or <3*EDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥EDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ EDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Form I Copy

SGS Environmental Services

Method 8290
F51154-6
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00164				
1,2,3,7,8-PeCDD	ND VJ	0.00525				Q
1,2,3,4,7,8-HxCDD	ND	0.00525				
1,2,3,6,7,8-HxCDD	ND	0.00525				
1,2,3,7,8,9-HxCDD	ND	0.00525				
1,2,3,4,6,7,8-HpCDD	ND	0.00525				
OCDD	0.0219 J			45:10	0.97	A
2,3,7,8-TCDF	ND	0.00105				
1,2,3,7,8-PeCDF	ND	0.00525				
2,3,4,7,8-PeCDF	ND VJ	0.00525				Q
1,2,3,4,7,8-HxCDF	ND	0.00525				
1,2,3,6,7,8-HxCDF	ND	0.00525				
2,3,4,6,7,8-HxCDF	ND	0.00525				
1,2,3,7,8,9-HxCDF	ND	0.00525				
1,2,3,4,6,7,8-HpCDF	ND	0.00525				
1,2,3,4,7,8,9-HpCDF	ND	0.00525				
OCDF	ND	0.0105				
Total TCDDs	ND	0.00164				
Total PeCDDs	ND VJ	0.00525				Q
Total HxCDDs	ND	0.00525				
Total HpCDDs	ND	0.00525				
Total TCDFs	ND	0.00105				
Total PeCDFs	ND VJ	0.00525				Q
Total HxCDFs	ND	0.00525				
Total HpCDFs	ND	0.00525				
WHO-2005 TEQ (ND=0)	0.00000657		0.00000657			
WHO-2005 TEQ (ND=½)	0.00629		0.00629			

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51154-6		Weight / Volume:	953 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14381
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-1C		Filename:	a27jul07a_3-8
Collection Date/Time:	07/18/07	10:40	Retchk:	a27jul07a_2-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12
Analysis Date/Time:	07/28/07	20:15	Initial Cal:	m8290-071007a

Form I (OM)

Method 8290
F51154-6
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.57	78.6	31:40	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.10	55.2	34:25	1.60	Q
13C12-1,2,3,6,7,8-HxCDD	2.0	1.64	82.0	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.73	86.3	40:39	1.06	
13C12-OCDD	4.0	3.79	94.7	45:09	0.90	
13C12-2,3,7,8-TCDF	2.0	1.76	88.0	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.41	70.5	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.37	68.5	36:28	0.53	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.69	84.7	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.365	91.3	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.269	67.3	34:13	1.63	Q
13C12-1,2,3,4,7,8-HxCDD	0.4	0.330	82.6	37:06	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.319	79.7	36:22	0.52	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.326	81.5	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51154-6		Weight / Volume:	953 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14381
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-1C		Filename:	a27jul07a_3-8
Collection Date/Time:	07/18/07	10:40	Retchk:	a27jul07a_2-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12
Analysis Date/Time:	07/28/07	20:15	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: JWC
Date: 28/07/07

Reviewed by: [illegible]
Date: 8/9/07

Form I copy

SGS Environmental Services

Method 8290
F51154-7
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.00114~~	0.00257 J	31:40	0.60	*	A
1,2,3,7,8-PeCDD	0.00607 J			34:25	1.36		A
1,2,3,4,7,8-HxCDD	0.00468 J			37:07	1.27		A
1,2,3,6,7,8-HxCDD	0.00475 J			37:12	1.10		A
1,2,3,7,8,9-HxCDD	0.00495 J			37:27	1.23		A
1,2,3,4,6,7,8-HpCDD	0.00564 J			40:39	1.14		A
OCDD	0.0292 J			45:09	0.91		A
2,3,7,8-TCDF	0.00147 J			31:07	0.73		A
1,2,3,7,8-PeCDF	0.00662 J			33:37	1.62		A
2,3,4,7,8-PeCDF	0.00589 J			34:15	1.71		A
1,2,3,4,7,8-HxCDF	0.00532 J			36:22	1.30		A
1,2,3,6,7,8-HxCDF	0.00509 J			36:28	1.18		A
2,3,4,6,7,8-HxCDF	0.00409 J			37:00	1.16		A
1,2,3,7,8,9-HxCDF	0.00501 J			37:46	1.18		A
1,2,3,4,6,7,8-HpCDF	EMPC	~~0.00509~~	0.00536 J	39:21	1.22	*	A
1,2,3,4,7,8,9-HpCDF	0.00420			41:21	1.08		A
OCDF	0.00874			45:27	1.01		A
Total TCDDs	ND	~~0.00114~~	0.00257 J				
Total PeCDDs	0.00607						
Total HxCDDs	0.0144						
Total HpCDDs	0.00564						
Total TCDFs	0.00147						
Total PeCDFs	0.0125						
Total HxCDFs	0.0195						
Total HpCDFs	~~0.00420~~		0.00955 J				
WHO-2005 TEQ (ND=0)	0.0117		0.0143				
WHO-2005 TEQ (ND=½)	0.0123		0.0143				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-7		Weight / Volume:	982 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-2C		Filename:	a27jul07a_3-9	
Collection Date/Time:	07/18/07	11:05	Retchk:	a27jul07a_2-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14	
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12	
Analysis Date/Time:	07/28/07	21:04	Initial Cal:	m8290-071007a	

Form I Cm

SGS Environmental Services

Method 8290
F51154-7
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.51	75.4	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.40	69.8	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.58	78.9	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.69	84.7	40:39	1.05	
13C12-OCDD	4.0	3.70	92.4	45:09	0.89	
13C12-2,3,7,8-TCDF	2.0	1.72	86.0	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.34	67.1	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.50	74.8	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.64	82.1	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.364	90.9	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.311	77.8	34:13	1.61	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.339	84.7	37:06	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.350	87.6	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.337	84.1	41:21	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.26	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-7		Weight / Volume:	982 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-2C		Filename:	a27jul07a_3-9	
Collection Date/Time:	07/18/07	11:05	Retchk:	a27jul07a_2-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14	
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12	
Analysis Date/Time:	07/28/07	21:04	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JWP
Date: 08/08/07

Reviewed by: DD
Date: 8/9/07

Form I Corr

SGS Environmental Services

Method 8290
F51154-8
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00179				
1,2,3,7,8-PeCDD	ND	0.00538				
1,2,3,4,7,8-HxCDD	ND	0.00689				
1,2,3,6,7,8-HxCDD	ND	0.00702				
1,2,3,7,8,9-HxCDD	ND	0.00712				
1,2,3,4,6,7,8-HpCDD	ND	0.00538				
OCDD	0.0618 J			45:09	0.95	A
2,3,7,8-TCDF	ND	0.00128				
1,2,3,7,8-PeCDF	ND	0.00538				
2,3,4,7,8-PeCDF	ND	0.00538				
1,2,3,4,7,8-HxCDF	ND	0.00538				
1,2,3,6,7,8-HxCDF	ND	0.00538				
2,3,4,6,7,8-HxCDF	ND	0.00538				
1,2,3,7,8,9-HxCDF	ND	0.00538				
1,2,3,4,6,7,8-HpCDF	ND	0.00538				
1,2,3,4,7,8,9-HpCDF	ND	0.00538				
OCDF	ND	0.0108				
Total TCDDs	ND	0.00179				
Total PeCDDs	ND	0.00538				
Total HxCDDs	ND	0.00712				
Total HpCDDs	ND	0.00538				
Total TCDFs	ND	0.00128				
Total PeCDFs	ND	0.00538				
Total HxCDFs	ND	0.00538				
Total HpCDFs	ND	0.00538				
WHO-2005 TEQ (ND=0)	0.0000185		0.0000185			
WHO-2005 TEQ (ND=½)	0.00677		0.00677			

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-8		Weight / Volume:	929 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-3C		Filename:	a27jul07a_3-10	
Collection Date/Time:	07/18/07	11:45	Retchk:	a27jul07a_2-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14	
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12	
Analysis Date/Time:	07/28/07	21:52	Initial Cal:	m8290-071007a	

Form I Copy

SGS Environmental Services

Method 8290
F51154-8
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.34	67.0	31:39	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.30	65.1	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.37	68.6	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.49	74.3	40:39	1.06	
13C12-OCDD	4.0	3.16	79.1	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.51	75.7	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.28	63.9	33:37	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.34	66.8	36:28	0.53	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.43	71.4	39:21	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.329	82.1	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.291	72.8	34:13	1.64	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.301	75.1	37:06	1.29	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.319	79.7	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.297	74.3	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.27	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-8		Weight / Volume:	929 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-3C		Filename:	a27jul07a_3-10	
Collection Date/Time:	07/18/07	11:45	Retchk:	a27jul07a_2-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14	
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12	
Analysis Date/Time:	07/28/07	21:52	Initial Cal:	m8290-071007a	

FormVersion:[8290_DB_2.14]Report

Analyzed by: JWO
Date: 08/09/07

Reviewed by: [illegible]
Date: 8/9/07

Form I Corr

Method 8290
F51154-9
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.438~~	0.748 J	31:40	0.98	*	A
1,2,3,7,8-PeCDD	ND	1.43					
1,2,3,4,7,8-HxCDD	ND	1.43					
1,2,3,6,7,8-HxCDD	ND	1.43					
1,2,3,7,8,9-HxCDD	3.18 J			37:28	1.30		A
1,2,3,4,6,7,8-HpCDD	46.7			40:42	1.05		
OCDD	2080			45:13	0.89		
2,3,7,8-TCDF	EMPC	~~0.637~~	1.55 J	31:09	0.91	*	A
1,2,3,7,8-PeCDF	2.90 J			33:37	1.61		A
2,3,4,7,8-PeCDF	1.40 J			34:16	1.39		A
1,2,3,4,7,8-HxCDF	8.37 J			36:24	1.27		A
1,2,3,6,7,8-HxCDF	4.78 J			36:30	1.34		A
2,3,4,6,7,8-HxCDF	1.49 J			37:01	1.35		A
1,2,3,7,8,9-HxCDF	ND	1.43					
1,2,3,4,6,7,8-HpCDF	62.2			39:22	1.03		
1,2,3,4,7,8,9-HpCDF	1.26 J			41:22	1.07		A
OCDF	53.9			45:31	0.86		
Total TCDDs	~~2.77~~		3.52 J				
Total PeCDDs	4.57						
Total HxCDDs	~~13.0~~		13.5 J				
Total HpCDDs	99.0						
Total TCDFs	~~16.5~~		27.6 J				
Total PeCDFs	~~30.6~~		32.6 J				
Total HxCDFs	~~43.3~~		45.3 J				
Total HpCDFs	75.6						
WHO-2005 TEQ (ND=0)	4.03		4.93				
WHO-2005 TEQ (ND=½)	5.21		5.86				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-9		Weight / Volume:	10.07 g	
			Solids / Lipids:	34.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-4B		Filename:	a30jul07a-8	
Collection Date/Time:	07/18/07	10:50	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/30/07	22:42	Initial Cal:	m8290-071007a	

Form I Copy

SGS Environmental Services

Method 8290
F51154-9
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.46	73.0	31:40	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.41	70.3	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.57	78.3	37:12	1.27	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.67	83.3	40:40	1.07	
13C12-OCDD	4.0	3.42	85.5	45:10	0.90	
13C12-2,3,7,8-TCDF	2.0	1.69	84.7	31:07	0.80	
13C12-1,2,3,7,8-PeCDF	2.0	1.37	68.7	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.41	70.7	36:30	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.52	76.1	39:22	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.341	85.3	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.253	63.1	34:15	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.297	74.1	37:07	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.299	74.6	36:24	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.289	72.3	41:22	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:28	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-9		Weight / Volume:	10.07 g	
			Solids / Lipids:	34.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-4B		Filename:	a30jul07a-8	
Collection Date/Time:	07/18/07	10:50	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/30/07	22:42	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JWF
Date: 08/09/07

Reviewed by: GM
Date: 8/9/07

Form 1 Copy

SGS Environmental Services

Method 8290
F51154-10
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.177~~	0.280 J	31:40	0.53	*	A
1,2,3,7,8-PeCDD	EMPC	~~0.564~~	0.259 J	34:27	1.80	*	A
1,2,3,4,7,8-HxCDD	0.316 J			37:07	1.08		A
1,2,3,6,7,8-HxCDD	EMPC	~~0.564~~	0.595 J	37:12	0.99	*	A
1,2,3,7,8,9-HxCDD	1.01 J			37:28	1.21		A
1,2,3,4,6,7,8-HpCDD	20.8			40:40	1.05		
OCDD	897			45:13	0.89		
2,3,7,8-TCDF	0.866 J			31:09	0.68		A
1,2,3,7,8-PeCDF	1.15 J			33:37	1.48		A
2,3,4,7,8-PeCDF	0.633 J			34:15	1.65		A
1,2,3,4,7,8-HxCDF	3.07 J			36:24	1.32		A
1,2,3,6,7,8-HxCDF	1.88 J			36:30	1.19		A
2,3,4,6,7,8-HxCDF	0.482 J			37:00	1.21		A
1,2,3,7,8,9-HxCDF	EMPC	~~0.564~~	0.189 J	37:49	1.67	*	A
1,2,3,4,6,7,8-HpCDF	22.2			39:22	1.05		
1,2,3,4,7,8,9-HpCDF	0.498 J			41:22	1.11		A
OCDF	20.8			45:31	0.87		
Total TCDDs	ND	~~0.177~~	0.280 J				
Total PeCDDs	1.59		2.15 J				
Total HxCDDs	6.16		6.76 J				
Total HpCDDs	44.4						
Total TCDFs	8.67		10.3 J				
Total PeCDFs	12.0		13.0 J				
Total HxCDFs	16.3						
Total HpCDFs	27.2						
WHO-2005 TEQ (ND=0)	1.70		2.31				
WHO-2005 TEQ (ND=½)	2.12		2.31				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-10		Weight / Volume:	12.20 g	
			Solids / Lipids:	72.7	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-5B		Filename:	a30jul07a-9	
Collection Date/Time:	07/18/07	11:15	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/30/07	23:30	Initial Cal:	m8290-071007a	

Form I copy

SGS Environmental Services

Method 8290
F51154-10
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.48	73.9	31:40	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.32	65.8	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.49	74.6	37:12	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.60	79.8	40:40	1.06	
13C12-OCDD	4.0	3.08	77.0	45:10	0.89	
13C12-2,3,7,8-TCDF	2.0	1.62	80.9	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.34	66.9	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.39	69.5	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.46	73.1	39:22	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.342	85.6	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.264	66.0	34:15	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.317	79.2	37:07	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.291	72.7	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.285	71.4	41:22	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:28	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-10		Weight / Volume:	12.20 g	
			Solids / Lipids:	72.7	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-5B		Filename:	a30jul07a-9	
Collection Date/Time:	07/18/07	11:15	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/30/07	23:30	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JW
Date: 080907

Reviewed by: DLD
Date: 8/9/07

for 5 Cm7

SGS Environmental Services

Method 8290
F51154-11
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.303~~	0.573 J	31:40	0.44	*	A
1,2,3,7,8-PeCDD	0.601			34:25	1.67		A
1,2,3,4,7,8-HxCDD	EMPC	~~1.35~~	0.805 J	37:07	1.50	*	A
1,2,3,6,7,8-HxCDD	EMPC	~~1.37~~	1.41 J	37:12	1.61	*	A
1,2,3,7,8,9-HxCDD	1.71 J			37:28	1.32		A
1,2,3,4,6,7,8-HpCDD	44.5			40:40	1.05		
OCDD	1790			45:10	0.89		
2,3,7,8-TCDF	1.58 J			31:09	0.78		A
1,2,3,7,8-PeCDF	2.68 J			33:37	1.60		A
2,3,4,7,8-PeCDF	1.27 J			34:15	1.74		A
1,2,3,4,7,8-HxCDF	7.44 J			36:22	1.22		A
1,2,3,6,7,8-HxCDF	4.60 J			36:28	1.24		A
2,3,4,6,7,8-HxCDF	1.68 J			37:00	1.27		A
1,2,3,7,8,9-HxCDF	0.541 J			37:48	1.15		A
1,2,3,4,6,7,8-HpCDF	58.6			39:22	1.04		
1,2,3,4,7,8,9-HpCDF	1.06 J			41:22	1.10		A
OCDF	48.4			45:28	0.88		
Total TCDDs	~~0.424~~		1.93 J				
Total PeCDDs	~~3.69~~		4.37 J				
Total HxCDDs	~~13.0~~		14.4 J				
Total HpCDDs	96.3						
Total TCDFs	~~17.2~~		19.3 J				
Total PeCDFs	~~27~~.1		28.1 J				
Total HxCDFs	41.0						
Total HpCDFs	69.2						
WHO-2005 TEQ (ND=0)	4.41		5.21				
WHO-2005 TEQ (ND=½)	4.70		5.21				

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-11		Weight / Volume:	10.42 g
			Solids / Lipids:	47.9 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14383
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-6B		Filename:	a30jul07a-10
Collection Date/Time:	07/18/07	12:00	Retchk:	a30jul07a-1
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15
Analysis Date/Time:	07/31/07	0:19	Initial Cal:	m8290-071007a

Form I Copy

Method 8290
F51154-11
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.46	72.8	31:39	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.39	69.6	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.53	76.3	37:12	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.63	81.6	40:39	1.05	
13C12-OCDD	4.0	3.25	81.4	45:10	0.90	
13C12-2,3,7,8-TCDF	2.0	1.64	82.2	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.35	67.6	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.41	70.5	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.48	73.8	39:22	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.400	99.9	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.308	77.0	34:13	1.61	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.340	85.0	37:07	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.359	89.8	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.346	86.4	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.26	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-11		Weight / Volume:	10.42 g	
			Solids / Lipids:	47.9	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-6B		Filename:	a30jul07a-10	
Collection Date/Time:	07/18/07	12:00	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	0:19	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JW
Date: 08/8/07

Reviewed by: DD
Date: 8/9/07

Form I CORY

SGS Environmental Services

Method 8290
F51154-15
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	2.38			31:40	0.76	
1,2,3,7,8-PeCDD	7.55 J			34:25	1.57	A
1,2,3,4,7,8-HxCDD	7.83 J			37:07	1.31	A
1,2,3,6,7,8-HxCDD	19.0			37:13	1.35	
1,2,3,7,8,9-HxCDD	17.5			37:28	1.28	
1,2,3,4,6,7,8-HpCDD	571			40:40	1.05	
OCDD	5030			45:10	0.89	
2,3,7,8-TCDF	5.58 J			31:09	0.69	
1,2,3,7,8-PeCDF	5.73 J			33:37	1.65	A
2,3,4,7,8-PeCDF	10.6 J			34:15	1.64	
1,2,3,4,7,8-HxCDF	19.8			36:22	1.25	
1,2,3,6,7,8-HxCDF	10.8 J			36:28	1.27	
2,3,4,6,7,8-HxCDF	11.7 J			37:00	1.38	
1,2,3,7,8,9-HxCDF	2.39 J			37:48	1.21	A
1,2,3,4,6,7,8-HpCDF	132			39:22	1.04	
1,2,3,4,7,8,9-HpCDF	5.24 J			41:22	1.17	A
OCDF	385			45:28	0.88	
Total TCDDs	37.9					
Total PeCDDs	69.9					
Total HxCDDs	200					
Total HpCDDs	1060					
Total TCDFs	~~132~~		140 J			
Total PeCDFs	~~137~~		137 J			
Total HxCDFs	~~158~~		163 J			
Total HpCDFs	328					
WHO-2005 TEQ (ND=0)	31.4		31.4			
WHO-2005 TEQ (ND=½)	31.4		31.4			

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-15		Weight / Volume:	10.10 g	
			Solids / Lipids:	60.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-8B		Filename:	a30jul07a-11	
Collection Date/Time:	07/19/07	11:30	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	1:07	Initial Cal:	m8290-071007a	

Form I Copy

Method 8290
F51154-15
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.48	73.9	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.41	70.7	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.56	78.0	37:12	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.67	83.5	40:39	1.07	
13C12-OCDD	4.0	3.37	84.3	45:10	0.89	
13C12-2,3,7,8-TCDF	2.0	1.63	81.4	31:07	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.37	68.6	33:37	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.42	70.8	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.50	75.2	39:22	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.342	85.5	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.258	64.5	34:13	1.61	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.301	75.2	37:06	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.307	76.7	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.295	73.9	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.26	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-15		Weight / Volume:	10.10 g	
			Solids / Lipids:	60.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-8B		Filename:	a30jul07a-11	
Collection Date/Time:	07/19/07	11:30	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	1:07	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JMC
Date: 080907

Reviewed by: [signature]
Date: 8/4/07

Form I copy

SGS Environmental Services

Method 8290
F51154-16
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	1.72			31:40	0.67	
1,2,3,7,8-PeCDD	5.77 J			34:25	1.60	A
1,2,3,4,7,8-HxCDD	6.23			37:07	1.35	
1,2,3,6,7,8-HxCDD	18.8			37:13	1.24	
1,2,3,7,8,9-HxCDD	16.2			37:28	1.29	
1,2,3,4,6,7,8-HpCDD	734			40:40	1.04	
OCDD	6660 J			45:10	0.89	E
2,3,7,8-TCDF	3.02 J			31:09	0.77	
1,2,3,7,8-PeCDF	3.09 J			33:37	1.66	A
2,3,4,7,8-PeCDF	3.83 J			34:15	1.60	A
1,2,3,4,7,8-HxCDF	15.8			36:22	1.31	
1,2,3,6,7,8-HxCDF	5.85 J			36:28	1.25	A
2,3,4,6,7,8-HxCDF	4.61 J			37:00	1.27	A
1,2,3,7,8,9-HxCDF	1.12 J			37:49	1.38	A
1,2,3,4,6,7,8-HpCDF	139			39:22	1.03	
1,2,3,4,7,8,9-HpCDF	4.97 J			41:22	1.02	A
OCDF	416			45:28	0.89	
Total TCDDs	~~27.8~~		28.8 J			
Total PeCDDs	57.4					
Total HxCDDs	186					
Total HpCDDs	1310					
Total TCDFs	~~53.8 J~~		54.3 J			
Total PeCDFs	~~51.7 J~~		58.1 J			
Total HxCDFs	113					
Total HpCDFs	333					
WHO-2005 TEQ (ND=0)	26.8		26.8			
WHO-2005 TEQ (ND=½)	26.8		26.8			

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-16		Weight / Volume:	11.67 g	
			Solids / Lipids:	70.5	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-9B		Filename:	a30jul07a-12	
Collection Date/Time:	07/19/07	10:30	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	1:55	Initial Cal:	m8290-071007a	

Form I copy

SGS Environmental Services

Method 8290
F51154-16
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.50	75.0	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.41	70.7	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.58	78.8	37:12	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.68	83.8	40:39	1.06	
13C12-OCDD	4.0	3.62	90.4	45:10	0.90	
13C12-2,3,7,8-TCDF	2.0	1.67	83.5	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.40	70.1	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.45	72.5	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.55	77.4	39:22	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.383	95.7	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.286	71.5	34:13	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.336	84.0	37:06	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.346	86.6	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.330	82.5	41:22	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.26	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-16		Weight / Volume:	11.67 g	
			Solids / Lipids:	70.5	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-9B		Filename:	a30jul07a-12	
Collection Date/Time:	07/19/07	10:30	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	1:55	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JWP
Date: 080907

Reviewed by: [illegible]
Date: 8/9/07

Form I Copy

Method 8290
F51154-17
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00175				
1,2,3,7,8-PeCDD	ND	0.00593				
1,2,3,4,7,8-HxCDD	ND	0.00593				
1,2,3,6,7,8-HxCDD	ND	0.00593				
1,2,3,7,8,9-HxCDD	ND	0.00593				
1,2,3,4,6,7,8-HpCDD	EMPC	~~0.00593~~	0.00503 J	40:39	0.88 *	A
OCDD	0.0423 K			45:10	0.87	A
2,3,7,8-TCDF	ND	0.00153				
1,2,3,7,8-PeCDF	ND	0.00593				
2,3,4,7,8-PeCDF	ND	0.00593				
1,2,3,4,7,8-HxCDF	ND	0.00593				
1,2,3,6,7,8-HxCDF	ND	0.00593				
2,3,4,6,7,8-HxCDF	ND	0.00593				
1,2,3,7,8,9-HxCDF	ND	0.00593				
1,2,3,4,6,7,8-HpCDF	0.00204 J			39:21	1.18	A
1,2,3,4,7,8,9-HpCDF	ND	0.00593				
OCDF	0.00586 J			45:28	0.79	A
Total TCDDs	ND	0.00175				
Total PeCDDs	ND	0.00593				
Total HxCDDs	ND	0.00593				
Total HpCDDs	~~0.00446~~		0.00949 J			
Total TCDFs	~~0.00382~~		0.00622 J			
Total PeCDFs	ND	~~0.00593~~	0.00202 J			
Total HxCDFs	ND	0.00593				
Total HpCDFs	~~0.00204~~		0.00422 J			
WHO-2005 TEQ (ND=0)	0.0000348		0.0000851			
WHO-2005 TEQ (ND=½)	0.00707		0.00709			

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51154-17		Weight / Volume:	843 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14381
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-10C		Filename:	a30jul07a_2-4
Collection Date/Time:	07/19/07	11:20	Retchk:	a30jul07a-15
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15
Extraction Date:	07/26/07		End ConCal:	a30jul07a_2-11
Analysis Date/Time:	07/31/07	7:38	Initial Cal:	m8290-071007a

Form I copy

Method 8290
F51154-17
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.47	73.6	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.46	73.2	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.66	83.1	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.76	88.1	40:37	1.06	
13C12-OCDD	4.0	3.84	95.9	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.68	84.2	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.41	70.6	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.51	75.6	36:28	0.53	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.66	83.2	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.360	89.9	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.276	69.1	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.322	80.5	37:06	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.341	85.3	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.326	81.5	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-17		Weight / Volume:	843 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-10C		Filename:	a30jul07a_2-4	
Collection Date/Time:	07/19/07	11:20	Retchk:	a30jul07a-15	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15	
Extraction Date:	07/26/07		End ConCal:	a30jul07a_2-11	
Analysis Date/Time:	07/31/07	7:38	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JWP
Date: 08/2/07

Reviewed by: [illegible]
Date: 8/9/07

For I Corp

SGS Environmental Services

Method 8290
F51154-18
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.168~~	0.191 J	31:39	0.62	*	A
1,2,3,7,8-PeCDD	0.875 J			34:25	1.45		A
1,2,3,4,7,8-HxCDD	1.53 J			37:07	1.18		A
1,2,3,6,7,8-HxCDD	4.08 J			37:12	1.28		A
1,2,3,7,8,9-HxCDD	4.19 J			37:27	1.29		A
1,2,3,4,6,7,8-HpCDD	178			40:40	1.04		
OCDD	2180			45:09	0.90		
2,3,7,8-TCDF	0.509 B			31:07	0.87		A
1,2,3,7,8-PeCDF	0.238 J			33:37	1.56		A
2,3,4,7,8-PeCDF	EMPC	~~0.561~~	0.0965 J	34:19	1.09	*	A
1,2,3,4,7,8-HxCDF	0.938 B			36:22	1.32		A
1,2,3,6,7,8-HxCDF	0.763 J			36:28	1.30		A
2,3,4,6,7,8-HxCDF	0.965 J			36:58	1.29		A
1,2,3,7,8,9-HxCDF	ND	0.561					
1,2,3,4,6,7,8-HpCDF	37.6			39:22	1.06		
1,2,3,4,7,8,9-HpCDF	1.14 J			41:22	1.11		A
OCDF	115			45:28	0.90		
Total TCDDs	ND	~~0.168~~	1.30 J				
Total PeCDDs	3.04		3.27 J				
Total HxCDDs	27.3						
Total HpCDDs	304						
Total TCDFs	3.13		3.48 J				
Total PeCDFs	5.63		5.80 J				
Total HxCDFs	23.2		23.4 J				
Total HpCDFs	95.5		95.9 J				
WHO-2005 TEQ (ND=0)	5.04		5.26				
WHO-2005 TEQ (ND=½)	5.23		5.28				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-18		Weight / Volume:	10.39 g	
			Solids / Lipids:	85.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-13B		Filename:	a30jul07a-13	
Collection Date/Time:	07/19/07	14:45	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	2:44	Initial Cal:	m8290-071007a	

Form 1 Con

Method 8290
F51154-18
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.42	71.2	31:39	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.43	71.5	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.54	77.1	37:12	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.65	82.6	40:39	1.07	
13C12-OCDD	4.0	3.48	86.9	45:09	0.89	
13C12-2,3,7,8-TCDF	2.0	1.59	79.5	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.36	68.2	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.43	71.4	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.50	74.8	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.331	82.7	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.255	63.7	34:13	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.315	78.8	37:06	1.29	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.295	73.7	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.290	72.5	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.77	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-18		Weight / Volume:	10.39 g	
			Solids / Lipids:	85.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-13B		Filename:	a30jul07a-13	
Collection Date/Time:	07/19/07	14:45	Retchk:	a30jul07a-1	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1	
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15	
Analysis Date/Time:	07/31/07	2:44	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JMP
Date: 080907

Reviewed by: MM
Date: 8/9/07

Form I Cont

Method 8290
F51154-20
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00236				
1,2,3,7,8-PeCDD	ND	0.00609				
1,2,3,4,7,8-HxCDD	ND	0.00609				
1,2,3,6,7,8-HxCDD	ND	0.00609				
1,2,3,7,8,9-HxCDD	ND	0.00609				
1,2,3,4,6,7,8-HpCDD	0.00448 J			40:39	1.19	A
OCDD	0.0295 J			45:09	0.92	A
2,3,7,8-TCDF	ND	0.00200				
1,2,3,7,8-PeCDF	0.00178 J			33:37	1.58	A
2,3,4,7,8-PeCDF	ND	0.00609				
1,2,3,4,7,8-HxCDF	ND	0.00609				
1,2,3,6,7,8-HxCDF	ND	0.00609				
2,3,4,6,7,8-HxCDF	ND	0.00609				
1,2,3,7,8,9-HxCDF	ND	0.00609				
1,2,3,4,6,7,8-HpCDF	ND	0.00609				
1,2,3,4,7,8,9-HpCDF	ND	0.00609				
OCDF	ND	0.0122				
Total TCDDs	ND	0.00236				
Total PeCDDs	ND	0.00609				
Total HxCDDs	ND	0.00609				
Total HpCDDs	0.00448 J					
Total TCDFs	ND	0.00200				
Total PeCDFs	~~0.00178~~		0.00373 J			
Total HxCDFs	ND	0.00609				
Total HpCDFs	ND	0.00609				
WHO-2005 TEQ (ND=0)	0.000107		0.000107			
WHO-2005 TEQ (ND=½)	0.00754		0.00754			

Client Information			Sample Information	
Project Name:	F51154		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51154-20		Weight / Volume:	821 mL
			Solids / Lipids:	NA %
			Original pH :	8
Laboratory Information			Batch ID:	WG14381
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-14C		Filename:	a30jul07a_2-7
Collection Date/Time:	07/19/07	11:20	Retchk:	a30jul07a-15
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15
Extraction Date:	07/26/07		End ConCal:	a30jul07a_2-11
Analysis Date/Time:	07/31/07	10:03	Initial Cal:	m8290-071007a

Form I Cont

Method 8290
F51154-20
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.39	69.3	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.45	72.4	34:25	1.57	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.55	77.7	37:10	1.24	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.73	86.4	40:37	1.06	
13C12-OCDD	4.0	3.70	92.5	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.58	78.9	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.37	68.6	33:37	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.45	72.6	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.57	78.4	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.341	85.2	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.303	75.8	34:13	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.338	84.4	37:04	1.33	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.320	80.1	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.310	77.6	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.26	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-20		Weight / Volume:	821 mL	
			Solids / Lipids:	NA	%
			Original pH :	8	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-14C		Filename:	a30jul07a_2-7	
Collection Date/Time:	07/19/07	11:20	Retchk:	a30jul07a-15	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15	
Extraction Date:	07/26/07		End ConCal:	a30jul07a_2-11	
Analysis Date/Time:	07/31/07	10:03	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: JLW
Date: 08/8/07

Reviewed by: [illegible]
Date: 8/9/07

form I Cn

Method 8290
F51154-22
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.181					
1,2,3,7,8-PeCDD	ND	0.594					
1,2,3,4,7,8-HxCDD	0.214 J			37:07	1.33		A
1,2,3,6,7,8-HxCDD	0.537 J			37:10	1.29		A
1,2,3,7,8,9-HxCDD	1.27 J			37:27	1.30		A
1,2,3,4,6,7,8-HpCDD	27.9			40:40	1.04		
OCDD	1710			45:10	0.89		
2,3,7,8-TCDF	0.492 B			31:07	0.86		A
1,2,3,7,8-PeCDF	0.235 J			33:37	1.52		A
2,3,4,7,8-PeCDF	EMPC	~~0.594~~	0.356 J	34:15	1.86	*	A
1,2,3,4,7,8-HxCDF	0.801 B			36:22	1.21		A
1,2,3,6,7,8-HxCDF	0.297 J			36:28	1.29		A
2,3,4,6,7,8-HxCDF	EMPC	~~0.594~~	0.342 J	36:58	1.50	*	A
1,2,3,7,8,9-HxCDF	ND	0.594					
1,2,3,4,6,7,8-HpCDF	4.20 B			39:21	1.08		A
1,2,3,4,7,8,9-HpCDF	0.361 J			41:21	0.91		A
OCDF	11.2 B			45:28	0.86		A
Total TCDDs	ND	0.181					
Total PeCDDs	0.268						
Total HxCDDs	8.65						
Total HpCDDs	65.9						
Total TCDFs	~~2.38~~		2.55 J				
Total PeCDFs	~~2.56~~		3.10 J				
Total HxCDFs	~~4.74~~		5.08 J				
Total HpCDFs	10.5						
WHO-2005 TEQ (ND=0)	1.21		1.35				
WHO-2005 TEQ (ND=½)	1.75		1.77				

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-22		Weight / Volume:	10.64 g
			Solids / Lipids:	79.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14383
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-15B		Filename:	a30jul07a-14
Collection Date/Time:	07/19/07	7:00	Retchk:	a30jul07a-1
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15
Analysis Date/Time:	07/31/07	3:32	Initial Cal:	m8290-071007a

Form I Copy

SGS Environmental Services

Method 8290
F51154-22
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.31	65.7	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.32	66.2	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.43	71.7	37:10	1.29	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.52	75.9	40:37	1.05	
13C12-OCDD	4.0	3.10	77.5	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.48	73.9	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.27	63.3	33:37	1.61	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.32	66.1	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.36	68.1	39:21	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.310	77.4	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.249	62.2	34:13	1.66	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.279	69.7	37:06	1.09	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.276	69.0	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.270	67.5	41:21	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-22		Weight / Volume:	10.64 g
			Solids / Lipids:	79.1 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14383
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-15B		Filename:	a30jul07a-14
Collection Date/Time:	07/19/07	7:00	Retchk:	a30jul07a-1
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-1
Extraction Date:	07/29/07		End ConCal:	a30jul07a-15
Analysis Date/Time:	07/31/07	3:32	Initial Cal:	m8290-071007a

Reviewed by: [signature]
Date: 8/9/07

Analyzed by: [signature]
Date: 08-09-07

Report Version: [8290_DB_2.14] Report

Form I Copy

SGS Environmental Services

Method 8290
F51154-23
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	EMPC	~~0.160~~	0.198 J	31:40	0.64 *	A
1,2,3,7,8-PeCDD	3.72 J			34:27	1.55	A
1,2,3,4,7,8-HxCDD	8.98			37:07	1.26	
1,2,3,6,7,8-HxCDD	29.3			37:12	1.28	
1,2,3,7,8,9-HxCDD	22.2			37:28	1.30	
1,2,3,4,6,7,8-HpCDD	1110			40:40	1.04	
OCDD	10000 J			45:10	0.90	E
2,3,7,8-TCDF	1.19			31:09	0.77	
1,2,3,7,8-PeCDF	1.45 J			33:37	1.52	A
2,3,4,7,8-PeCDF	0.348 J			34:19	1.44	A
1,2,3,4,7,8-HxCDF	8.47			36:24	1.23	
1,2,3,6,7,8-HxCDF	6.38			36:30	1.27	
2,3,4,6,7,8-HxCDF	8.25			37:00	1.28	
1,2,3,7,8,9-HxCDF	1.30 J			37:49	1.15	A
1,2,3,4,6,7,8-HpCDF	214			39:22	1.05	
1,2,3,4,7,8,9-HpCDF	13.7			41:22	1.10	
OCDF	736			45:28	0.89	
Total TCDDs	~~5.11~~		5.67 J			
Total PeCDDs	14.4					
Total HxCDDs	~~147~~		148 J			
Total HpCDDs	1670					
Total TCDFs	~~13.6~~		15.6 J			
Total PeCDFs	~~45.4~~		46.3 J			
Total HxCDFs	221					
Total HpCDFs	719					
WHO-2005 TEQ (ND=0)	29.1		29.3			
WHO-2005 TEQ (ND=½)	29.2		29.3			

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-23		Weight / Volume:	11.02 g
			Solids / Lipids:	89.6 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14383
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-16B		Filename:	a30jul07a_2-2
Collection Date/Time:	07/19/07	7:55	Retchk:	a30jul07a-15
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15
Extraction Date:	07/29/07		End ConCal:	a30jul07a_2-11
Analysis Date/Time:	07/31/07	6:01	Initial Cal:	m8290-071007a

Form I Cont

SGS Environmental Services

Method 8290
F51154-23
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.50	75.2	31:40	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.46	72.8	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.57	78.3	37:12	1.24	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.70	84.8	40:39	1.05	
13C12-OCDD	4.0	3.50	87.4	45:10	0.89	
13C12-2,3,7,8-TCDF	2.0	1.74	87.1	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.41	70.7	33:37	1.60	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.44	72.1	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.52	76.2	39:22	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.348	87.0	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.294	73.6	34:15	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.309	77.2	37:07	1.42	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.297	74.4	36:22	0.49	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.278	69.5	41:21	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:16	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.26	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-23		Weight / Volume:	11.02 g
			Solids / Lipids:	89.6 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14383
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-16B		Filename:	a30jul07a_2-2
Collection Date/Time:	07/19/07	7:55	Retchk:	a30jul07a-15
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15
Extraction Date:	07/29/07		End ConCal:	a30jul07a_2-11
Analysis Date/Time:	07/31/07	6:01	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/8/07

Reviewed by: _____
Date: 8/9/07

Form I copy

TCDF Confirmation - Method 8290
F51154-23
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	1.71	0.274		20.84	0.79	

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
$^{13}C_{12}$-2,3,7,8-TCDF	2.00	20.83	0.78	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-23		Weight / Volume:	11.02	g
			Solids / Lipids:	89.63	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	hrms3	
Sample ID:	G383-583-16B		Filename:	c11aug07a-8	
Collection Date/Time:	07/19/07	7:55	Retchk:	c11aug07a-2	
Receipt Date:	07/21/07	10:35	Begin ConCal:	c11aug07a-1	
Extraction Date:	07/29/07		End ConCal:	c11aug07a-25	
Analysis Date/Time:	08/11/07	13:07	Initial Cal:	mcf-c041807a	

Analyzed by: JWP
Date: 081307

Reviewed by: [signature]
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51154-24
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	0.318 J			31:40	0.69		A
1,2,3,7,8-PeCDD	1.91 J			34:25	1.64		A
1,2,3,4,7,8-HxCDD	4.29 J			37:07	1.41		A
1,2,3,6,7,8-HxCDD	13.6			37:12	1.27		
1,2,3,7,8,9-HxCDD	11.7			37:28	1.26		
1,2,3,4,6,7,8-HpCDD	549			40:40	1.04		
OCDD	6510 J			45:10	0.90		E
2,3,7,8-TCDF	1.44			31:07	0.88		
1,2,3,7,8-PeCDF	1.80 J			33:37	1.74		A
2,3,4,7,8-PeCDF	EMPC	~~0.537~~	0.189 J	34:19	1.17	*	A
1,2,3,4,7,8-HxCDF	5.21 J			36:24	1.24		A
1,2,3,6,7,8-HxCDF	3.66 J			36:30	1.30		A
2,3,4,6,7,8-HxCDF	4.48 J			37:00	1.23		A
1,2,3,7,8,9-HxCDF	0.833 J			37:49	1.09		A
1,2,3,4,6,7,8-HpCDF	101			39:22	1.05		
1,2,3,4,7,8,9-HpCDF	7.64			41:22	1.01		
OCDF	389			45:28	0.89		
Total TCDDs	~~18.3~~		18.6 J				
Total PeCDDs	10.3						
Total HxCDDs	~~76.9~~		77.8 J				
Total HpCDDs	871						
Total TCDFs	~~17.4~~		17.8 J				
Total PeCDFs	~~29.1~~		30.0 J				
Total HxCDFs	101						
Total HpCDFs	325						
WHO-2005 TEQ (ND=0)	15.4		15.5				
WHO-2005 TEQ (ND=½)	15.5		15.5				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-24		Weight / Volume:	10.22 g	
			Solids / Lipids:	91.2	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-17B		Filename:	a30jul07a_2-3	
Collection Date/Time:	07/19/07	8:10	Retchk:	a30jul07a-15	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15	
Extraction Date:	07/29/07		End ConCal:	a30jul07a_2-11	
Analysis Date/Time:	07/31/07	6:50	Initial Cal:	m8290-071007a	

Form I Corp

SGS Environmental Services

Method 8290
F51154-24
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.53	76.4	31:40	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.52	75.9	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.61	80.3	37:12	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.73	86.4	40:39	1.04	
13C12-OCDD	4.0	3.56	88.9	45:09	0.89	
13C12-2,3,7,8-TCDF	2.0	1.78	88.9	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.45	72.3	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.46	72.9	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.56	78.2	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.355	88.8	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.299	74.9	34:15	1.63	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.300	74.9	37:06	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.304	76.0	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.288	72.0	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-24		Weight / Volume:	10.22 g
			Solids / Lipids:	91.2 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14383
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-17B		Filename:	a30jul07a_2-3
Collection Date/Time:	07/19/07	8:10	Retchk:	a30jul07a-15
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a-15
Extraction Date:	07/29/07		End ConCal:	a30jul07a_2-11
Analysis Date/Time:	07/31/07	6:50	Initial Cal:	m8290-071007a

Print Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 08/01/07

Reviewed by: _____
Date: 8/9/07

Form I Copy

TCDF Confirmation - Method 8290
F51154-24
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	1.95	0.585		20.83	0.77	

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
$^{13}C_{12}$-2,3,7,8-TCDF	2.00	20.80	0.78	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-24		Weight / Volume:	10.22	g
			Solids / Lipids:	91.19	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14383	
Project ID:	G383-583		Instrument:	hrms3	
Sample ID:	G383-583-17B		Filename:	c11aug07a-9	
Collection Date/Time:	07/19/07	8:10	Retchk:	c11aug07a-2	
Receipt Date:	07/21/07	10:35	Begin ConCal:	c11aug07a-1	
Extraction Date:	07/29/07		End ConCal:	c11aug07a-25	
Analysis Date/Time:	08/11/07	13:31	Initial Cal:	mcf-c041807a	

Analyzed by: JWP
Date: 08/13/07

Reviewed by: [signature]
Date: 8/13/07

Form I Copy

SGS Environmental Services

Method 8290
F51154-25
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.198					
1,2,3,7,8-PeCDD	ND	0.553					
1,2,3,4,7,8-HxCDD	0.588 J			37:06	1.13		A
1,2,3,6,7,8-HxCDD	1.60 J			37:12	1.25		A
1,2,3,7,8,9-HxCDD	1.32 J			37:27	1.18		A
1,2,3,4,6,7,8-HpCDD	80.0			40:39	1.04		
OCDD	4540 J			45:09	0.90		E
2,3,7,8-TCDF	0.413 B			31:07	0.81		A
1,2,3,7,8-PeCDF	0.168 J			33:37	1.75		A
2,3,4,7,8-PeCDF	EMPC	~~0.553~~	0.252 B	34:15	1.19	*	A
1,2,3,4,7,8-HxCDF	0.791 J			36:22	1.30		A
1,2,3,6,7,8-HxCDF	0.343 J			36:28	1.20		A
2,3,4,6,7,8-HxCDF	0.422 J			36:58	1.34		A
1,2,3,7,8,9-HxCDF	ND	0.553					
1,2,3,4,6,7,8-HpCDF	10.4			39:21	1.02		
1,2,3,4,7,8,9-HpCDF	0.718 J			41:21	1.05		A
OCDF	30.2			45:27	0.90		
Total TCDDs	~~ND~~	~~0.198~~	1.20 J				
Total PeCDDs	1.13						
Total HxCDDs	~~10.8~~		11.1 J				
Total HpCDDs	147						
Total TCDFs	~~1.45~~		1.59 J				
Total PeCDFs	~~2.68~~		2.94 J				
Total HxCDFs	8.87						
Total HpCDFs	28.9						
WHO-2005 TEQ (ND=0)	2.83		2.91				
WHO-2005 TEQ (ND=½)	3.32		3.31				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-25		Weight / Volume:	10.40 g	
			Solids / Lipids:	87.0	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-18B		Filename:	a30jul07a_4-2	
Collection Date/Time:	07/19/07	8:25	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	2:21	Initial Cal:	m8290-071007a	

Form I Cdn

SGS Environmental Services

Method 8290
F51154-25
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.52	76.2	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.54	77.2	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.57	78.5	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.67	83.7	40:37	1.06	
13C12-OCDD	4.0	3.36	84.0	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.78	89.0	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.46	73.1	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.44	71.8	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.50	75.0	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.354	88.5	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.303	75.7	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.325	81.4	37:04	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.318	79.5	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.291	72.8	41:19	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-25		Weight / Volume:	10.40 g	
			Solids / Lipids:	87.0	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-18B		Filename:	a30jul07a_4-2	
Collection Date/Time:	07/19/07	8:25	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	2:21	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/8/07

Reviewed by: _____
Date: 8/9/07

Form I COA

SGS Environmental Services

Method 8290
F51154-26
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.161~~	0.333 J	31:40	0.57	*	A
1,2,3,7,8-PeCDD	2.89 J			34:25	1.49		A
1,2,3,4,7,8-HxCDD	9.00			37:06	1.25		
1,2,3,6,7,8-HxCDD	26.5			37:10	1.27		
1,2,3,7,8,9-HxCDD	21.0			37:27	1.27		
1,2,3,4,6,7,8-HpCDD	946			40:39	1.04		
OCDD	9640 J			45:09	0.89		E
2,3,7,8-TCDF	0.938 J			31:07	0.74		A
1,2,3,7,8-PeCDF	0.567 J			33:37	1.54		A
2,3,4,7,8-PeCDF	1.04 J			34:15	1.55		A
1,2,3,4,7,8-HxCDF	4.61 J			36:22	1.34		A
1,2,3,6,7,8-HxCDF	3.71 J			36:28	1.18		A
2,3,4,6,7,8-HxCDF	6.00			36:58	1.23		
1,2,3,7,8,9-HxCDF	0.839 J			37:48	1.20		A
1,2,3,4,6,7,8-HpCDF	138			39:21	1.05		
1,2,3,4,7,8,9-HpCDF	10.2			41:21	1.01		
OCDF	367			45:27	0.89		
Total TCDDs	~~3.56~~		4.08 J				
Total PeCDDs	~~13.0~~		13.2 J				
Total HxCDDs	137						
Total HpCDDs	1400						
Total TCDFs	~~7.08~~		8.68 J				
Total PeCDFs	~~24.9~~		25.3 J				
Total HxCDFs	138						
Total HpCDFs	418						
WHO-2005 TEQ (ND=0)	24.4		24.8				
WHO-2005 TEQ (ND=½)	24.5		24.8				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-26		Weight / Volume:	10.48 g	
			Solids / Lipids:	86.5	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-19B		Filename:	a30jul07a_4-3	
Collection Date/Time:	07/19/07	8:40	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	3:09	Initial Cal:	m8290-071007a	

Form 1 Copy

SGS Environmental Services

Method 8290
F51154-26
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.77	88.3	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.77	88.5	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.85	92.3	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	2.02	101	40:37	1.05	
13C12-OCDD	4.0	4.23	106	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.99	99.5	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.64	82.0	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.66	83.2	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.76	88.1	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.410	102	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.351	87.7	34:13	1.58	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.392	98.0	37:06	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.357	89.3	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.360	90.0	41:19	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.77	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-26		Weight / Volume:	10.48 g	
			Solids / Lipids:	86.5	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-19B		Filename:	a30jul07a_4-3	
Collection Date/Time:	07/19/07	8:40	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	3:09	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/8/07

Reviewed by: _____
Date: 8/9/07

Form I Corr

SGS Environmental Services

Method 8290
F51154-27
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.178~~	0.236 J	31:39	0.52	*	A
1,2,3,7,8-PeCDD	1.09 J			34:25	1.61		A
1,2,3,4,7,8-HxCDD	2.05 J			37:04	1.28		A
1,2,3,6,7,8-HxCDD	5.92			37:10	1.24		
1,2,3,7,8,9-HxCDD	5.30			37:27	1.20		
1,2,3,4,6,7,8-HpCDD	274			40:39	1.04		
OCDD	17400 J			45:09	0.89		E
2,3,7,8-TCDF	0.424 B			31:07	0.77		A
1,2,3,7,8-PeCDF	0.302 J			33:37	1.53		A
2,3,4,7,8-PeCDF	0.473 J			34:15	1.47		A
1,2,3,4,7,8-HxCDF	2.03 J			36:22	1.14		A
1,2,3,6,7,8-HxCDF	0.963 J			36:28	1.31		A
2,3,4,6,7,8-HxCDF	1.40 J			36:58	1.30		A
1,2,3,7,8,9-HxCDF	0.581 J			37:48	1.23		A
1,2,3,4,6,7,8-HpCDF	46.1			39:21	1.03		
1,2,3,4,7,8,9-HpCDF	2.02 J			41:21	1.03		A
OCDF	150			45:27	0.89		
Total TCDDs	~~1.60~~		1.84 J				
Total PeCDDs	~~4.35~~		5.00 J				
Total HxCDDs	41.5						
Total HpCDDs	490						
Total TCDFs	~~2.21~~		2.42 J				
Total PeCDFs	~~6.76~~		7.31 J				
Total HxCDFs	49.4						
Total HpCDFs	154						
WHO-2005 TEQ (ND=0)	11.6		11.8				
WHO-2005 TEQ (ND=½)	11.7		11.8				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-27		Weight / Volume:	10.67 g	
			Solids / Lipids:	90.7	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-20B		Filename:	a30jul07a_4-4	
Collection Date/Time:	07/19/07	9:40	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	3:58	Initial Cal:	m8290-071007a	

Form I Corp

SGS Environmental Services

Method 8290
F51154-27
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.59	79.6	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.60	79.9	34:25	1.59	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.68	83.8	37:10	1.25	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.77	88.5	40:37	1.05	
13C12-OCDD	4.0	3.76	94.1	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.80	90.2	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.51	75.5	33:37	1.57	
13C12-1,2,3,6,7.8-HxCDF	2.0	1.50	75.2	36:28	0.52	
13C12-1,2.3,4,6,7,8-HpCDF	2.0	1.56	78.1	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.371	92.6	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.286	71.4	34:13	1.59	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.316	78.9	37:04	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.327	81.7	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.313	78.3	41:19	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-27		Weight / Volume:	10.67 g
			Solids / Lipids:	90.7 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14385
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-20B		Filename:	a30jul07a_4-4
Collection Date/Time:	07/19/07	9:40	Retchk:	a30jul07a_3-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12
Analysis Date/Time:	08/01/07	3:58	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: DWO
Date: 08/9/07

Reviewed by: [signature]
Date: 8/9/07

Form I Cont

Method 8290
F51154-28
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.210					
1,2,3,7,8-PeCDD	1.23 J			34:25	1.55		A
1,2,3,4,7,8-HxCDD	1.95 J			37:06	1.24		A
1,2,3,6,7,8-HxCDD	5.26			37:12	1.20		
1,2,3,7,8,9-HxCDD	5.44			37:27	1.24		
1,2,3,4,6,7,8-HpCDD	204			40:39	1.04		
OCDD	7200 J			45:07	0.89		E
2,3,7,8-TCDF	0.413 B			31:07	0.68		A
1,2,3,7,8-PeCDF	EMPC	~~0.496~~	0.254 J	33:37	1.95	*	A
2,3,4,7,8-PeCDF	0.437 J			34:15	1.55		A
1,2,3,4,7,8-HxCDF	2.11 J			36:22	1.27		A
1,2,3,6,7,8-HxCDF	0.840 J			36:28	1.24		A
2,3,4,6,7,8-HxCDF	1.11 J			36:58	1.12		A
1,2,3,7,8,9-HxCDF	0.391 J			37:48	1.21		A
1,2,3,4,6,7,8-HpCDF	33.2			39:21	1.04		
1,2,3,4,7,8,9-HpCDF	1.39 J			41:21	0.96		A
OCDF	79.3			45:25	0.89		
Total TCDDs	1.26						
Total PeCDDs	~~3.87~~		5.17 J				
Total HxCDDs	~~40.0~~		41.3 J				
Total HpCDDs	385						
Total TCDFs	~~2.02~~		2.52 J				
Total PeCDFs	~~5.87~~		6.13 J				
Total HxCDFs	36.2						
Total HpCDFs	~~93.3~~		93.8 J				
WHO-2005 TEQ (ND=0)	7.68		7.69				
WHO-2005 TEQ (ND=½)	7.79		7.79				

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-28		Weight / Volume:	11.03 g
			Solids / Lipids:	91.4 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14385
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-21B		Filename:	a30jul07a_4-5
Collection Date/Time:	07/19/07	9:25	Retchk:	a30jul07a_3-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12
Analysis Date/Time:	08/01/07	4:46	Initial Cal:	m8290-071007a

From I Corp

SGS Environmental Services

Method 8290
F51154-28
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.58	79.2	31:37	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.64	81.8	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.66	82.9	37:10	1.23	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.77	88.4	40:37	1.05	
13C12-OCDD	4.0	3.73	93.3	45:07	0.90	
13C12-2,3,7,8-TCDF	2.0	1.82	91.2	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.52	75.9	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.52	76.0	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.58	78.9	39:19	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.366	91.4	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.283	70.6	34:13	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.336	84.0	37:04	1.38	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.321	80.3	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.316	79.1	41:19	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-28		Weight / Volume:	11.03 g	
			Solids / Lipids:	91.4	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-21B		Filename:	a30jul07a_4-5	
Collection Date/Time:	07/19/07	9:25	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	4:46	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2 14]Report

Analyzed by: JMP
Date: 080907

Reviewed by: BPA
Date: 8/8/07

Form I Corr

Method 8290
F51154-29
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	0.231 J			31:40	0.77		A
1,2,3,7,8-PeCDD	2.03 J			34:25	1.58		A
1,2,3,4,7,8-HxCDD	3.47 J			37:06	1.41		A
1,2,3,6,7,8-HxCDD	8.25			37:12	1.28		
1,2,3,7,8,9-HxCDD	9.49			37:27	1.25		
1,2,3,4,6,7,8-HpCDD	269			40:39	1.05		
OCDD	9970 J			45:07	0.90		E
2,3,7,8-TCDF	0.566 B			31:07	0.84		A
1,2,3,7,8-PeCDF	EMPC	~~0.560~~	0.275 J	33:37	1.26	*	A
2,3,4,7,8-PeCDF	0.537 J			34:15	1.52		A
1,2,3,4,7,8-HxCDF	2.10 J			36:22	1.20		A
1,2,3,6,7,8-HxCDF	1.38 J			36:28	1.17		A
2,3,4,6,7,8-HxCDF	1.95 J			36:58	1.27		A
1,2,3,7,8,9-HxCDF	ND	0.560					
1,2,3,4,6,7,8-HpCDF	49.2			39:21	1.04		
1,2,3,4,7,8,9-HpCDF	2.09 J			41:21	1.11		A
OCDF	136			45:25	0.89		
Total TCDDs	1.67						
Total PeCDDs	7.45						
Total HxCDDs	55.3						
Total HpCDDs	461						
Total TCDFs	~~3.62~~		3.91 J				
Total PeCDFs	~~8.05~~		8.48 J				
Total HxCDFs	~~48.3~~		48.5 J				
Total HpCDFs	143						
WHO-2005 TEQ (ND=0)	11.4		11.4				
WHO-2005 TEQ (ND=½)	11.4		11.4				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-29		Weight / Volume:	10.07 g	
			Solids / Lipids:	88.7	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-22B		Filename:	a30jul07a_4-6	
Collection Date/Time:	07/19/07	8:55	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	5:35	Initial Cal:	m8290-071007a	

Form I Cont

Method 8290
F51154-29
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.59	79.4	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.56	78.1	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.63	81.7	37:10	1.27	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.76	88.1	40:37	1.06	
13C12-OCDD	4.0	3.68	92.1	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.80	89.9	31:06	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.47	73.6	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.49	74.7	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.56	78.0	39:19	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.355	88.9	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.271	67.8	34:13	1.59	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.329	82.2	37:04	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.326	81.5	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.301	75.2	41:19	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.24	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-29		Weight / Volume:	10.07 g	
			Solids / Lipids:	88.7	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-22B		Filename:	a30jul07a_4-6	
Collection Date/Time:	07/19/07	8:55	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	5:35	Initial Cal:	m8290-071007a	

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 8/8/07

Reviewed by: _____
Date: 8/9/07

Form I copy

Method 8290
F51154-30
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.184~~	0.248 J	31:42	0.55	*	A
1,2,3,7,8-PeCDD	0.934 J			34:25	1.61		A
1,2,3,4,7,8-HxCDD	1.66 J			37:07	1.13		A
1,2,3,6,7,8-HxCDD	3.73 J			37:13	1.25		A
1,2,3,7,8,9-HxCDD	4.39 J			37:28	1.19		A
1,2,3,4,6,7,8-HpCDD	122			40:40	1.05		
OCDD	1410			45:10	0.89		
2,3,7,8-TCDF	0.424 B			31:10	0.78		A
1,2,3,7,8-PeCDF	EMPC	~~0.484~~	0.286 J	33:39	1.79	*	A
2,3,4,7,8-PeCDF	EMPC	~~0.484~~	0.292 B	34:15	1.83	*	A
1,2,3,4,7,8-HxCDF	1.04 J			36:24	1.20		A
1,2,3,6,7,8-HxCDF	0.619 J			36:30	1.14		A
2,3,4,6,7,8-HxCDF	0.745 J			37:00	1.21		A
1,2,3,7,8,9-HxCDF	ND	0.484					
1,2,3,4,6,7,8-HpCDF	21.5			39:22	1.04		
1,2,3,4,7,8,9-HpCDF	0.830 J			41:22	1.09		A
OCDF	57.6			45:28	0.90		
Total TCDDs	~~3.35~~		3.60 J				
Total PeCDDs	~~5.10~~		5.46 J				
Total HxCDDs	30.9						
Total HpCDDs	222						
Total TCDFs	~~5.14 J~~		5.30 J				Q
Total PeCDFs	~~4.05~~		4.74 J				
Total HxCDFs	~~17.5~~		17.8 J				
Total HpCDFs	57.9						
WHO-2005 TEQ (ND=0)	4.08		4.42				
WHO-2005 TEQ (ND=½)	4.27		4.45				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-30		Weight / Volume:	11.03 g	
			Solids / Lipids:	93.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-23B		Filename:	a30jul07a_4-7	
Collection Date/Time:	07/19/07	9:10	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	6:23	Initial Cal:	m8290-071007a	

Form I com

SGS Environmental Services

Method 8290
F51154-30
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.59	79.6	31:40	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.63	81.4	34:25	1.57	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.74	86.8	37:12	1.27	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.88	93.9	40:39	1.06	
13C12-OCDD	4.0	3.87	96.8	45:10	0.89	
13C12-2,3,7,8-TCDF	2.0	1.88	93.8	31:09	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.50	75.1	33:39	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.57	78.4	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.67	83.4	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.375	93.7	31:42	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.306	76.4	34:15	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.343	85.8	37:07	1.27	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.339	84.9	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.337	84.4	41:21	0.43	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:16	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-30		Weight / Volume:	11.03 g	
			Solids / Lipids:	93.8	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14385	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-23B		Filename:	a30jul07a_4-7	
Collection Date/Time:	07/19/07	9:10	Retchk:	a30jul07a_3-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14	
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12	
Analysis Date/Time:	08/01/07	6:23	Initial Cal:	m8290-071007a	

Form Version:[8290_DD_2.14]Report

Analyzed by: JWC
Date: 080107

Reviewed by: [illegible]
Date: 8/9/07

Form I Corr

SGS Environmental Services

Method 8290
F51154-31
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	ND	0.204					
1,2,3,7,8-PeCDD	0.341 J			34:25	1.56		A
1,2,3,4,7,8-HxCDD	0.657 J			37:07	1.21		A
1,2,3,6,7,8-HxCDD	1.56 J			37:13	1.23		A
1,2,3,7,8,9-HxCDD	1.49 J			37:27	1.37		A
1,2,3,4,6,7,8-HpCDD	54.1			40:40	1.04		
OCDD	1030			45:10	0.89		
2,3,7,8-TCDF	EMPC	~~0.184~~	0.442 B	31:09	0.89	*	A
1,2,3,7,8-PeCDF	0.196 J			33:39	1.47		A
2,3,4,7,8-PeCDF	EMPC	~~0.517~~	0.184 B	34:15	1.93	*	A
1,2,3,4,7,8-HxCDF	0.810 J			36:22	1.18		A
1,2,3,6,7,8-HxCDF	0.358 J			36:28	1.14		A
2,3,4,6,7,8-HxCDF	0.335 J			36:58	1.23		A
1,2,3,7,8,9-HxCDF	ND	0.517					
1,2,3,4,6,7,8-HpCDF	10.6			39:22	1.02		
1,2,3,4,7,8,9-HpCDF	0.451 J			41:21	1.05		A
OCDF	26.0			45:28	0.89		
Total TCDDs	13.3						
Total PeCDDs	~~1.93~~		2.20 J				
Total HxCDDs	11.8						
Total HpCDDs	99.1						
Total TCDFs	~~1.70~~		2.82 J				
Total PeCDFs	~~2.11~~		2.57 J				
Total HxCDFs	~~7.58~~		7.80 J				
Total HpCDFs	26.4						
WHO-2005 TEQ (ND=0)	1.84		1.94				
WHO-2005 TEQ (ND=½)	2.05		2.06				

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-31		Weight / Volume:	10.26 g
			Solids / Lipids:	94.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14385
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-24B		Filename:	a30jul07a_4-8
Collection Date/Time:	07/19/07	9:55	Retchk:	a30jul07a_3-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12
Analysis Date/Time:	08/01/07	7:11	Initial Cal:	m8290-071007a

Form I cont

Method 8290
F51154-31
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.63	81.7	31:40	0.77	
13C12-1,2,3,7,8-PeCDD	2.0	1.66	82.8	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.68	84.1	37:12	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.83	91.5	40:39	1.06	
13C12-OCDD	4.0	3.73	93.2	45:09	0.90	
13C12-2,3,7,8-TCDF	2.0	1.90	95.0	31:07	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.54	77.2	33:37	1.59	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.54	76.8	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.63	81.7	39:21	0.44	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.404	101	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.316	79.0	34:15	1.60	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.377	94.3	37:06	1.26	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.366	91.4	36:22	0.51	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.351	87.8	41:21	0.44	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:15	0.78	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.25	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-31		Weight / Volume:	10.26 g
			Solids / Lipids:	94.3 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14385
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-24B		Filename:	a30jul07a_4-8
Collection Date/Time:	07/19/07	9:55	Retchk:	a30jul07a_3-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_3-14
Extraction Date:	07/30/07		End ConCal:	a30jul07a_4-12
Analysis Date/Time:	08/01/07	7:11	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 08-Aug-07

Reviewed by: _____
Date: 8/9/07

Form I Copy

SGS Environmental Services

Method 8290
F51154-32
Accutest

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio		Qualifier
2,3,7,8-TCDD	EMPC	~~0.223~~	0.241 J	31:39	0.61	*	A
1,2,3,7,8-PeCDD	3.04 J			34:25	1.58		A
1,2,3,4,7,8-HxCDD	10.8			37:06	1.26		
1,2,3,6,7,8-HxCDD	27.8			37:10	1.30		
1,2,3,7,8,9-HxCDD	19.2			37:25	1.29		
1,2,3,4,6,7,8-HpCDD	950			40:39	1.04		
OCDD	10300 J			45:07	0.89		E
2,3,7,8-TCDF	0.917 J			31:06	0.87		A
1,2,3,7,8-PeCDF	0.593 J			33:37	1.35		A
2,3,4,7,8-PeCDF	0.996 J			34:13	1.71		A
1,2,3,4,7,8-HxCDF	6.93			36:22	1.21		
1,2,3,6,7,8-HxCDF	6.14			36:28	1.35		
2,3,4,6,7,8-HxCDF	5.34 J			36:58	1.30		A
1,2,3,7,8,9-HxCDF	0.635 J			37:46	1.19		A
1,2,3,4,6,7,8-HpCDF	132			39:21	1.05		
1,2,3,4,7,8,9-HpCDF	8.10			41:21	0.90		
OCDF	397			45:25	0.89		
Total TCDDs	~~5.50~~		6.23 J				
Total PeCDDs	15.9						
Total HxCDDs	~~130~~		134 J				
Total HpCDDs	1420						
Total TCDFs	~~7.80~~		10.4 J				
Total PeCDFs	~~21.6~~		22.0 J				
Total HxCDFs	129						
Total HpCDFs	420						
WHO-2005 TEQ (ND=0)	25.2		25.5				
WHO-2005 TEQ (ND=½)	25.4		25.5				

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Dry	
			Matrix:	Soil	
Sample ID:	F51154-32		Weight / Volume:	10.19 g	
			Solids / Lipids:	85.4	%
			Original pH :	NA	
Laboratory Information			Batch ID:	WG14389	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-25B		Filename:	a30jul07a_6-5	
Collection Date/Time:	07/19/07	8:40	Retchk:	a30jul07a_4-12	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_4-12	
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14	
Analysis Date/Time:	08/01/07	18:39	Initial Cal:	m8290-071007a	

Form I CDF

SGS Environmental Services

Method 8290
F51154-32
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.54	76.8	31:39	0.78	
13C12-1,2,3,7,8-PeCDD	2.0	1.48	74.0	34:25	1.60	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.64	81.9	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.78	89.1	40:37	1.06	
13C12-OCDD	4.0	3.83	95.8	45:07	0.89	
13C12-2,3,7,8-TCDF	2.0	1.73	86.6	31:06	0.78	
13C12-1,2,3,7,8-PeCDF	2.0	1.40	70.0	33:37	1.61	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.51	75.3	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.58	79.2	39:19	0.43	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.362	90.4	31:39	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.267	66.7	34:13	1.64	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.317	79.3	37:04	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.324	81.1	36:22	0.50	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.293	73.3	41:19	0.41	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:25	1.26	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	F51154-32		Weight / Volume:	10.19 g
			Solids / Lipids:	85.4 %
			Original pH :	NA
Laboratory Information			Batch ID:	WG14389
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-25B		Filename:	a30jul07a_6-5
Collection Date/Time:	07/19/07	8:40	Retchk:	a30jul07a_4-12
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a30jul07a_4-12
Extraction Date:	07/31/07		End ConCal:	a30jul07a_6-14
Analysis Date/Time:	08/01/07	18:39	Initial Cal:	m8290-071007a

Form Version:[8290_DB_2.14]Report

Analyzed by: JWP
Date: 08/07/07

Reviewed by: DLL
Date: 8/9/07

For I copy

SGS Environmental Services

Method 8290
F51154-12 RB071807
Accutest

Analytical Data Summary Sheet

Analyte	Amount (ng/L)	EDL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	ND	0.00179				
1,2,3,7,8-PeCDD	ND	0.00551				
1,2,3,4,7,8-HxCDD	ND	0.00551				
1,2,3,6,7,8-HxCDD	ND	0.00551				
1,2,3,7,8,9-HxCDD	ND	0.00551				
1,2,3,4,6,7,8-HpCDD	ND	0.00551				
OCDD	ND	0.0110				
2,3,7,8-TCDF	ND	0.00126				
1,2,3,7,8-PeCDF	ND	0.00551				
2,3,4,7,8-PeCDF	ND	0.00551				
1,2,3,4,7,8-HxCDF	ND	0.00551				
1,2,3,6,7,8-HxCDF	ND	0.00551				
2,3,4,6,7,8-HxCDF	ND	0.00551				
1,2,3,7,8,9-HxCDF	ND	0.00551				
1,2,3,4,6,7,8-HpCDF	ND	0.00551				
1,2,3,4,7,8,9-HpCDF	ND	0.00551				
OCDF	ND	0.0110				
Total TCDDs	ND	0.00179				
Total PeCDDs	ND	0.00551				
Total HxCDDs	ND	0.00551				
Total HpCDDs	ND	0.00551				
Total TCDFs	ND	0.00126				
Total PeCDFs	ND	0.00551				
Total HxCDFs	ND	0.00551				
Total HpCDFs	ND	0.00551				
WHO-2005 TEQ (ND=0)	ND		ND			
WHO-2005 TEQ (ND=½)	0.00664		0.00664			

Client Information			**Sample Information**		
Project Name:	F51154		Report Basis:	Wet	
			Matrix:	Water	
Sample ID:	F51154-12		Weight / Volume:	907 mL	
			Solids / Lipids:	NA	%
			Original pH :	7	
Laboratory Information			Batch ID:	WG14381	
Project ID:	G383-583		Instrument:	HRMS1	
Sample ID:	G383-583-7C		Filename:	a27jul07a_3-11	
Collection Date/Time:	07/18/07	13:15	Retchk:	a27jul07a_2-14	
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14	
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12	
Analysis Date/Time:	07/28/07	22:40	Initial Cal:	m8290-071007a	

Form I Corr

Method 8290
F51154-12
Accutest

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
13C12-2,3,7,8-TCDD	2.0	1.59	79.7	31:39	0.79	
13C12-1,2,3,7,8-PeCDD	2.0	1.58	79.0	34:25	1.58	
13C12-1,2,3,6,7,8-HxCDD	2.0	1.66	83.2	37:10	1.26	
13C12-1,2,3,4,6,7,8-HpCDD	2.0	1.81	90.3	40:39	1.06	
13C12-OCDD	4.0	3.96	99.0	45:09	0.89	
13C12-2,3,7,8-TCDF	2.0	1.81	90.4	31:07	0.79	
13C12-1,2,3,7,8-PeCDF	2.0	1.56	77.9	33:37	1.58	
13C12-1,2,3,6,7,8-HxCDF	2.0	1.63	81.6	36:28	0.52	
13C12-1,2,3,4,6,7,8-HpCDF	2.0	1.75	87.3	39:21	0.45	
Cleanup Standards						
37Cl4-2,3,7,8-TCDD	0.4	0.382	95.5	31:40	-	
13C12-2,3,4,7,8-PeCDF	0.4	0.341	85.3	34:13	1.62	
13C12-1,2,3,4,7,8-HxCDD	0.4	0.369	92.3	37:06	1.28	
13C12-1,2,3,4,7,8-HxCDF	0.4	0.367	91.9	36:22	0.54	
13C12-1,2,3,4,7,8,9-HpCDF	0.4	0.362	90.5	41:19	0.42	
Injection Standards						
13C12-1,2,3,4-TCDD	2.0	-	-	31:13	0.79	
13C12-1,2,3,7,8,9-HxCDD	2.0	-	-	37:27	1.26	

Client Information			**Sample Information**	
Project Name:	F51154		Report Basis:	Wet
			Matrix:	Water
Sample ID:	F51154-12		Weight / Volume:	907 mL
			Solids / Lipids:	NA %
			Original pH :	7
Laboratory Information			Batch ID:	WG14381
Project ID:	G383-583		Instrument:	HRMS1
Sample ID:	G383-583-7C		Filename:	a27jul07a_3-11
Collection Date/Time:	07/18/07	13:15	Retchk:	a27jul07a_2-14
Receipt Date/Time:	07/21/07	10:35	Begin ConCal:	a27jul07a_2-14
Extraction Date:	07/26/07		End ConCal:	a27jul07a_3-12
Analysis Date/Time:	07/28/07	22:40	Initial Cal:	m8290-071007a

Report Version:[8290_DB_2.14]Report

Analyzed by: _____
Date: 08/08/07

Reviewed by: _____
Date: 8/9/07

Shaw Environmental, Inc.
2790 Mosside Blvd
Monroeville, PA
412-858-3335
FAX: 412-372-8968

Shaw® Shaw Environmental, Inc.

MEMORANDUM

TO: Jeff Parks, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Richard McCracken, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
Accutest Laboratories, Inc., SDG F52208

DATE: October 29, 2007

The purpose of this memorandum is to present the data validation report for the samples collected at RFAAP on August 30, 2007. The samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) using USEPA SW846 Method 5030B/8260B. A total of seven aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
RB083007	F52208-1	48MW05	F52208-5
50MW01	F52208-2	48MW06	F52208-6
48MW07	F52208-3	TB083007	F52208-8
50MW02	F52208-4		

Data were reviewed by Richard McCracken and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 3, January, 2006* (DoD, 2006) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Richard McCracken, Chemist

10/29/07
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG F52208

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples cooled @ 4°C±2°C; pH<2 HCl, the maximum holding time is 14 days (7 days if no HCl added) from sample collection to analysis. For soil samples cooled @ 4°C±2°C; the maximum holding time is 14 days from sample collection to analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. The samples collected on 8/30/07 were sent in 15 coolers, and were received by the laboratory on 8/31/07 at temperatures ranging from 0.6°C to 2.2°C, with 12 of the 15 coolers having temperatures below 2.0°C. The low sample temperatures are not expected to have an adverse impact on the analytical results. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected for VOCs on 08/30/07 and analyzed on 9/13/07. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99. All detects are qualified as estimated "J" for where there were exceeding %RSDs, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the 9/7/07 initial calibration performed on instrument MSVOA4, target compounds acetone (15.12%), chloroethane (15.55%), 2-hexanone (20.41%), 4-methyl-2-pentanone (24.74%), methylene chloride (33.22%), and styrene (17.15%) were outside %RSD criteria. All other target compounds met %RSD criteria, and all compounds met RRF criteria. The compounds with high %RSD were quantified using second order regression, and had correlation coefficients >0.995; therefore, no qualifiers were applied. All samples were analyzed in conjunction with this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration establishes the 12-hour relative response factors on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. All detects are qualified as estimated "J" for where there were exceeding %Ds, and all non-detects are qualified as estimated "UJ" for where there were grossly exceeding recoveries, unless determined to be unusable "R". Grossly exceeding is defined as twice the established criteria limits. For where there were low RRFs, all detects are qualified as estimated "J" and non-detects are rejected "R".

- During the initial calibration verification performed on 9/7/07 @1307 on instrument MSVOA4, acetone (31.6%) had a %drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples were analyzed following this initial calibration verification, therefore no qualifiers were applied.

- During the continuing calibration performed on 9/13/07 @1030 on instrument MSVOA4, acetone (21.7%) had a %drift outside criteria. All other target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No acetone was detected in any of the associated samples, so no data qualification was required. All samples were analyzed following this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples
9/13/07	VB2036-MB	All target <½MRL	NA	NA	None
9/13/07	RB083007	All target <½MRL	NA	NA	None
9/13/07	TB083007	All target <½MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample

Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. The DoD aqueous LCS recovery limits are specified in Table D-4 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample VB2036-BS was used as the aqueous LCS for the VOC analysis on 9/13/07. Methyl chloride (143%) was above the DoD QSM criteria. No methyl chloride was detected in any samples, therefore no data qualifiers were applied. All other target compound recoveries were within criteria. All samples were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table D-4 of the DoD QSM (DoD, 2006). If the compound is not listed, then the laboratory criteria shall be used.

- Sample RB083007 was used for the aqueous MS/MSD analysis on 9/13/07. Methyl chloride (150%, 141%) was above the DoD QSM criteria. No methyl chloride was detected in any samples, therefore no data qualifiers were applied. All other target compound recoveries were within criteria. All samples were analyzed in conjunction with this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)

Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table D-3 of the DoD QSM (DoD, 2006). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria: Dibromofluoromethane (87-116%) (DoD QSM = 85-115%)
1,2-Dichloroethane-d4 (76-127%) (DoD QSM = 70-120%)
Toluene-d8 (86-112%) (DoD QSM = 85-120%)
4-Bromofluorobenzene (84-120%) (DoD QSM = 75-120%)

- All samples met criteria. No qualifiers were applied.

IX-Internal Standards (IS)

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- All samples met criteria. No qualifiers were applied.

X-Field Duplicate Sample Analysis

Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous and solid samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- No field duplicates were included in this sample set.

XI-Quantitation Verification

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 50MW02 (F52208-4), trichloroethylene

Conc. (μg/L) = (Ax * Is * DF)/(Ais * RRF * Vo)

where: Ax is the compound area
Is is the amount of internal standard added (ng)
DF is the dilution factor
Ais is the internal standard area
RRF is the relative response factor
Vo is the volume of water purged (ml)

Conc. μg/L = (33658 * 250 μg/L * 1) / (1645049 * 0.304 *5) = 3.4 μg/L

Reported Conc. = 3.4 μg/L
%D = 0.0%
Values were within 10% difference.

USEPA Region III Validation Qualifiers

(No Code) = Confirmed identification.

B = The analyte has been detected in the sample and the associated laboratory or field blank.

J = Indicates an estimated value for (1) estimated value due to QC non-conformance. Reported value may not be accurate or precise, (2) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (3) estimating a concentration ≥MDL and <MRL or <3*MDL, whichever is greater.

K = Analyte present. Reported value may be biased high (estimated) due to QC non-conformance.

L = Analyte present. Reported value may be biased low (estimated) due to QC non-conformance.

R = Unreliable result. Analyte may or may not be present in the sample due to QC non-conformance.

UL = Value is estimated bias low and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise. Quantitation limit is probably higher.

UJ = Value is estimated and not detected due to QC non-conformance. Reporting limit may be inaccurate or imprecise.

Laboratory Qualifiers

(No Code) = Confirmed identification.

U = Not detected. The associated number indicates the compound reporting limit for the sample.

A (Dioxins) = B (Metals) = The reported value was obtained from a reading <MRL and ≥MDL and is considered estimated.

B (Organics) = The analyte or compound has been detected in the sample and laboratory method blank. It indicates probable blank contamination.

E (Metals) = Reported value is estimated because of the presence of interferences.

E (Organics) = Identifies compounds whose concentrations exceed the upper level of the calibration range.

EMPC (Dioxins) = The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

D = Indicates sample was analyzed at a dilution.

J = Indicates an estimated value for (1) estimating a concentration as a tentatively identified compound as indicated by the mass spectral and retention time data, or (2) estimating a concentration <MRL and ≥ MDL.

N (Organics) = Indicates presumptive evidence of a compound for tentatively identified compounds using a library search.

N (Metals) = Laboratory spike sample recovery not within control limits.

P (Organics) = Target analyte confirmation >40% difference for detected compound between the primary and secondary columns. The lower of the two values was reported.

* (Metals) = Duplicate analysis not within control limits.

* (Organics) = Surrogate outside of QC limits on both original and re-analysis.

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048431.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RB083007		
Lab Sample ID:	F52208-1	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		87-116%
17060-07-0	1,2-Dichloroethane-D4	107%		76-127%
2037-26-5	Toluene-D8	103%		86-112%
460-00-4	4-Bromofluorobenzene	113%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048438.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	50MW01		
Lab Sample ID:	F52208-2	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	110%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	111%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048439.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW07		
Lab Sample ID:	F52208-3	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		87-116%
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	111%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

3.4

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048440.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

DATA VAL QUALIFIER

CAS No.	Compound	Result	RL	MDL	Units	Q	
67-64-1	Acetone	ND	25	10	ug/l		
71-43-2	Benzene	ND	1.0	0.20	ug/l		
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l		
75-25-2	Bromoform	ND	1.0	0.28	ug/l		
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l		
75-00-3	Chloroethane	ND	2.0	0.46	ug/l		
67-66-3	Chloroform	ND	1.0	0.21	ug/l		
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l		
56-23-5	Carbon tetrachloride	2.7	1.0	0.29	ug/l		
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l		
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l		
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l		
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l		
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l		
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l		
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l		
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0 20	ug/l		
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l		
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l		
591-78-6	2-Hexanone	ND	10	2.9	ug/l		
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l		
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l		
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l		
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l		
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l		
100-42-5	Styrene	ND	1.0	0.20	ug/l		
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l		
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l		
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l		
127-18-4	Tetrachloroethylene	0.84	1.0	0.25	ug/l	J	J
108-88-3	Toluene	ND	1.0	0.27	ug/l		
79-01-6	Trichloroethylene	3.4	1.0	0.38	ug/l		

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	50MW02		
Lab Sample ID:	F52208-4	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	102%		86-112%
460-00-4	4-Bromofluorobenzene	112%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048441.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	2.3	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW05		
Lab Sample ID:	F52208-5	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	110%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	111%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048442.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	3.4	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	2.9	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	1.8	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	3.7	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	48MW06		
Lab Sample ID:	F52208-6	Date Sampled:	08/30/07
Matrix:	AQ - Ground Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	103%		86-112%
460-00-4	4-Bromofluorobenzene	111%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest LabLink@70184 17:26 25-Oct-2007

Report of Analysis

Client Sample ID:	TB083007		
Lab Sample ID:	F52208-8	Date Sampled:	08/30/07
Matrix:	AQ - Trip Blank Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	B048444.D	1	09/13/07	LD	n/a	n/a	VB2036
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	25	10	ug/l	
71-43-2	Benzene	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.29	ug/l	
75-25-2	Bromoform	ND	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	2.0	0.46	ug/l	
67-66-3	Chloroform	ND	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	ND	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.25	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	ND	5.0	2.2	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.54	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.38	ug/l	
75-09-2	Methylene chloride	ND	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	ND	5.0	2.0	ug/l	
100-42-5	Styrene	ND	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.25	ug/l	
108-88-3	Toluene	ND	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.38	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB083007		
Lab Sample ID:	F52208-8	Date Sampled:	08/30/07
Matrix:	AQ - Trip Blank Water	Date Received:	08/31/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	WPA 019 Field Investigation; Radford AAP, VA		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	ND	1.0	0.34	ug/l	
	m,p-Xylene	ND	2.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		87-116%
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	103%		86-112%
460-00-4	4-Bromofluorobenzene	111%		84-120%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Total Organic Carbon
GCAL Laboratories, Inc., SDG 213051016

DATE: July 11, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 08, 2013 and May 09, 2013. Samples were analyzed for Total Organic Carbon (TOC) using SM 5310B. A total of four aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW02	213051016-14	48MW2	213051016-18
48MW3	213051016-15	49MW01	213051016-19

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), and method-specific criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial and Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample and Laboratory Control Sample Duplicate
	X	Matrix Spike and Spike Duplicate
	X	Laboratory Duplicate
	X	Field Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

E. Malarek

Eric Malarek, Chemist

7/11/13

Date

RFAAP VALIDATION REPORT
TOC REVIEW
SDG 213051016

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool 4°C±2°C, HCl pH<2, 28 days for TOC (USEPA criteria). The dates and times were compared between the sample collection and laboratory analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For TOC samples collected on 05/08/13 and 05/09/13, the coolers were received by the laboratory (GCAL) on 05/10/13 at 5.6°C and 4.3°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The samples were collected on 05/08/13 and 05/09/13. The TOC analysis was run on 05/11/13. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifier was applied.

II-Initial and Continuing Calibration
Bench and run summary sheets were reviewed to determine whether calibration was performed at the beginning of sample analysis using the following criteria. Percent recoveries for initial and continuing calibration (90-110%) must be within limits.

TOC:	1 - blank 5 - standards ($r \geq 0.995$) ICV/CCV (90-110%)

- The TOC analysis was run on 05/11/13. The initial calibration for TC was analyzed on 02/22/13 with a coefficient of determination of 0.9999. The initial calibration for TIC was analyzed on 02/22/13 with a coefficient of determination of 1.000. The ICV and CCVs were evaluated for where they bracketed reported samples. All ICV/CCVs that bracketed reported samples were within criteria. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to these initial and continuing calibrations.

III-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) and <LOD (i.e. <2MDL) for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters, or 5 times (5x) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/L	Action Level mg/L	B qualified samples (For this SDG)
05/11/13	TOC	ICB/CCBs	<LOD	NA	None
05/11/13	TOC	MB1190965	<½MRL	NA	None
05/10/13	TOC	RB050813	<½MRL	NA	None

LOD = Limit of Detection
MRL = Method Reporting Limit
MDL = Method Detection Limit
NA = Not Applicable

IV-Laboratory Control Sample and Laboratory Control Sample Duplicate
The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) serve as a monitor of the overall performance of each step during the analysis, including the sample preparation. LCS and LCSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. All aqueous LCS results must fall within the control limits (80-120%; RPD≤25%).

- Samples LCS1190966 and LCS1190967 were used as the aqueous LCS/LCSD for TOC analysis on 05/11/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this LCS/LCSD.

V-Matrix Spike and Spike Duplicate
Matrix spikes (MSs) and matrix spike duplicates (MSDs) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. The percent recoveries (%Rs or RPD) must be within the specified control limits (75-125%; RPD≤25%).

- Sample 48MW3 (213051016-15) was used as the aqueous MS/MSD for TOC analysis on 05/11/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this MS/MSD.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits (≤25%RPD).

- No aqueous laboratory duplicate was analyzed for TOC with this SDG; therefore, it was not evaluated. See Section IV for lab precision statements using LCS/LCSD.

VII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- No site field groundwater sample duplicate pair was analyzed for TOC analysis in this SDG; therefore, was not evaluated.

VIII-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 48MW3 (213051016-15), TOC

TC: Y = m*X (mg/L) + b	TIC: Y = m*X (mg/L) + b
m = 4.113	m = 4.154
b = 1.262	b = 0.1181
Y = 355.7	Y = 356.0
DF = 1	DF = 1
X = (86.19 mg/L) * 1 = 86.19 mg/L	X = (85.67 mg/L) * 1 = 85.67 mg/L

TOC (mg/L) = TC (mg/L) – TIC (mg/L) = 86.19 – 85.67 = 0.52 mg/L = 0.52 mg/L

Reported Value = 0.52 mg/L
% Difference = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101614	49MW02	Water	05/09/2013 10:00	05/10/2013 09:05

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/11/2013 15:16	JEM	507146

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	12.1	1.0	0.30	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101615	48MW3	Water	05/09/2013 11:35	05/10/2013 09:05

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/11/2013 15:42	JEM	507146

CAS#	Parameter	Result		RDL	MDL	Units
C-012	Total Organic Carbon	0.52J	J	1.0	0.30	mg/L

213051016 265

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101618	48MW2	Water	05/09/2013 13:45	05/10/2013 09:05

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/11/2013 16:39	JEM	507146

CAS#	Parameter	Result		RDL	MDL	Units
C-012	Total Organic Carbon	0.31J	J	1.0	0.30	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101619	49MW01	Water	05/08/2013 18:25	05/10/2013 09:05

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/11/2013 17:55	JEM	507146

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	2.5	1.0	0.30	mg/L

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: PTA Data Validation – TAL Metals
GCAL Laboratories, Inc., SDG 213051016

DATE: July 12, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 08, 2013 and May 09, 2013. The aqueous samples were analyzed for total and dissolved target analyte list (TAL) metals using USEPA SW-846 3005A/3010A/6020A and for mercury using SW-846 7470A. A total of four aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW02	213051016-14	48MW2	213051016-18
48MW3	213051016-15	49MW01	213051016-19

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	ICPMS Performance Check Sample
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICPMS Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Duplicate
X		Matrix Spike (MS) and Spike Duplicate (MSD)
	X	Field Duplicate
	X	Serial Dilution
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

E Malarek

Eric Malarek, Chemist

7/12/13

Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG 213051016

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. For TAL metals analysis, aqueous samples are received and stored at cool @4°C±2°C and preserved to pH<2 with nitric acid with a maximum holding time of 180 days for ICPMS metals (28 days for mercury) from collection (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For metals samples collected on 05/08/13 and 05/09/13, the coolers were received by the laboratory (GCAL) on 05/10/13 at 5.6°C and 4.3°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 05/08/13 and 05/09/13 for TAL metals. For ICPMS metals, the aqueous samples were digested on 05/10/13 and 05/11/13 and were analyzed on 05/18/13, 05/21/13, and 05/22/13. For mercury, the aqueous samples were digested on 05/11/13 and analyzed on 05/17/13. The analysis dates for each sample may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each run during which samples are analyzed.

- The instrument performance checks 7-lithium, 89-yttrium, 140-cerium, and 205-thallium met the tuning criteria. No qualification was applied.

III-Initial and Continuing Calibration
Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICPMS:	1- blank (DoD QSM <1/2MRL)	Hg:	1- blank (DoD QSM <1/2MRL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (DoD QSM 90-110%)		ICV (85-115%) (DoD QSM 90-110%)
	LLCCV (80-120% for 6020) (DoD QSM 80-120%)		CCV (85-115%) (DoD QSM 80-120%)
			LLCCV (70-130%) (DoD QSM None Specified)

- For ICPMS metals, the aqueous samples were analyzed on 05/18/13, 05/21/13, and 05/22/13. All ICPMS metals were calibrated using 5 point calibrations with correlation coefficients >0.995. Mercury was analyzed for the aqueous samples on 05/17/13 with a correlation coefficient of 0.9997.

- For ICPMS total metals LLCCV analyzed on 05/18/13 @19:04, calcium (121%) was outside criteria. Total calcium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Samples 49MW02 (213051016-14) and 48MW3 (213051016-15) apply to this LLCCV standard. .

- For ICPMS total metals LLCCV analyzed on 05/18/13 @20:39, vanadium (129%) was outside criteria. Total vanadium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals CCV analyzed on 05/21/13 @09:43, thallium (89%) was outside criteria. Dissolved thallium was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals ICV analyzed on 05/21/13 @14:14, cobalt (111%) was outside criteria. Dissolved cobalt was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals LLCCV analyzed on 05/21/13 @19:03, vanadium (121%) was outside criteria. total vanadium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals CCV analyzed on 05/21/13 @22:28, silver (88%) was outside criteria. Dissolved silver was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals LLCCV analyzed on 05/22/13 @00:03, beryllium (122%) and vanadium (128%) were outside criteria. Dissolved beryllium and vanadium were analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals CCV analyzed on 05/22/13 @00:10, silver (87%) was outside criteria. Dissolved silver was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals CCV analyzed on 05/22/13 @01:53, silver (88%) was outside criteria. Dissolved silver was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- All other ICV/CCV/MRL criteria were met for all metals and runs.

IV-Blanks

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters) and <LOD (i.e. <2MDL) for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples (for this SDG)
05/18/13	ICPMS-Na (Total)	ICB/CCBs	10.2J	51.0	None
05/18/13	ICPMS-V (Total)	ICB/CCBs	0.43J	2.15	None
05/20-21/13	ICPMS-Na (Diss.)	ICB/CCBs	15.8J	79.0	None
05/20-21/13	ICPMS-V (Diss.)	ICB/CCBs	0.17J	0.85	48MW2, 48MW3, 49MW02
05/21-22/13	ICPMS-Se (Diss.)	ICB/CCBs	0.14J	0.70	48MW2
05/21-22/13	ICPMS-Tl (Diss.)	ICB/CCBs	0.086J	0.43	49MW02
05/21-22/13	ICPMS-V (Total)	ICB/CCBs	<LOD	NA	None
05/22/13	ICPMS-Be (Diss.)	ICB/CCBs	<LOD	NA	None
05/22/13	ICPMS-Ag (Diss.)	ICB/CCBs	<LOD	NA	None
05/17/13	Hg (Total)	ICB/CCBs	<LOD	NA	None
05/17/13	Hg (Diss.)	ICB/CCBs	<LOD	NA	None
05/21/13	ICPMS-Al (Total)	RB050813	16.0J	80.0	49MW02
05/21/13	ICPMS-Ba (Total)	RB050813	0.18J	0.90	None
05/21/13	ICPMS-Ca (Total)	RB050813	74.8J	374	None
05/21/13	ICPMS-Cr (Total)	RB050813	0.10J	0.50	49MW02
05/21/13	ICPMS-Co (Total)	RB050813	0.066J	0.33	48MW3
05/21/13	ICPMS-Cu (Total)	RB050813	0.18J	0.90	48MW3
05/21/13	ICPMS-Fe (Total)	RB050813	3.21J	16.1	None
05/21/13	ICPMS-Pb (Total)	RB050813	0.038J	0.19	48MW3, 49MW02
05/21/13	ICPMS-Mg (Total)	RB050813	7.79J	39.0	None
05/21/13	ICPMS-Mn (Total)	RB050813	0.30J	1.50	None
05/21/13	ICPMS-Na (Total)	RB050813	20.4J	102	None
05/21/13	ICPMS-V (Total)	RB050813	0.62J	3.1	48MW2, 48MW3, 49MW01, 49MW02
05/19/13	ICPMS-Ca (Diss.)	RB050813	60.3J	302	None
05/19/13	ICPMS-Cr (Diss.)	RB050813	1.24J	6.2	48MW2, 48MW3, 49MW01, 49MW02
05/19/13	ICPMS-Cu (Diss.)	RB050813	0.72J	3.6	48MW2, 48MW3, 49MW01, 49MW02
05/19/13	ICPMS-Fe (Diss.)	RB050813	6.58J	32.9	48MW2, 48MW3, 49MW01, 49MW02
05/19/13	ICPMS-Pb (Diss.)	RB050813	0.036J	0.18	48MW2, 49MW01, 49MW02
05/19/13	ICPMS-Ni (Diss.)	RB050813	0.51J	2.55	48MW3
05/19/13	ICPMS-K (Diss.)	RB050813	10.4J	52.0	None
05/19/13	ICPMS-Na (Diss.)	RB050813	21.3J	107	None
05/19/13	ICPMS-Tl (Diss.)	RB050813	0.080J	0.40	49MW02
05/19/13	ICPMS-Zn (Diss.)	RB050813	1.85J	9.25	48MW2, 48MW3, 49MW01, 49MW02
05/16/13	Hg (Total)	RB050813	<LOD	NA	None
05/16/13	Hg (Diss.)	RB050813	<LOD	NA	None
05/18/13	ICPMS-Al (Total)	MB1190767	2.72J	13.6	None
05/18/13	ICPMS-Cr (Total)	MB1190767	0.14J	0.70	49MW02
05/18/13	ICPMS-Cu (Total)	MB1190767	0.25J	1.25	48MW3, 49MW02
05/18/13	ICPMS-V (Total)	MB1190767	0.27J	1.35	49MW02
05/21/13	ICPMS-Al (Diss)	MB1190610	4.10J	20.5	48MW2, 48MW3, 49MW01, 49MW02
05/21/13	ICPMS-Cu (Diss)	MB1190610	0.13J	0.65	48MW2, 48MW3, 49MW01
05/21/13	ICPMS-Fe (Diss)	MB1190610	5.75J	28.8	48MW2, 48MW3, 49MW01, 49MW02
05/17/13	Hg (Total)	MB1190612	<LOD	NA	None

J = Estimated Value <MRL and >LOD.
LOD = Limit of Detection
MRL = Method Reporting Limit
NA = Not Applicable
SDG= Sample Delivery Group

V-ICPMS Interference Check Sample (ICS)

The ICPMS interference check sample (ICS) verifies inter-element and background correction factors. ICPMS Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met for all other runs. No qualifiers were applied.

VI-Laboratory Control Samples (LCS)
The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. The DoD QSM aqueous LCS criteria are specified in Table G-18 of the DoD QSM (DoD, 2010) and are 80-120% and RPD≤20% for TAL metals. For non-TAL metals, the laboratory control limits should be used.

- Sample LCS1190768 was used as aqueous LCS for ICPMS total metals analysis dated 05/18/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this LCS.

- Sample LCS1190611 was used as aqueous LCS for ICPMS dissolved metals analysis dated 05/21/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this LCS.

- Sample LCS1190613 was used as aqueous LCS for mercury analysis dated 05/17/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this LCS.

VII-Laboratory Duplicate
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. The DoD QSM aqueous limits for metals are 20% RPD for ICPMS metals and mercury.

- No aqueous laboratory duplicate was analyzed with this SDG; therefore, it was not evaluated. See Section VIII for lab accuracy and precision statements using MS/MSD and Section VI for lab accuracy using LCS.

VIII-Matrix Spike (MS) and Spike Duplicate (MSD)
MS and MSD are generated to determine long-term accuracy and precision of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. MS/MSD recoveries and relative percent differences between MS recoveries should be within the specified limits. The DoD MS and MSD aqueous recovery limits use the LCS criteria specified in Table G-18 of the DoD QSM (DoD, 2010) and are 80-120% and RPD≤20% for TAL metals. Post digestion spikes aqueous and solid limits are 75-125% for ICPMS metals. For non-TAL metals, the laboratory control limits should be used.

- Sample 48MW3 (213051016-15) was used as the aqueous MS/MSD for the ICPMS total metals analysis on 05/18/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this MS/MSD.

- Sample 48MW3 (213051016-15) was used as the aqueous MS/MSD for the ICPMS dissolved metals analysis on 05/21-22/13. Barium (157%, 148%), calcium (449%, 357%), and magnesium (239%, 204%) were outside criteria. All post digestion spikes were within criteria. The sample concentration was >4 times the spike added for calcium and magnesium; therefore, no qualifiers were applied based upon this outlier. Barium was qualified estimated bias high "K" for detections and no qualification for non-detections based upon the high recovery. For all other target metals, all criteria were met. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this MS/MSD.

- Sample 48MW3 (213051016-15) was used as the aqueous MS/MSD for the total and dissolved mercury analysis on 05/17/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- No site field groundwater sample duplicate pair was analyzed for metals analysis in this SDG; therefore, was not evaluated.

X-Serial Dilution
A serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 100 above MDL for ICPMS and 50 above MDL for mercury.

- The serial dilution for ICPMS total metals was analyzed on 05/18-21/13 using aqueous sample 48MW3 (213051016-15). Aluminum (11%), arsenic (100%), cobalt (24%), copper (32%), lead (64%), thallium (373%), and zinc (100%) were outside of criteria limits. All other metals were within of criteria limits. Sample concentrations were <100 times MDL for aluminum, arsenic, cobalt, copper, lead, thallium, and zinc; therefore, no qualifiers were applied based upon these outliers. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this serial dilution.

- The serial dilution for total and dissolved mercury was analyzed on 05/17/13 using aqueous sample 48MW3 (213051016-15). All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this serial dilution.

XI-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any value >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, "J."

- The total and dissolved fractions were compared. The metals data results for samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) are presented in **Table 3**. Data qualification was applied based upon professional judgment. Generally, if the concentrations are greater than the MRL and the dissolved concentration is greater than its total concentration by >10%D, then both results have been flagged as estimated with a "J."

Table 3 Total/Dissolved Summary

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
49MW02	Aluminum	20	16.4J	11.0J	NA	None
49MW02	Antimony	1.00	3.53	3.84	8.1	None
49MW02	Arsenic	1.00	1.56	1.50	NA	None
49MW02	Barium	10	129	134	NA	None
49MW02	Beryllium	1.00	0.10U	0.10U	NA	None
49MW02	Cadmium	1.00	0.10U	0.10U	NA	None
49MW02	Calcium	1000	56100	56800	1.2	None
49MW02	Chromium	1.00	0.47J	0.53J	11.3	J
49MW02	Cobalt	1.00	1.42	2.02	29.7	J
49MW02	Copper	1.00	0.98J	0.76J	NA	None
49MW02	Iron	100	17.9J	16.9J	NA	None
49MW02	Lead	1.00	0.034J	0.035J	2.9	None
49MW02	Magnesium	1000	34800	33900	NA	None
49MW02	Manganese	5.00	36.4	35.7	NA	None
49MW02	Nickel	1.00	40.1	35.4	NA	None
49MW02	Potassium	100	3010	2950	NA	None
49MW02	Selenium	1.00	10.2	11.7	12.8	J
49MW02	Silver	1.00	0.060U	0.060U	NA	None
49MW02	Sodium	1000	8280	7760	NA	None
49MW02	Thallium	1.00	0.16J	0.14J	NA	None
49MW02	Vanadium	1.00	1.10	0.40J	NA	None
49MW02	Zinc	20	5.00U	3.74J	NA	None
49MW02	Mercury	0.00020	0.00020U	0.00020U	NA	None
48MW3	Aluminum	20	86.0	3.49J	NA	None
48MW3	Antimony	1.00	1.00U	1.00U	NA	None
48MW3	Arsenic	1.00	0.25J	0.13J	NA	None
48MW3	Barium	10	128	110	NA	None
48MW3	Beryllium	1.00	0.10U	0.10U	NA	None
48MW3	Cadmium	1.00	0.10U	0.10U	NA	None
48MW3	Calcium	1000	94400	76000	NA	None
48MW3	Chromium	1.00	4.04	1.17	NA	None
48MW3	Cobalt	1.00	0.25J	0.077J	NA	None
48MW3	Copper	1.00	0.85J	0.41J	NA	None
48MW3	Iron	100	160	23.4J	NA	None
48MW3	Lead	1.00	0.14J	0.10U	NA	None
48MW3	Magnesium	1000	45400	35100	NA	None
48MW3	Manganese	5.00	4.95J	0.33J	NA	None
48MW3	Nickel	1.00	2.88	1.79	NA	None
48MW3	Potassium	100	1410	1130	NA	None
48MW3	Selenium	1.00	1.90	2.62	27.5	J
48MW3	Silver	1.00	0.060U	0.060U	NA	None
48MW3	Sodium	1000	1700	1410	NA	None
48MW3	Thallium	1.00	0.11J	0.20U	NA	None
48MW3	Vanadium	1.00	1.35	0.42J	NA	None
48MW3	Zinc	20	5.06J	2.43J	NA	None
48MW3	Mercury	0.00020	0.00020U	0.00020U	NA	None

Table 3 Total/Dissolved Summary, Continued

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
48MW2	Aluminum	20	726	2.23J	NA	None
48MW2	Antimony	1.00	1.00U	1.00U	NA	None
48MW2	Arsenic	1.00	0.39J	0.095J	NA	None
48MW2	Barium	10	408	401	NA	None
48MW2	Beryllium	1.00	0.058J	0.10U	NA	None
48MW2	Cadmium	1.00	0.10U	0.10U	NA	None
48MW2	Calcium	1000	72200	59900	NA	None
48MW2	Chromium	1.00	29.8	1.05	NA	None
48MW2	Cobalt	1.00	1.24	0.23J	NA	None
48MW2	Copper	1.00	2.61	0.50J	NA	None
48MW2	Iron	100	988	20.1J	NA	None
48MW2	Lead	1.00	0.30J	0.034J	NA	None
48MW2	Magnesium	1000	36600	28300	NA	None
48MW2	Manganese	5.00	23.9	3.32J	NA	None
48MW2	Nickel	1.00	19.8	8.86	NA	None
48MW2	Potassium	100	1680	1430	NA	None
48MW2	Selenium	1.00	0.30J	0.43J	30.2	J
48MW2	Silver	1.00	0.060U	0.060U	NA	None
48MW2	Sodium	1000	3320	3010	NA	None
48MW2	Thallium	1.00	0.12J	0.20U	NA	None
48MW2	Vanadium	1.00	2.53	0.11J	NA	None
48MW2	Zinc	20	3.60J	2.45J	NA	None
48MW2	Mercury	0.00020	0.00020U	0.00020U	NA	None
49MW01	Aluminum	20	1050	5.02J	NA	None
49MW01	Antimony	1.00	1.00U	1.00U	NA	None
49MW01	Arsenic	1.00	0.53J	0.30U	NA	None
49MW01	Barium	10	48.4	43.6	NA	None
49MW01	Beryllium	1.00	0.052J	0.10U	NA	None
49MW01	Cadmium	1.00	0.10U	0.10U	NA	None
49MW01	Calcium	1000	42600	32700	NA	None
49MW01	Chromium	1.00	11.8	1.22	NA	None
49MW01	Cobalt	1.00	3.15	0.12J	NA	None
49MW01	Copper	1.00	8.58	0.20J	NA	None
49MW01	Iron	100	2540	12.3J	NA	None
49MW01	Lead	1.00	0.68J	0.029J	NA	None
49MW01	Magnesium	1000	39900	32500	NA	None
49MW01	Manganese	5.00	67.8	2.87J	NA	None
49MW01	Nickel	1.00	8.34	2.69	NA	None
49MW01	Potassium	100	1670	1410	NA	None
49MW01	Selenium	1.00	0.20J	0.40U	NA	None
49MW01	Silver	1.00	0.060U	0.060U	NA	None
49MW01	Sodium	1000	673J	649J	NA	None
49MW01	Thallium	1.00	0.20U	0.20U	NA	None
49MW01	Vanadium	1.00	2.23	0.30U	NA	None
49MW01	Zinc	20	1.75J	1.90J	7.9	None
49MW01	Mercury	0.00020	0.00020U	0.00020U	NA	None

J = Estimated value
U = Value Non-detect as <MRL
NA = Not Applicable

Sample: 49MW02 (213051016-14), Cobalt

Conc. (µg/L) = (conc. µg/L) * (Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (1.4157 µg/L) * (50 mL) * (1) / (50 mL) = 1.42 µg/L

Reported concentration = 1.42 µg/L
%D = 0.0%
Values were within 10% difference.

Sample: LCS1190613, Mercury

Conc. (µg/L) = (conc. µg/L) * (Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (5.1286 µg/L) * (20 mL) * (1) / (20 mL) = 5.1 µg/L

Reported concentration = 5.1 µg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL
Sample ID 49MW02
Lab Code: LA024
Case No.:
Contract:
Matrix: (soil / water) Water
SAS No.:
SDG No.: 213051016
Level: (low / med)
% Solids:
Lab Sample ID: 21305101614
Date Received: 05/10/13
Time: 0905
Date Collected: 05/09/13
Time: 1000

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	16.4	ug/L	J	B 1.66	6.00	20.0	SW-846 6020A	MS	05/18/13 2017
Antimony	3.53	ug/L		0.48	1.00	1.00	SW-846 6020A	MS	05/18/13 2017
Arsenic	1.56	ug/L		0.094	0.30	1.00	SW-846 6020A	MS	05/18/13 2017
Barium	129	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/18/13 2010
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/18/13 2017
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/18/13 2017
Calcium	56100	ug/L		J 434	1000	1000	SW-846 6020A	MS	05/18/13 2010
Chromium	0.47	ug/L	J	B 0.030	0.10	1.00	SW-846 6020A	MS	05/18/13 2017
Cobalt	1.42	ug/L		J 0.053	0.20	1.00	SW-846 6020A	MS	05/18/13 2017
Copper	0.98	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A	MS	05/18/13 2017
Iron	17.9	ug/L	J	J 3.04	10.0	100	SW-846 6020A	MS	05/18/13 2017
Lead	0.034	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A	MS	05/18/13 2017
Magnesium	34800	ug/L		52.2	200	1000	SW-846 6020A	MS	05/18/13 2010
Manganese	36.4	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/18/13 2017
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/17/13 2107
Nickel	40.1	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/18/13 2017
Potassium	3010	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/18/13 2017
Selenium	10.2	ug/L		J 0.11	0.40	1.00	SW-846 6020A	MS	05/18/13 2017
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/18/13 2017
Sodium	8280	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/18/13 2017
Thallium	0.16	ug/L	J	J 0.060	0.20	1.00	SW-846 6020A	MS	05/18/13 2017
Vanadium	1.10	ug/L		B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 2108
Zinc	5.00	ug/L	U	1.31	5.00	20.0	SW-846 6020A	MS	05/18/13 2017

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW02

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101614

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/09/13 | Time: 1000

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	11.0	ug/L	J	B 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/21/13 2319
Antimony (Di	3.84	ug/L		0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Arsenic (Diss	1.50	ug/L		0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Barium (Diss	134	ug/L		K 0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/21/13 2206
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 1532
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Calcium (Dis	56800	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/21/13 2206
Chromium (D	0.53	ug/L	J	B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Cobalt (Diss	2.02	ug/L		J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Copper (Diss	0.76	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Iron (Dissolv	16.9	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/21/13 2319
Lead (Dissol	0.035	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Magnesium (	33900	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/21/13 2206
Manganese (	35.7	ug/L		0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/17/13 2121
Nickel (Disso	35.4	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Potassium (	2950	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/21/13 2319
Selenium (Di	11.7	ug/L		J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/22/13 1532
Sodium (Diss	7760	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/21/13 2319
Thallium (Dis	0.14	ug/L	J	B 0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Vanadium (D	0.40	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2319
Zinc (Dissolv	3.74	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/21/13 2319

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW3

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101615

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/09/13 | Time: 1135

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	86.0	ug/L		1.66	6.00	20.0	SW-846 6020A	MS	05/18/13 2054
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/18/13 2054
Arsenic	0.25	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A	MS	05/18/13 2054
Barium	128	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/18/13 2024
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/18/13 2054
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/18/13 2054
Calcium	94400	ug/L		J 434	1000	1000	SW-846 6020A	MS	05/18/13 2024
Chromium	4.04	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/18/13 2054
Cobalt	0.25	ug/L	J	B 0.053	0.20	1.00	SW-846 6020A	MS	05/18/13 2054
Copper	0.85	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A	MS	05/18/13 2054
Iron	160	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/18/13 2054
Lead	0.14	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A	MS	05/18/13 2054
Magnesium	45400	ug/L		52.2	200	1000	SW-846 6020A	MS	05/18/13 2024
Manganese	4.95	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A	MS	05/18/13 2054
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/17/13 2056
Nickel	2.88	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/18/13 2054
Potassium	1410	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/18/13 2054
Selenium	1.90	ug/L		J 0.11	0.40	1.00	SW-846 6020A	MS	05/18/13 2054
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/18/13 2054
Sodium	1700	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/18/13 2054
Thallium	0.11	ug/L	J	J 0.060	0.20	1.00	SW-846 6020A	MS	05/18/13 2054
Vanadium	1.35	ug/L		B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 2115
Zinc	5.06	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/18/13 2054

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW3

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101615

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/09/13 | Time: 1135

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	3.49	ug/L	J	B 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/21/13 2326
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Arsenic (Diss	0.13	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Barium (Diss	110	ug/L		K 0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/21/13 2243
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 1539
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Calcium (Dis	76000	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/21/13 2243
Chromium (D	1.17	ug/L		B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Cobalt (Diss	0.077	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Copper (Diss	0.41	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Iron (Dissolv	23.4	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/21/13 2326
Lead (Dissol	0.10	ug/L	U	0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Magnesium (	35100	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/21/13 2243
Manganese (	0.33	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/17/13 2123
Nickel (Disso	1.79	ug/L		B 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Potassium (	1130	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/21/13 2326
Selenium (Di	2.62	ug/L		J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/22/13 1539
Sodium (Diss	1410	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/21/13 2326
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Vanadium (D	0.42	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2326
Zinc (Dissolv	2.43	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/21/13 2326

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW2

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101618

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/09/13 | Time: 1345

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	726	ug/L		1.66	6.00	20.0	SW-846 6020A	MS	05/18/13 2228
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/18/13 2228
Arsenic	0.39	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A	MS	05/18/13 2228
Barium	408	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/18/13 2159
Beryllium	0.058	ug/L	J	J 0.049	0.10	1.00	SW-846 6020A	MS	05/18/13 2228
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/18/13 2228
Calcium	72200	ug/L		434	1000	1000	SW-846 6020A	MS	05/18/13 2159
Chromium	29.8	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/18/13 2228
Cobalt	1.24	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/18/13 2228
Copper	2.61	ug/L		0.093	0.30	1.00	SW-846 6020A	MS	05/18/13 2228
Iron	988	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/18/13 2228
Lead	0.30	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/18/13 2228
Magnesium	36600	ug/L		52.2	200	1000	SW-846 6020A	MS	05/18/13 2159
Manganese	23.9	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/18/13 2228
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/17/13 2109
Nickel	19.8	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/18/13 2228
Potassium	1680	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/18/13 2228
Selenium	0.30	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/18/13 2228
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/18/13 2228
Sodium	3320	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/18/13 2228
Thallium	0.12	ug/L	J	J 0.060	0.20	1.00	SW-846 6020A	MS	05/18/13 2228
Vanadium	2.53	ug/L		B 0.085	0.30	1.00	SW-846 6020A	MS	05/18/13 2228
Zinc	3.60	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/18/13 2228

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW2

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101618

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/09/13 | Time: 1345

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	2.23	ug/L	J	B 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/21/13 2348
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Arsenic (Diss	0.095	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Barium (Diss	401	ug/L		K 0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/21/13 2305
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 1601
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Calcium (Dis	59900	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/21/13 2305
Chromium (D	1.05	ug/L		B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Cobalt (Diss	0.23	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Copper (Diss	0.50	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Iron (Dissolv	20.1	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/21/13 2348
Lead (Dissol	0.034	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Magnesium (	28300	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/21/13 2305
Manganese (	3.32	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/17/13 2132
Nickel (Disso	8.86	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Potassium (	1430	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/21/13 2348
Selenium (Di	0.43	ug/L	J	B 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/22/13 1601
Sodium (Diss	3010	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/21/13 2348
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Vanadium (D	0.11	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 2348
Zinc (Dissolv	2.45	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/21/13 2348

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW01

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101619

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/08/13 | Time: 1825

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	1050	ug/L		1.66	6.00	20.0	SW-846 6020A	MS	05/18/13 2243
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/18/13 2243
Arsenic	0.53	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A	MS	05/18/13 2243
Barium	48.4	ug/L		0.077	0.30	1.00	SW-846 6020A	MS	05/18/13 2243
Beryllium	0.052	ug/L	J	J 0.049	0.10	1.00	SW-846 6020A	MS	05/18/13 2243
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/18/13 2243
Calcium	42600	ug/L		434	1000	1000	SW-846 6020A	MS	05/18/13 2236
Chromium	11.8	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/18/13 2243
Cobalt	3.15	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/18/13 2243
Copper	8.58	ug/L		0.093	0.30	1.00	SW-846 6020A	MS	05/18/13 2243
Iron	2540	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/18/13 2243
Lead	0.68	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/18/13 2243
Magnesium	39900	ug/L		52.2	200	1000	SW-846 6020A	MS	05/18/13 2236
Manganese	67.8	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/18/13 2243
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/17/13 2110
Nickel	8.34	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/18/13 2243
Potassium	1670	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/18/13 2243
Selenium	0.20	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/18/13 2243
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/18/13 2243
Sodium	673	ug/L	J	J 8.00	30.0	1000	SW-846 6020A	MS	05/18/13 2243
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/18/13 2243
Vanadium	2.23	ug/L		B 0.085	0.30	1.00	SW-846 6020A	MS	05/18/13 2243
Zinc	1.75	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/18/13 2243

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW01

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213051016

Level: (low / med) | % Solids: | Lab Sample ID: 21305101619

Date Received: 05/10/13 | Time: 0905 | Date Collected: 05/08/13 | Time: 1825

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	5.02	ug/L	J	B 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/22/13 0025
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Barium (Diss	43.6	ug/L		K 0.077	0.30	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 1609
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Calcium (Dis	32700	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/21/13 2312
Chromium (D	1.22	ug/L		B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Cobalt (Diss	0.12	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Copper (Diss	0.20	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Iron (Dissolv	12.3	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/22/13 0025
Lead (Dissol	0.029	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Magnesium (	32500	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/21/13 2312
Manganese (	2.87	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/17/13 2134
Nickel (Disso	2.69	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Potassium (	1410	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/22/13 0025
Selenium (Di	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/22/13 1609
Sodium (Diss	649	ug/L	J	J 8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/22/13 0025
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Vanadium (D	0.30	ug/L	U	0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/22/13 0025
Zinc (Dissolv	1.90	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/22/13 0025

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: RFAAP Data Validation – Methane, Ethane, and Ethene
GCAL Laboratories, Inc., SDG 213051016

DATE: July 11, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013, May 08, 2013, and May 09, 2013. The samples were analyzed for methane, ethane, and ethene using laboratory method RSK-175. A total of five aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW03	213051016-13	48MW2	213051016-18
49MW02	213051016-14	49MW01	213051016-19
48MW3	213051016-15		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/11/13
Date

RFAAP VALIDATION REPORT
DISSOLVED GASES REVIEW
SDG 213051016

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For methane, ethane, and ethene, aqueous samples are cooled @ 4°C ± 2°C; the maximum holding time is 7 days un-preserved and 14 days preserved to pH<2 with HCl from sample collection to analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For dissolved gases samples collected on 05/07/13, 05/08/13, and 05/09/13, the coolers were received by the laboratory (GCAL) on 05/10/13 at 5.6°C and 4.3°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 05/07/13. They were prepped and analyzed for the dissolved gases on 05/20/13. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the calibration factors on which the quantitations are based. If linear regression is used for quantification, the correlation coefficient must be ≥0.995 for linearity fit (DoD QSM). If calibration factor method is used, the %RSD should be ≤20% (DoD QSM). All ICVs should be within 80-120% recovery limits (DoD QSM).

- For initial calibration performed on 03/04/13 on instrument GCV8, methane, ethane, and ethene were calibrated using calibration factors. All criteria were met. No qualifiers were applied. Samples 49MW03 (213051016-13), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this initial calibration.

III-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis. If calibration factor method is used, the percent difference (%D) should all fall within the control criteria of ≤20% (DoD QSM). All CCVs should be within 80-120% recovery limits (DoD QSM).

- For initial calibration verification for methane, ethane, and ethene performed on 03/04/13 @17:20 on instrument GCV8, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. No groundwater samples were reported using this initial calibration verification.

- For continuing calibration for methane, ethane, and ethene performed on 05/20/13 @12:15 on instrument GCT GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). No groundwater samples were reported using this continuing calibration.

- For continuing calibration for methane, ethane, and ethene performed on 05/20/13 @15:06 on instrument GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. Samples 49MW03 (213051016-13), 49MW02 (213051016-14), and 48MW3 (213051016-15) apply to this continuing calibration.

- For continuing calibration for methane, ethane, and ethene performed on 05/20/13 @16:28 on instrument GCT GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 48MW2 (213051016-18) and 49MW01 (213051016-19) apply to this continuing calibration.

- For continuing calibration for methane, ethane, and ethene performed on 05/20/13 @17:09 on instrument GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. No groundwater samples were reported using this continuing calibration.

IV-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. The rinse blank RB050813 (213050904-03) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples (For this SDG)
05/20/13	MB1193374	All target <½MRL	NA	NA	None
05/20/13	RB050813	All target <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

V-System Monitoring Compound (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD aqueous surrogate recovery limits are specified in the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. .

Aqueous Criteria: Propene (43-143%)

- All criteria were met. No qualifiers were applied.

VI-Laboratory Control Sample

Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. DoD LCS aqueous recovery limits are specified in the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. Percent recoveries (%Rs) should be within the specified control limits.

- Sample LCS1193375 was used as LCS for methane, ethane, and ethene analysis performed on 05/20/13. All criteria were met. No qualifiers were applied. Samples 49MW03 (213051016-13), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM MS and MSD recovery limits use the LCS criteria, which currently is the use of in-house specified limits (DoD, 2010).

- Sample 48MW3 (213051016-15) was used as MS/MSD for methane, ethane, and ethene analysis performed on 05/20/13. All criteria were met. No qualifiers were applied. Samples 49MW03 (213051016-13), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established in the Groundwater Monitored Natural Attenuation (GWMNA) QAPP at 50% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213051016-13) and 49TM01 (213050904-01) was analyzed for methane, ethane, and ethene analysis in this SDG. All target analytes were non-detect for the duplicate pair. All criteria were met. No qualifiers were applied.

IX-Quantitation Verification and Data Review
The accuracy of analytical results was verified and data results reviewed. The following was determined:

- The percent difference (%D) between the calculated and the reported values should be within 10% through the calculation from the raw data provided. The calculation verification was confirmed within 10% difference.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J".

- The extraction sample volume is already accounted in the conversion of the ICAL standards from µl/L to µg/L. Both the ICAL standards and the samples are prepared in the same manner. Therefore, concentration of the sample calculated is based on the average response factor and the area counts of the analyte only.

Sample: 49MW02 (213051016-14), methane

Conc. µg/L = (Ax * DF) / (CF)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
CF = Average relative calibration factor for compound being measured (from ICAL)
DF = Dilution factor

Conc. µg/L = (788641 * 1) / (562859) = 1.40 µg/L
Reported Value = 1.40 µg/L

% Difference = 0.0%
Values were within 10% difference

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994).

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507632

Sample ID: 49MW03
Contract:
SAS No.: SDG No.: 213051016
Lab Sample ID: 21305101613
Date Collected: 05/07/13 Time: 1455
Date Received: 05/10/13
Date Extracted:
Date Analyzed: 05/20/13 Time: 1547
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130520/v8024

CONCENTRATION UNITS: *ug/L*

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507632

Sample ID: 49MW02
Contract:
SAS No.: SDG No.: 213051016
Lab Sample ID: 21305101614
Date Collected: 05/09/13 Time: 1000
Date Received: 05/10/13
Date Extracted:
Date Analyzed: 05/20/13 Time: 1552
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130520/v8025

CONCENTRATION UNITS: *ug/L*

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.40	J	J 0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507632

Sample ID: 48MW3
Contract:
SAS No.: SDG No.: 213051016
Lab Sample ID: 21305101615
Date Collected: 05/09/13 Time: 1135
Date Received: 05/10/13
Date Extracted:
Date Analyzed: 05/20/13 Time: 1601
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130520/v8026

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL

Lab Code: LA024 Case No.:

Matrix: Water

Sample wt/vol: 5 Units: mL

Level: (low/med)

% Moisture: decanted: (Y/N)

GC Column: GS-Q 30 ID: .53 (mm)

Concentrated Extract Volume: 5000 (µL)

Soil Aliquot Volume: (µL)

Injection Volume: 1 (µL)

GPC Cleanup: (Y/N) N pH:

Prep Batch: Analytical Batch: 507632

Sample ID: 48MW2

Contract:

SAS No.: SDG No.: 213051016

Lab Sample ID: 21305101618

Date Collected: 05/09/13 Time: 1345

Date Received: 05/10/13

Date Extracted:

Date Analyzed: 05/20/13 Time: 1639

Dilution Factor: 1 Analyst: BMR

Prep Method:

Analytical Method: RSK-175

Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A

Lab File ID: 2130520/v8030

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL

Lab Code: LA024 Case No.:

Matrix: Water

Sample wt/vol: 5 Units: mL

Level: (low/med)

% Moisture: decanted: (Y/N)

GC Column: GS-Q 30 ID: .53 (mm)

Concentrated Extract Volume: 5000 (µL)

Soil Aliquot Volume: (µL)

Injection Volume: 1 (µL)

GPC Cleanup: (Y/N) N pH:

Prep Batch: Analytical Batch: 507632

CONCENTRATION UNITS: ug/L

Sample ID: 49MW01

Contract:

SAS No.: SDG No.: 213051016

Lab Sample ID: 21305101619

Date Collected: 05/08/13 Time: 1825

Date Received: 05/10/13

Date Extracted:

Date Analyzed: 05/20/13 Time: 1646

Dilution Factor: 1 Analyst: BMR

Prep Method:

Analytical Method: RSK-175

Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A

Lab File ID: 2130520/v8031

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Chloride, Nitrate, and Sulfate
GCAL Laboratories, Inc., SDG 213051016

DATE: July 11, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 08, 2013 and May 09, 2013. Samples were analyzed for the anions chloride, nitrate, and sulfate using USEPA 300.0. A total of four aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW02	213051016-14	48MW2	213051016-18
48MW3	213051016-15	49MW01	213051016-19

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), and method-specific criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial and Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Laboratory Duplicate Sample
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate Sample
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/11/13
Date

RFAAP VALIDATION REPORT
ANIONS REVIEW
SDG 213051016

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool 4°C±2°C and 28 days for sulfate and chloride and Cool to 4°C±2°C with H_2SO_4 to pH<2 and 2 days for nitrate. The dates and times were compared between the sample collection and laboratory analysis (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For chloride, sulfate, and nitrate samples collected on 05/08/13 and 05/09/13, the coolers were received by the laboratory (GCAL) on 05/10/13 at 5.6°C and 4.3°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: Samples were collected on 05/08/13 and 05/09/13. The samples were prepped and analyzed on 05/10/13 for chloride and nitrate analysis and 05/10/13 and 05/11/13 for sulfate analysis. Sample collection dates may be found on the attached form 1s. All holding time criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration
Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

Anions: 1 – blank
5 – standards ($r \geq 0.995$ or $r^2 \geq 0.99$)
ICV/CCV (90-110%)
Method Reporting Limit (MRL) (75-125%)

- Chloride, sulfate, and nitrate analysis was calibrated on 03/27/13 using linear equation techniques. All correlation coefficients were ≥0.995 for chloride, sulfate, and nitrate. All ICV/CCV/MRL criteria were met for all anions and runs. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to these initial and continuing calibrations.

III-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) and <2MDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters, or 5 times (5x) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/L	Action Level mg/L	B qualified samples (for this SDG)
05/10/13	Chloride	ICB/CCBs	<LOD	NA	None
05/10/13	Sulfate	ICB/CCBs	<LOD	NA	None
05/10/13	Nitrate	ICB/CCBs	<LOD	NA	None
05/11/13	Sulfate	ICB/CCBs	<LOD	NA	None
05/10/13	Chloride	MB1190681	<½MRL	NA	None
05/10/13	Sulfate	MB1190681	<½MRL	NA	None
05/10/13	Nitrate	MB1190681	<½MRL	NA	None
05/09/13	Chloride	RB050813	0.040J	0.20	None
05/09/13	Sulfate	RB050813	0.047J	0.24	None
05/09/13	Nitrate	RB050813	<½MRL	NA	None

J = Estimated Value >MDL and <MRL
LOD = Limit of Detection
MRL = Method Reporting Limit
MDL = Method Detection Limit
NA = Not Applicable

IV-Laboratory Control Sample

The laboratory control sample (LCS) serve as a monitor of the overall performance of each step during the analysis, including the sample preparation. LCS are generated to determine long-term accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Per DoD QSM, all LCS results must fall within the specified control limits:

Anions: 80-120% (DOD QSM = 80-120%)

- Sample LCS1190682 was used as the aqueous LCS for chloride, sulfate, and nitrate analysis on 05/10/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this LCS.

V-Duplicate Sample Analysis

Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is performed to generate data in order to determine the long-term precision of the analytical method on various matrices. Per DoD QSM, RPDs must be within established control limits (≤25%RPD).

- No site lab duplicate was performed with this SDG; therefore, was not evaluated.

VI-Matrix Spike and Matrix Spike Duplicate
Matrix spikes (MSs) and MSDs are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples or preparatory batch of similar matrix. Per DoD QSM, MS/MSD recoveries and RPDs should be within the specified limits:

Anions: 75-125%; RPD≤25% (DOD QSM = 80-120%; RPD≤20%)

- Sample 48MW3 (213051016-15) was used as the aqueous MS/MSD for chloride, sulfate, and nitrate analysis on 05/10-11/13. All criteria were met. No qualifiers were applied. Samples 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), and 49MW01 (213051016-19) apply to this MS/MSD.

VII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- No site field groundwater sample duplicate pair was analyzed for chloride, sulfate, and nitrate analysis in this SDG; therefore, was not evaluated.

VIII-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 49MW02 (213051016-14), sulfate

$Y = mX + b$

Y = Sample Area
m = slope of curve
X = Concentration (mg/L)
b = Y-intercept
DF = Dilution Factor

Given:
m = 0.2076
b = 0.0
Y = Area = 1.116
DF = 10

X = 5.38 mg/L * DF = 5.38 mg/L * 10 = 53.8 mg/L

Reported concentration = 53.8 mg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101614	49MW02	Water	05/09/2013 10:00	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 17:05	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	0.028J J	0.500	0.020	mg/L

213051016 260

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101614	49MW02	Water	05/09/2013 10:00	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	05/10/2013 18:49	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	12.5	1.00	0.100	mg/L
14808-79-8	Sulfate	53.8	2.00	0.200	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101615	48MW3	Water	05/09/2013 11:35	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	05/10/2013 19:07	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	3.08	0.500	0.050	mg/L
14797-55-8	Nitrate	6.21	2.50	0.100	mg/L

213051016 263

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101615	48MW3	Water	05/09/2013 11:35	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	05/11/2013 08:49	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	27.3	2.00	0.200	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101618	48MW2	Water	05/09/2013 13:45	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 18:14	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	4.98	0.100	0.010	mg/L
14797-55-8	Nitrate	1.06	0.500	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101618	48MW2	Water	05/09/2013 13:45	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	05/10/2013 20:34	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	29.6	1.00	0.100	mg/L

213051016 273

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101619	49MW01	Water	05/08/2013 18:25	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 16:13	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	0.242J J	0.500	0.020	mg/L
14808-79-8	Sulfate	0.240	0.200	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305101619	49MW01	Water	05/08/2013 18:25	05/10/2013 09:05

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/10/2013 18:32	JEM	507089

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	5.21	0.200	0.020	mg/L

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
GCAL Laboratories, Inc., SDG 213050904

DATE: July 8, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013. The samples were analyzed for volatile organic compounds (VOCs) using USEPA SW846 method 5030B/8260B for aqueous matrices. A total of one aqueous sample was validated. The sample Id is:

Field Sample ID	Lab Sample ID
49MW03	213050904-06

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
X		Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample and Laboratory Control Sample Duplicate
	X	Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/8/13
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG 213050904

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples, VOC compounds are shipped cooled (@4°C ± 2°C) and preserved pH≤2 HCl with a maximum holding time of 14 days (7 days if no HCl) from sample collection to determinative analysis (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/07/13, the coolers were received by the laboratory (GCAL) on 05/09/13 at 4.5°C and 5.4°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: For the sample collected on 05/07/13, the aqueous VOCs were prepped and analyzed on 05/30/13. Sample collection and analysis dates may be found on the attached form 1s. The sample was analyzed 9 days beyond prescribed holding times due to lab error. All detections were qualified estimated bias low ""L" for detections and "UL" for non-detections based upon this outlier.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the relative response factors on which the quantitations are based. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99.

- For initial calibration performed on 05/28/13 on instrument MSV12.i, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No qualifiers were applied. Sample 49MW03 (213050904-06) was analyzed using this initial calibration.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. The initial calibration verification should be between 80-120% recoveries.

- For initial calibration verification for the VOC analysis performed on 05/28/13 @17:32 on instrument MSV12.i, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples reported were analyzed using this initial calibration verification; therefore, no qualifiers were applied based upon this outlier.

- For continuing calibration for the VOC analysis performed on 05/30/13 @08:16 on instrument MSV12.i, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Sample GW082312R1 (D3943-07) was analyzed using this continuing calibration.

V-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, toluene, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213051016-10) applies to all groundwater samples collected in this SDG. Trip blank sample TRIP BLANK (213051016-20) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples (for this SDG)
05/30/13	MB1196706	All target <½MRL	NA	NA	None
05/11/13	RB050813	Acetone	3.96J	39.6	None
05/12/13	TRIP BLANK	All target <½MRL	NA	NA	None

J = Estimated Value <LOD
NA = Not Applicable
MRL = Method Reporting Limit
LOD = Level of Detection

VI-Laboratory Control Sample and Laboratory Control Sample Duplicate
Data for laboratory control samples (LCS) and LCSD are evaluated to determine long-term precision and accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table G-4 of the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. The LCS/LCSD RPD should be ≤30%.

- Samples LCS1196707 and LCS1196708 were used as the aqueous LCS/LCSD for the VOC analysis on 05/30/13. All criteria were met. No qualifiers were applied. Sample 49MW03 (213050904-06) applies to this LCS/LCSD.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table G-4 of the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. The MS/MSD RPD should be ≤30%.

- No project specific aqueous MS/MSD was analyzed for the VOCs analysis on 05/30/13; therefore, was not evaluated.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table G-3 of the DoD QSM (DoD, 2010). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria: 4-Bromofluorobenzene (75-120%) (DoD QSM = 75-120%)
Dibromofluoromethane (85-115%) (DoD QSM = 85-115%)
Toluene-d8 (85-120%) (DoD QSM = 85-120%)
1,2-Dichloroethane-d4 (70-120%) (DoD QSM = 70-120%)

- All criteria were met. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213050904-06) and 49TM01 (213051016-08) was analyzed for TCL VOC analysis in this SDG. Methylene chloride was detected in the parent sample at trace level 2.30J µg/L and non-detect in the duplicate pair at <0.50 µg/L. Toluene was detected in the duplicate pair sample at trace level 0.696J µg/L and non-detect in the parent sample at <0.20 µg/L. These are common lab contaminants. No qualifiers were applied based upon these outliers. All other target analytes were non-detect for the duplicate pair. All criteria were met. No qualifiers were applied.

XI-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J".

Sample: 49MW03 (213050904-06), methylene chloride

Conc. (μg/L) = (Ax)*(Is)*(DF) / (Ais)*(RRF)

where: Ax is the compound area
Ais is the corresponding internal standard area
Is is the corresponding internal standard concentration (μg/L)
DF is the dilution factor
RRF is the relative response factor.

Conc. μg/L = (2458 * 50 μg/L * 1) / (150913 * 0.35437) = 2.30 μg/L

Reported Conc. = 2.30 μg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994).

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW03

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213050904

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305090406

Level: (low/med)

Lab File ID: 2130530/j6117

% Moisture: not dec.

Date Collected: 05/07/13 Time: 1455

GC Column: RTX-VMS-30 ID: .25 (mm

Date Received: 05/09/13

Instrument ID: MSV12

Date Analyzed: 05/30/13 Time: 1528

Soil Extract Volume: (µL

Dilution Factor: 1 Analyst: LBH

Soil Aliquot Volume: (µL

Prep Batch: Analytical Batch: 508332

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	VL 0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	VL 0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	VL 0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	VL 0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	VL 0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	VL 0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	VL 0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	VL 0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	VL 0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	VL 0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	VL 0.120	0.500	5.00
67-64-1	Acetone	1.00	U	VL 0.193	1.00	5.00
71-43-2	Benzene	0.200	U	VL 0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	VL 0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	VL 0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	VL 0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	VL 0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	VL 0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	VL 0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	VL 0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	VL 0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	VL 0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	VL 0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	VL 0.109	0.200	1.00
75-09-2	Methylene chloride	2.30	J	L 0.149	0.500	5.00
100-42-5	Styrene	0.200	U	VL 0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	VL 0.193	0.500	1.00
108-88-3	Toluene	0.200	U	VL 0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	VL 0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	VL 0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	VL 0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW03

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213050904

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL Lab Sample ID: 21305090406

Level: (low/med) Lab File ID: 2130530/j6117

% Moisture: not dec. Date Collected: 05/07/13 Time: 1455

GC Column: RTX-VMS-30 ID: .25 (mm Date Received: 05/09/13

Instrument ID: MSV12 Date Analyzed: 05/30/13 Time: 1528

Soil Extract Volume: (µL Dilution Factor: 1 Analyst: LBH

Soil Aliquot Volume: (µL Prep Batch: Analytical Batch: 508332

CONCENTRATION UNITS: ug/L Analytical Method: SW-846 8260B

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	VL 0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	VL 0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	VL 0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	VL 0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	VL 0.128	0.200	1.00

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Total Organic Carbon
GCAL Laboratories, Inc., SDG 213050904

DATE: July 9, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013. Samples were analyzed for Total Organic Carbon (TOC) using SM 5310B. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49TM01	213050904-01	50MW02	213050904-04
49TM02	213050904-02	48MW1	213050904-05
RB050813	213050904-03	49MW03	213050904-06

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), and method-specific criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial and Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample and Laboratory Control Sample Duplicate
	X	Matrix Spike and Spike Duplicate
	X	Laboratory Duplicate
X		Field Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/9/13
Date

RFAAP VALIDATION REPORT
TOC REVIEW
SDG 213050904

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool 4°C±2°C, HCl pH<2, 28 days for TOC (USEPA criteria). The dates and times were compared between the sample collection and laboratory analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/07/13, the coolers were received by the laboratory (GCAL) on 05/09/13 at 4.5°C and 5.4°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The samples were collected on 05/07/13. The TOC analysis was run on 05/10/13. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifier was applied.

II-Initial and Continuing Calibration
Bench and run summary sheets were reviewed to determine whether calibration was performed at the beginning of sample analysis using the following criteria. Percent recoveries for initial and continuing calibration (90-110%) must be within limits.

TOC: 1 - blank
5 - standards ($r \geq 0.995$)
ICV/CCV (90-110%)

- The TOC analysis was run on 05/10/13. The initial calibration for TC was analyzed on 02/22/13 with a coefficient of determination of 0.9999. The initial calibration for TIC was analyzed on 02/22/13 with a coefficient of determination of 1.000. The ICV and CCVs were evaluated for where they bracketed reported samples. All ICV/CCVs that bracketed reported samples were within criteria. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to these initial and continuing calibrations.

III-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) and <LOD (i.e. <2MDL) for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters, or 5 times (5x) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/L	Action Level mg/L	B qualified samples (For this SDG)
05/10/13	TOC	ICB/CCBs	<LOD	NA	None
05/10/13	TOC	MB1190580	<½MRL	NA	None
05/10/13	TOC	RB050813	<½MRL	NA	None

LOD = Limit of Detection
MRL = Method Reporting Limit
MDL = Method Detection Limit
NA = Not Applicable

IV-Laboratory Control Sample and Laboratory Control Sample Duplicate
The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) serve as a monitor of the overall performance of each step during the analysis, including the sample preparation. LCS and LCSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. All aqueous LCS results must fall within the control limits (80-120%; RPD≤25%).

- Samples LCS1190581 and LCS119582 were used as the aqueous LCS/LCSD for TOC analysis on 05/10/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this LCS/LCSD.

V-Matrix Spike and Spike Duplicate
Matrix spikes (MSs) and matrix spike duplicates (MSDs) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. The percent recoveries (%Rs or RPD) must be within the specified control limits (75-125%; RPD≤25%).

- Sample U31EPAC (213051008-02) was used as the aqueous MS/MSD for TOC analysis on 05/10/13. The spiked sample was not a site specific sample; therefore, was not evaluated.

- Sample AveC003 (213050924-03) was used as the aqueous MS/MSD for TOC analysis on 05/10/13. The spiked sample was not a site specific sample; therefore, was not evaluated.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits (≤25%RPD).

- No aqueous laboratory duplicate was analyzed for TOC with this SDG; therefore, it was not evaluated. See Section IV for lab precision statements using LCS/LCSD.

VII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213050904-06) and 49TM01 (213050904-01) was analyzed for TOC analysis in this SDG. TOC was detected at trace levels 0.53J mg/L in the parent sample and non-detect at <1.00 mg/L in the duplicate pair. No qualifiers were applied based upon this outlier.

- Field groundwater sample duplicate pair 50MW02 (213050904-04) and 49TM02 (213050904-02) was analyzed for TOC analysis in this SDG. TOC was detected at 1.30 mg/L in the parent sample and at 0.47J mg/L in the duplicate pair, resulting in a RPD of 93.8%. TOC was qualified estimated "J" for the duplicate pair based upon the high RPD.

VIII-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 49TM02 (213050904-02), TOC

TC: Y = m*X (mg/L) + b	TIC: Y = m*X (mg/L) + b
m = 4.113	m = 4.154
b = 1.262	b = 0.1181
Y = 317.1	Y = 317.2
DF = 1	DF = 1
X = (76.79 mg/L) * 1 = 76.79 mg/L	X = (76.33 mg/L) * 1 = 76.33 mg/L

TOC (mg/L) = TC (mg/L) – TIC (mg/L) = 76.79 – 76.33 = 0.46 mg/L = 0.46 mg/L

Reported Value = 0.47 mg/L
% Difference = 2.1%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090401	49TM01	Water	05/07/2013 14:55	05/09/2013 09:15

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 16:11	MCP	507076

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	1.0U	1.0	0.30	mg/L

213050904 210

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090402	49TM02	Water	05/08/2013 12:25	05/09/2013 09:15

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 16:28	MCP	507076

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	0.47J J	1.0	0.30	mg/L

213050904 214

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090403	RB050813	Water	05/08/2013 13:20	05/09/2013 09:15

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 17:47	MCP	507076

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	1.0U	1.0	0.30	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090404	50MW02	Water	05/08/2013 12:25	05/09/2013 09:15

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 18:10	MCP	507076

CAS#	Parameter	Result		RDL	MDL	Units
C-012	Total Organic Carbon	1.3	J	1.0	0.30	mg/L

213050904 220

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090405	48MW1	Water	05/08/2013 09:45	05/09/2013 09:15

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 18:27	MCP	507076

CAS#	Parameter	Result		RDL	MDL	Units
C-012	Total Organic Carbon	0.88J	J	1.0	0.30	mg/L

213050904 223

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090406	49MW03	Water	05/07/2013 14:55	05/09/2013 09:15

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/10/2013 18:45	MCP	507076

CAS#	Parameter	Result		RDL	MDL	Units
C-012	Total Organic Carbon	0.53J	J	1.0	0.30	mg/L

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: PTA Data Validation – TAL Metals
GCAL Laboratories, Inc., SDG 213050904

DATE: July 10, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013. The aqueous samples were analyzed for total and dissolved target analyte list (TAL) metals using USEPA SW-846 3005A/3010A/6020A and for mercury using SW-846 7470A. A total of six aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49TM01	213050904-01	50MW02	213050904-04
49TM02	213050904-02	48MW1	213050904-05
RB050813	213050904-03	49MW03	213050904-06

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	ICPMS Performance Check Sample
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICPMS Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Duplicate
	X	Matrix Spike (MS) and Spike Duplicate (MSD)
X		Field Duplicate
	X	Serial Dilution
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/10/13
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG 213050904

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. For TAL metals analysis, aqueous samples are received and stored at cool @4°C±2°C and preserved to pH<2 with nitric acid with a maximum holding time of 180 days for ICPMS metals (28 days for mercury) from collection (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/07/13, the coolers were received by the laboratory (GCAL) on 05/09/13 at 4.5°C and 5.4°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 05/07/13 for TAL metals. For ICPMS metals, the aqueous samples were digested on 05/09/13 and 05/10/13 and were analyzed on 05/19/13, 05/20/13, and 05/21/13. For mercury, the aqueous samples were digested on 05/09/13 and analyzed on 05/16/13. The analysis dates for each sample may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each run during which samples are analyzed.

- The instrument performance checks 7-lithium, 89-yttrium, 140-cerium, and 205-thallium met the tuning criteria. No qualification was applied.

III-Initial and Continuing Calibration
Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICPMS:	1- blank (DoD QSM <1/2MRL)	Hg:	1- blank (DoD QSM <1/2MRL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (DoD QSM 90-110%)		ICV (85-115%) (DoD QSM 90-110%)
	LLCCV (80-120% for 6020) (DoD QSM 80-120%)		CCV (85-115%) (DoD QSM 80-120%)
			LLCCV (70-130%) (DoD QSM None Specified)

- For ICPMS metals, the aqueous samples were analyzed on 05/19/13, 05/20/13, and 05/21/13. All ICPMS metals were calibrated using 5 point calibrations with correlation coefficients >0.995. Mercury was analyzed for the aqueous samples on 05/16/13 with a correlation coefficient of 0.9995.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @04:55, sodium (136%) was outside criteria. Dissolved sodium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @06:44, sodium (173%) was outside criteria. Dissolved sodium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @08:19, sodium (121%) was outside criteria. Dissolved sodium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Sample 50MW02 (213050904-04) applies to this LLCCV standard.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @11:29, vanadium (136%) was outside criteria. Dissolved vanadium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals CCV analyzed on 05/19/13 @13:12, sodium (89%) was outside criteria. Dissolved sodium was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @23:05, calcium (121%) was outside criteria. Dissolved calcium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals LLCCV analyzed on 05/20/13 @00:40, calcium (125%) was outside criteria. Total calcium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) applies to this LLCCV standard.

- For ICPMS total metals LLCCV analyzed on 05/20/13 @02:15, vanadium (133%) was outside criteria. Total vanadium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals LLCCV analyzed on 05/20/13 @23:38, vanadium (129%) was outside criteria. Total vanadium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) applies to this LLCCV standard.

- For ICPMS total metals ICV analyzed on 05/21/13 @14:14, cobalt (111%) was outside criteria. Total cobalt was analyzed under a different CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals LLCCV analyzed on 05/21/13 @19:03, vanadium (121%) was outside criteria. Total vanadium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Sample 50MW02 (213050904-04) applies to this LLCCV standard.

- All other ICV/CCV/MRL criteria were met for all metals and runs.

IV-Blanks

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters) and <LOD (i.e. <2MDL) for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples (for this SDG)
05/18-19/13	ICPMS-Ba (Diss.)	ICB/CCBs	0.096J	0.48	None
05/18-19/13	ICPMS-Cr (Diss.)	ICB/CCBs	0.089J	0.45	None
05/18-19/13	ICPMS-Cu (Diss.)	ICB/CCBs	0.11J	0.55	None
05/18-19/13	ICPMS-Mg (Diss.)	ICB/CCBs	21.4J	107	None
05/18-19/13	ICPMS-Na (Diss.)	ICB/CCBs	51.5J	258	None
05/18-19/13	ICPMS-Tl (Diss.)	ICB/CCBs	0.082J	0.41	None
05/18-19/13	ICPMS-V (Diss.)	ICB/CCBs	0.55J	2.75	None
05/19-20/13	ICPMS-Na (Diss.)	ICB/CCBs	17.5J	87.5	None
05/19-20/13	ICPMS-V (Diss.)	ICB/CCBs	0.49J	2.45	49TM02, 50MW02
05/20-21/13	ICPMS-Tl (Total)	ICB/CCBs	0.26J	1.30	None
05/20-21/13	ICPMS-V (Total)	ICB/CCBs	0.26J	1.30	49MW03, 49TM01
05/21/13	ICPMS-Tl (Total)	ICB/CCBs	0.074J	0.37	None
05/21/13	ICPMS-V (Total)	ICB/CCBs	0.28J	1.40	49MW03, 49TM01
05/16/13	Hg (Total)	ICB/CCBs	<LOD	NA	None
05/16/13	Hg (Diss.)	ICB/CCBs	<LOD	NA	None
05/21/13	ICPMS-Al (Total)	RB050813	16.0J	80.0	49MW03, 49TM01
05/21/13	ICPMS-Ba (Total)	RB050813	0.18J	0.90	None
05/21/13	ICPMS-Ca (Total)	RB050813	74.8J	374	None
05/21/13	ICPMS-Cr (Total)	RB050813	0.10J	0.50	None
05/21/13	ICPMS-Co (Total)	RB050813	0.066J	0.33	None
05/21/13	ICPMS-Cu (Total)	RB050813	0.18J	0.90	None
05/21/13	ICPMS-Fe (Total)	RB050813	3.21J	16.1	None
05/21/13	ICPMS-Pb (Total)	RB050813	0.038J	0.19	49MW03, 49TM01
05/21/13	ICPMS-Mg (Total)	RB050813	7.79J	39.0	None
05/21/13	ICPMS-Mn (Total)	RB050813	0.30J	1.50	None
05/21/13	ICPMS-Na (Total)	RB050813	20.4J	102	None
05/21/13	ICPMS-V (Total)	RB050813	0.62J	3.1	49MW03, 49TM01, 50MW02
05/19/13	ICPMS-Ca (Diss.)	RB050813	60.3J	302	None
05/19/13	ICPMS-Cr (Diss.)	RB050813	1.24J	6.2	None
05/19/13	ICPMS-Cu (Diss.)	RB050813	0.72J	3.6	None
05/19/13	ICPMS-Fe (Diss.)	RB050813	6.58J	32.9	48MW1, 49MW03, 49TM01, 49TM02, 50MW02
05/19/13	ICPMS-Pb (Diss.)	RB050813	0.036J	0.18	48MW1, 49TM02
05/19/13	ICPMS-Ni (Diss.)	RB050813	0.51J	2.55	50MW02
05/19/13	ICPMS-K (Diss.)	RB050813	10.4J	52.0	None
05/19/13	ICPMS-Na (Diss.)	RB050813	21.3J	107	None
05/19/13	ICPMS-Tl (Diss.)	RB050813	0.080J	0.40	None
05/19/13	ICPMS-Zn (Diss.)	RB050813	1.85J	9.25	49MW03, 49TM01, 49TM02, 50MW02
05/16/13	Hg (Total)	RB050813	<LOD	NA	None
05/16/13	Hg (Diss.)	RB050813	<LOD	NA	None
05/19/13	ICPMS-Mn (Total)	MB1190266	0.33J	1.65	None
05/19/13	ICPMS-Al (Total)	MB1190266	2.86J	14.3	None
05/19/13	ICPMS-Cu (Total)	MB1190266	0.10J	0.50	None
05/19/13	ICPMS-Na (Total)	MB1190266	18.8J	94.0	None
05/19/13	ICPMS-V (Total)	MB1190266	0.30J	1.50	48MW1, 49TM02
05/19/13	ICPMS-Cr (Total)	MB1190266	0.12J	0.60	None
05/19/13	ICPMS-Ba (Diss)	MB1190129	0.12J	0.60	None
05/19/13	ICPMS-Ca (Diss)	MB1190129	58.1J	291	None
05/19/13	ICPMS-Mg (Diss)	MB1190129	23.5J	118	None
05/19/13	ICPMS-Na (Diss)	MB1190129	62.0J	310	None
05/16/13	Hg (Total)	MB1190270	<LOD	NA	None

J = Estimated Value <MRL and >LOD.
LOD = Limit of Detection
MRL = Method Reporting Limit
NA = Not Applicable
SDG= Sample Delivery Group

V-ICPMS Interference Check Sample (ICS)
The ICPMS interference check sample (ICS) verifies inter-element and background correction factors. ICPMS Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met for all other runs. No qualifiers were applied.

VI-Laboratory Control Samples (LCS)
The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. The DoD QSM aqueous LCS criteria are specified in Table G-18 of the DoD QSM (DoD, 2010) and are 80-120% and RPD≤20% for TAL metals. For non-TAL metals, the laboratory control limits should be used.

- Sample LCS1190267 was used as aqueous LCS for ICPMS total metals analysis dated 05/19/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this LCS.

- Sample LCS1190130 was used as aqueous LCS for ICPMS dissolved metals analysis dated 05/19/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this LCS.

- Sample LCS1190271 was used as aqueous LCS for mercury analysis dated 05/16/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this LCS.

VII-Laboratory Duplicate
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. The DoD QSM aqueous limits for metals are 20% RPD for ICPMS metals and mercury.

- No aqueous laboratory duplicate was analyzed with this SDG; therefore, it was not evaluated. See Section VIII for lab accuracy and precision statements using MS/MSD and Section VI for lab accuracy using LCS.

VIII-Matrix Spike (MS) and Spike Duplicate (MSD)
MS and MSD are generated to determine long-term accuracy and precision of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. MS/MSD recoveries and relative percent differences between MS recoveries should be within the specified limits. The DoD MS and MSD aqueous recovery limits use the LCS criteria specified in Table G-18 of the DoD QSM (DoD, 2010) and are 80-120% and RPD≤20% for TAL metals. Post digestion spikes aqueous and solid limits are 75-125% for ICPMS metals. For non-TAL metals, the laboratory control limits should be used.

- Sample GW-8 (213050911-01) was used as the aqueous MS/MSD for the ICPMS total metals analysis on 05/19/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this MS/MSD.

- Sample 50MW02 (213050904-04) was used as the aqueous MS/MSD for the ICPMS dissolved metals analysis on 05/19/13. Calcium (66%) was outside criteria. The sample concentration was >4 times the spike added for calcium; therefore, no qualifiers were applied based upon this outlier. For all other target metals, all criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this MS/MSD.

- Sample GW-8 (213050911-01) was used as the aqueous MS/MSD for the mercury analysis on 05/16/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213050904-06) and 49TM01 (213050904-01) was collected for total and dissolved TAL metals. All detected metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. Total chromium, total copper, and total nickel were outside criteria and were qualified estimated "J" for the duplicate pair based upon the high RPDs. Sample in-homogeneity and/or matrix effects are probable causes for these outliers.

Table 3 Field Precision Analysis Summary for TAL Metals for Duplicate Pair 49MW03 (213050904-06) and 49TM01 (213050904-01)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
Aluminum	39.2	40.9	4.2%
Antimony	1.00U	1.00U	NA
Arsenic	0.30U	0.30U	NA
Barium	191	182	4.8%
Beryllium	0.10U	0.10U	NA
Cadmium	0.10U	0.10U	NA
Calcium	50700	47400	6.7%
Chromium	17.3	11.6	39.4%
Cobalt	2.00	1.64	19.8%
Copper	2.83	2.06	31.5%
Iron	142	120	16.8%
Lead	0.12J	0.12J	0.0%
Magnesium	22700	21200	6.8%
Manganese	6.58	8.22	22.2%
Nickel	8.27	5.50	40.2%
Potassium	1870	1800	3.8%
Selenium	0.40U	0.40U	NA
Silver	2.45	2.00	20.2%
Sodium	2180	2080	4.7%
Thallium	0.20U	0.20U	NA
Vanadium	0.59J	0.59J	0.0%
Zinc	8.29J	6.65J	22.0%
Mercury (Dissolved)	0.00020U	0.00020U	NA
Mercury	0.00020U	0.00020U	NA
Aluminum (Dissolved)	4.19J	4.20J	0.2%
Antimony (Dissolved)	1.00U	1.00U	NA
Arsenic (Dissolved)	0.30U	0.30U	NA
Barium (Dissolved)	171	180	5.1%
Beryllium (Dissolved)	0.10U	0.10U	NA
Cadmium (Dissolved)	0.10U	0.10U	NA
Calcium (Dissolved)	43300	45000	3.9%
Chromium (Dissolved)	1.18	1.08	8.8%
Cobalt (Dissolved)	0.75J	0.65J	14.3%
Copper (Dissolved)	1.15	1.44	22.4%
Iron (Dissolved)	13.3J	13.5J	1.5%
Lead (Dissolved)	0.10U	0.10U	NA
Magnesium (Dissolved)	18400	19000	3.2%
Manganese (Dissolved)	3.69J	3.30J	11.2%
Nickel (Dissolved)	3.88	2.90	28.9%
Potassium (Dissolved)	1630	1640	0.6%
Selenium (Dissolved)	0.40U	0.40U	NA
Silver (Dissolved)	0.060U	0.060U	NA
Sodium (Dissolved)	2040	1900	7.1%
Thallium (Dissolved)	0.20U	0.20U	NA
Vanadium (Dissolved)	0.30U	0.30U	NA
Zinc (Dissolved)	5.27J	4.36J	18.9%

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
U = Analyte was non-detect as <LOD.
NA = Not Applicable.
LOD = Limit of Detection. MDL = Method Detection Limit. MRL = Method Reporting Limit.

- Field groundwater sample duplicate pair 50MW02 (213050904-04) and 49TM02 (213050904-02) was collected for total and dissolved TAL metals. All detected metals found in the sample and its duplicate pair and associated %RPD are noted in **Table 4**. Total aluminum, total arsenic, total beryllium, total chromium, total cobalt, total copper, total iron, total lead, total manganese, total nickel, total selenium, total vanadium, total zinc, dissolved aluminum, dissolved chromium, dissolved cobalt, dissolved iron, dissolved manganese, and dissolved nickel were outside criteria and were qualified estimated "J" for the duplicate pair based upon the high RPDs. Sample in-homogeneity and/or matrix effects are probable causes for these outliers.

Table 4 Field Precision Analysis Summary for TAL Metals for Duplicate Pair 50MW02 (213050904-04) and 49TM02 (213050904-02)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
Aluminum	519	1360	89.5%
Antimony	1.00U	1.00U	NA
Arsenic	0.36J	0.66J	58.8%
Barium	105	118	11.7%
Beryllium	0.068J	0.10J	38.1%
Cadmium	0.10U	0.040J	NA
Calcium	87300	103000	16.5%
Chromium	5.01	34.5	149%
Cobalt	0.39J	1.11	96.0%
Copper	2.09	5.99	96.5%
Iron	652	1710	89.6%
Lead	5.27	12.6	82.0%
Magnesium	36100	42600	16.5%
Manganese	12.8	33.9	90.4%
Nickel	3.74	19.8	136%
Potassium	2190	2640	18.6%
Selenium	0.36J	0.48J	28.6%
Silver	0.060U	0.020J	NA
Sodium	15200	16400	7.6%
Thallium	0.20U	0.20U	NA
Vanadium	2.16	4.45	69.3%
Zinc	13.2J	28.3	72.8%
Mercury (Dissolved)	0.00020U	0.00020U	NA
Mercury	0.00020U	0.00020U	NA
Aluminum (Dissolved)	4.00J	3.05J	27.0%
Antimony (Dissolved)	1.00U	1.00U	NA
Arsenic (Dissolved)	0.30U	0.30U	NA
Barium (Dissolved)	102	102	0.0%
Beryllium (Dissolved)	0.10U	0.10U	NA
Cadmium (Dissolved)	0.10U	0.10U	NA
Calcium (Dissolved)	80000	81200	1.5%
Chromium (Dissolved)	1.00J	3.02	101%
Cobalt (Dissolved)	0.082J	0.13J	45.3%
Copper (Dissolved)	0.90J	1.08	18.2%
Iron (Dissolved)	23.1J	32.3J	33.2%
Lead (Dissolved)	0.20J	0.18J	10.5%
Magnesium (Dissolved)	30300	30500	0.7%
Manganese (Dissolved)	2.30J	3.62J	44.6%
Nickel (Dissolved)	2.28	4.24	60.1%
Potassium (Dissolved)	1930	1920	0.5%
Selenium (Dissolved)	0.30J	0.31J	3.3%
Silver (Dissolved)	0.060U	0.060U	NA
Sodium (Dissolved)	13600	13500	0.7%
Thallium (Dissolved)	0.20U	0.20U	NA
Vanadium (Dissolved)	0.19J	0.20J	5.1%
Zinc (Dissolved)	6.09J	5.40J	12.0%

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
U = Analyte was non-detect as <LOD.
NA = Not Applicable.
LOD = Limit of Detection. MDL = Method Detection Limit. MRL = Method Reporting Limit.

X-Serial Dilution
A serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 100 above MDL for ICPMS and 50 above MDL for mercury.

- The serial dilution for ICPMS total metals was analyzed on 05/19/13 using aqueous sample GW-8 (213050911-01). Zinc (16.9%) and vanadium (126%) were outside of criteria limits. All other metals were within of criteria limits. Sample concentrations were <100 times MDL for zinc and vanadium; therefore, no qualifiers were applied based upon these outliers. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this serial dilution.

- The serial dilution for ICPMS dissolved metals was analyzed on 05/19/13 using aqueous sample 50MW02 (213050904-04). Aluminum (100%), cobalt (100%), copper (36.7%), iron (29.4%), lead (30%), manganese (27%), selenium (100%), vanadium (526%) and zinc (56.5%) were outside of criteria limits. Sample concentrations were <100 times MDL for aluminum, cobalt, copper, iron, lead, manganese, selenium, vanadium, and zinc; therefore, no qualifiers were applied based upon these outliers. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this serial dilution.

XI-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any value >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, "J."

- The total and dissolved fractions were compared. The metals data results for samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) are presented in **Table 5**. Data qualification was applied based upon professional judgment. Generally, if the concentrations are greater than the MRL and the dissolved concentration is greater than its total concentration by >10%D, then both results have been flagged as estimated with a "J."

Table 5 Total/Dissolved Summary

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
49TM01	Aluminum	20	40.9	4.20J	NA	None
49TM01	Antimony	1.00	1.00U	1.00U	NA	None
49TM01	Arsenic	1.00	0.30U	0.30U	NA	None
49TM01	Barium	10	182	180	NA	None
49TM01	Beryllium	1.00	0.10U	0.10U	NA	None
49TM01	Cadmium	1.00	0.10U	0.10U	NA	None
49TM01	Calcium	1000	47400	45000	NA	None
49TM01	Chromium	1.00	11.6	1.08	NA	None
49TM01	Cobalt	1.00	1.64	0.65J	NA	None
49TM01	Copper	1.00	2.06	1.44	NA	None
49TM01	Iron	100	120	13.5J	NA	None
49TM01	Lead	1.00	0.12J	0.10U	NA	None
49TM01	Magnesium	1000	21200	19000	NA	None
49TM01	Manganese	5.00	8.22	3.30J	NA	None
49TM01	Nickel	1.00	5.50	2.90	NA	None
49TM01	Potassium	100	1800	1640	NA	None
49TM01	Selenium	1.00	0.40U	0.40U	NA	None
49TM01	Silver	1.00	2.00	0.060U	NA	None
49TM01	Sodium	1000	2080	1900	NA	None
49TM01	Thallium	1.00	0.20U	0.20U	NA	None
49TM01	Vanadium	1.00	0.59J	0.30U	NA	None
49TM01	Zinc	20	6.65J	4.36J	NA	None
49TM01	Mercury	0.00020	0.00020U	0.00020U	NA	None
49TM02	Aluminum	20	1360	3.05J	NA	None
49TM02	Antimony	1.00	1.00U	1.00U	NA	None
49TM02	Arsenic	1.00	0.66J	0.30U	NA	None
49TM02	Barium	10	118	102	NA	None
49TM02	Beryllium	1.00	0.10J	0.10U	NA	None
49TM02	Cadmium	1.00	0.040J	0.10U	NA	None
49TM02	Calcium	1000	103000	81200	NA	None
49TM02	Chromium	1.00	34.5	3.02	NA	None
49TM02	Cobalt	1.00	1.11	0.13J	NA	None
49TM02	Copper	1.00	5.99	1.08	NA	None
49TM02	Iron	100	1710	32.3J	NA	None
49TM02	Lead	1.00	12.6	0.18J	NA	None
49TM02	Magnesium	1000	42600	30500	NA	None
49TM02	Manganese	5.00	33.9	3.62J	NA	None
49TM02	Nickel	1.00	19.8	4.24	NA	None
49TM02	Potassium	100	2640	1920	NA	None
49TM02	Selenium	1.00	0.48J	0.31J	NA	None
49TM02	Silver	1.00	0.020J	0.060U	NA	None
49TM02	Sodium	1000	16400	13500	NA	None
49TM02	Thallium	1.00	0.20U	0.20U	NA	None
49TM02	Vanadium	1.00	4.45	0.20J	NA	None
49TM02	Zinc	20	28.3	5.40J	NA	None
49TM02	Mercury	0.00020	0.00020U	0.00020U	NA	None

Table 5 Total/Dissolved Summary, Continued

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
RB050813	Aluminum	20	16.0J	6.00U	NA	None
RB050813	Antimony	1.00	1.00U	1.00U	NA	None
RB050813	Arsenic	1.00	0.30U	0.30U	NA	None
RB050813	Barium	10	0.18J	0.30U	NA	None
RB050813	Beryllium	1.00	0.10U	0.10U	NA	None
RB050813	Cadmium	1.00	0.10U	0.10U	NA	None
RB050813	Calcium	1000	74.8J	60.3J	NA	None
RB050813	Chromium	1.00	0.10J	1.24	NA	None
RB050813	Cobalt	1.00	0.066J	0.20U	NA	None
RB050813	Copper	1.00	0.18J	0.72J	75.0	J
RB050813	Iron	100	3.21J	6.58J	51.2	J
RB050813	Lead	1.00	0.038J	0.036J	NA	None
RB050813	Magnesium	1000	7.79J	20.0U	NA	None
RB050813	Manganese	5.00	0.30J	1.00U	NA	None
RB050813	Nickel	1.00	1.00U	0.51J	NA	None
RB050813	Potassium	100	30.0U	10.4J	NA	None
RB050813	Selenium	1.00	0.40U	0.40U	NA	None
RB050813	Silver	1.00	0.060U	0.060U	NA	None
RB050813	Sodium	1000	20.4J	21.3J	4.2	None
RB050813	Thallium	1.00	0.20U	0.080J	NA	None
RB050813	Vanadium	1.00	0.62J	0.30U	NA	None
RB050813	Zinc	20	5.00U	1.85J	NA	None
RB050813	Mercury	0.00020	0.00020U	0.00020U	NA	None
50MW02	Aluminum	20	519	4.00J	NA	None
50MW02	Antimony	1.00	1.00U	1.00U	NA	None
50MW02	Arsenic	1.00	0.36J	0.30U	NA	None
50MW02	Barium	10	105	102	NA	None
50MW02	Beryllium	1.00	0.068J	0.10U	NA	None
50MW02	Cadmium	1.00	0.10U	0.10U	NA	None
50MW02	Calcium	1000	87300	80000	NA	None
50MW02	Chromium	1.00	5.01	1.00J	NA	None
50MW02	Cobalt	1.00	0.39J	0.082J	NA	None
50MW02	Copper	1.00	2.09	0.90J	NA	None
50MW02	Iron	100	652	23.1J	NA	None
50MW02	Lead	1.00	5.27	0.20J	NA	None
50MW02	Magnesium	1000	36100	30300	NA	None
50MW02	Manganese	5.00	12.8	2.30J	NA	None
50MW02	Nickel	1.00	3.74	2.28	NA	None
50MW02	Potassium	100	2190	1930	NA	None
50MW02	Selenium	1.00	0.36J	0.30J	NA	None
50MW02	Silver	1.00	0.060U	0.060U	NA	None
50MW02	Sodium	1000	15200	13600	NA	None
50MW02	Thallium	1.00	0.20U	0.20U	NA	None
50MW02	Vanadium	1.00	2.16	0.19J	NA	None
50MW02	Zinc	20	13.2J	6.09J	NA	None
50MW02	Mercury	0.00020	0.00020U	0.00020U	NA	None

Table 5 Total/Dissolved Summary, Continued

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
48MW1	Aluminum	20	1730	5.38J	NA	None
48MW1	Antimony	1.00	1.00U	1.00U	NA	None
48MW1	Arsenic	1.00	1.12	0.10J	NA	None
48MW1	Barium	10	134	104	NA	None
48MW1	Beryllium	1.00	0.091J	0.10U	NA	None
48MW1	Cadmium	1.00	0.027J	0.10U	NA	None
48MW1	Calcium	1000	53600	43900	NA	None
48MW1	Chromium	1.00	31.6	1.27	NA	None
48MW1	Cobalt	1.00	4.54	0.75J	NA	None
48MW1	Copper	1.00	8.59	1.79	NA	None
48MW1	Iron	100	2870	19.3J	NA	None
48MW1	Lead	1.00	1.54	0.031J	NA	None
48MW1	Magnesium	1000	40900	32100	NA	None
48MW1	Manganese	5.00	49.4	6.11	NA	None
48MW1	Nickel	1.00	21.3	9.57	NA	None
48MW1	Potassium	100	2280	1620	NA	None
48MW1	Selenium	1.00	0.59J	0.35J	NA	None
48MW1	Silver	1.00	0.69J	0.060U	NA	None
48MW1	Sodium	1000	16100	14600	NA	None
48MW1	Thallium	1.00	0.20U	0.20U	NA	None
48MW1	Vanadium	1.00	3.74	0.30U	NA	None
48MW1	Zinc	20	30.5	20.0	NA	None
48MW1	Mercury	0.00020	0.00020U	0.00020U	NA	None
49MW03	Aluminum	20	39.2	4.19J	NA	None
49MW03	Antimony	1.00	1.00U	1.00U	NA	None
49MW03	Arsenic	1.00	0.30U	0.30U	NA	None
49MW03	Barium	10	191	171	NA	None
49MW03	Beryllium	1.00	0.10U	0.10U	NA	None
49MW03	Cadmium	1.00	0.10U	0.10U	NA	None
49MW03	Calcium	1000	50700	43300	NA	None
49MW03	Chromium	1.00	17.3	1.18	NA	None
49MW03	Cobalt	1.00	2.00	0.75J	NA	None
49MW03	Copper	1.00	2.83	1.15	NA	None
49MW03	Iron	100	142	13.3J	NA	None
49MW03	Lead	1.00	0.12J	0.10U	NA	None
49MW03	Magnesium	1000	22700	18400	NA	None
49MW03	Manganese	5.00	6.58	3.69J	NA	None
49MW03	Nickel	1.00	8.27	3.88	NA	None
49MW03	Potassium	100	1870	1630	NA	None
49MW03	Selenium	1.00	0.40U	0.40U	NA	None
49MW03	Silver	1.00	2.45	0.060U	NA	None
49MW03	Sodium	1000	2180	2040	NA	None
49MW03	Thallium	1.00	0.20U	0.20U	NA	None
49MW03	Vanadium	1.00	0.59J	0.30U	NA	None
49MW03	Zinc	20	8.29J	5.27J	NA	None
49MW03	Mercury	0.00020	0.00020U	0.00020U	NA	None

J = Estimated value
U = Value Non-detect as <MRL
NA = Not Applicable

Sample: 49TM01 (213050904-01), Zinc

Conc. (µg/L) = (conc. µg/L) * (Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (6.6467 µg/L) * (50 mL) * (1) / (50 mL) = 6.65 µg/L

Reported concentration = 6.65 µg/L
%D = 0.0%
Values were within 10% difference.

Sample: LCS1190271, Mercury

Conc. (µg/L) = (conc. µg/L) * (Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (5.4484 µg/L) * (20 mL) * (1) / (20 mL) = 5.4 µg/L

Reported concentration = 5.4 µg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49TM01

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090401

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/07/13 | Time: 1455

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	40.9	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/21/13 0015
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 0015
Arsenic	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A	MS	05/21/13 0015
Barium	182	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/20/13 0131
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/21/13 0015
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/21/13 0015
Calcium	47400	ug/L		J 434	1000	1000	SW-846 6020A	MS	05/20/13 0131
Chromium	11.6	ug/L		J 0.030	0.10	1.00	SW-846 6020A	MS	05/21/13 0015
Cobalt	1.64	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/21/13 0015
Copper	2.06	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/21/13 0015
Iron	120	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/21/13 0015
Lead	0.12	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A	MS	05/21/13 0015
Magnesium	21200	ug/L		52.2	200	1000	SW-846 6020A	MS	05/20/13 0131
Manganese	8.22	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/21/13 0015
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/16/13 1808
Nickel	5.50	ug/L		J 0.26	1.00	1.00	SW-846 6020A	MS	05/21/13 0015
Potassium	1800	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/21/13 0015
Selenium	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A	MS	05/21/13 0015
Silver	2.00	ug/L		0.017	0.060	1.00	SW-846 6020A	MS	05/21/13 0015
Sodium	2080	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/21/13 0015
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/21/13 2002
Vanadium	0.59	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 0015
Zinc	6.65	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/21/13 0015

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49TM01

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090401

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/07/13 | Time: 1455

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	4.20	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1107
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Barium (Diss	180	ug/L		0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/19/13 1009
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2319
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Calcium (Dis	45000	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 1009
Chromium (D	1.08	ug/L		0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Cobalt (Diss	0.65	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Copper (Diss	1.44	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Iron (Dissolv	13.5	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 1107
Lead (Dissol	0.10	ug/L	U	0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Magnesium (	19000	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 1009
Manganese (	3.30	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/16/13 1823
Nickel (Disso	2.90	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Potassium (	1640	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 1107
Selenium (Di	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Sodium (Diss	1900	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/19/13 1107
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1107
Vanadium (D	0.30	ug/L	U	0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 2319
Zinc (Dissolv	4.36	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1107

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49TM02

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090402

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 1225

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	1360	ug/L		J 1.66	6.00	20.0	SW-846 6020A	MS	05/21/13 0022
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 0022
Arsenic	0.66	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A	MS	05/21/13 0022
Barium	118	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/20/13 0138
Beryllium	0.10	ug/L	J	J 0.049	0.10	1.00	SW-846 6020A	MS	05/21/13 0022
Cadmium	0.040	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A	MS	05/21/13 0022
Calcium	103000	ug/L		J 868	2000	2000	SW-846 6020A	MS	05/21/13 2009
Chromium	34.5	ug/L		J 0.030	0.10	1.00	SW-846 6020A	MS	05/21/13 0022
Cobalt	1.11	ug/L		J 0.053	0.20	1.00	SW-846 6020A	MS	05/21/13 0022
Copper	5.99	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/21/13 0022
Iron	1710	ug/L		J 3.04	10.0	100	SW-846 6020A	MS	05/21/13 0022
Lead	12.6	ug/L		J 0.025	0.10	1.00	SW-846 6020A	MS	05/21/13 0022
Magnesium	42600	ug/L		52.2	200	1000	SW-846 6020A	MS	05/20/13 0138
Manganese	33.9	ug/L		J 0.27	1.00	5.00	SW-846 6020A	MS	05/21/13 0022
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/16/13 1810
Nickel	19.8	ug/L		J 0.26	1.00	1.00	SW-846 6020A	MS	05/21/13 0022
Potassium	2640	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/21/13 0022
Selenium	0.48	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/21/13 0022
Silver	0.020	ug/L	J	J 0.017	0.060	1.00	SW-846 6020A	MS	05/21/13 0022
Sodium	16400	ug/L		80.0	300	10000	SW-846 6020A	MS	05/20/13 0138
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/21/13 2016
Vanadium	4.45	ug/L		J 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 0022
Zinc	28.3	ug/L		J 1.31	5.00	20.0	SW-846 6020A	MS	05/21/13 0022

213050904 66

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49TM02

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090402

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 1225

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	3.05	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1115
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Barium (Diss	102	ug/L		0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/19/13 1016
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2327
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Calcium (Dis	81200	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 1016
Chromium (D	3.02	ug/L		J 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Cobalt (Diss	0.13	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Copper (Diss	1.08	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Iron (Dissolv	32.3	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 1115
Lead (Dissol	0.18	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Magnesium (	30500	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 1016
Manganese (	3.62	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/16/13 1824
Nickel (Disso	4.24	ug/L		J 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Potassium (	1920	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 1115
Selenium (Di	0.31	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Sodium (Diss	13500	ug/L		80.0	300	10000	SW-846 6020A Dissolved	MS	05/19/13 1016
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1115
Vanadium (D	0.20	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 1955
Zinc (Dissolv	5.40	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1115

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: RB050813

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090403

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 1320

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	16.0	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A	MS	05/21/13 0029
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 0029
Arsenic	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A	MS	05/21/13 0029
Barium	0.18	ug/L	J	J 0.077	0.30	1.00	SW-846 6020A	MS	05/21/13 0029
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/21/13 0029
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/21/13 0029
Calcium	74.8	ug/L	J	J 43.4	100	100	SW-846 6020A	MS	05/21/13 0029
Chromium	0.10	ug/L	J	J 0.030	0.10	1.00	SW-846 6020A	MS	05/21/13 0029
Cobalt	0.066	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A	MS	05/21/13 0029
Copper	0.18	ug/L	J	J 0.093	0.30	1.00	SW-846 6020A	MS	05/21/13 0029
Iron	3.21	ug/L	J	J 3.04	10.0	100	SW-846 6020A	MS	05/21/13 0029
Lead	0.038	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/21/13 0029
Magnesium	7.79	ug/L	J	J 5.22	20.0	100	SW-846 6020A	MS	05/21/13 0029
Manganese	0.30	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A	MS	05/21/13 0029
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/16/13 1815
Nickel	1.00	ug/L	U	0.26	1.00	1.00	SW-846 6020A	MS	05/21/13 0029
Potassium	30.0	ug/L	U	9.98	30.0	100	SW-846 6020A	MS	05/21/13 0029
Selenium	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A	MS	05/21/13 0029
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/21/13 0029
Sodium	20.4	ug/L	J	J 8.00	30.0	1000	SW-846 6020A	MS	05/21/13 0029
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/21/13 0029
Vanadium	0.62	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 0029
Zinc	5.00	ug/L	U	1.31	5.00	20.0	SW-846 6020A	MS	05/21/13 0029

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: RB050813

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090403

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 1320

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	6.00	ug/L	U	1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 2334
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Barium (Diss	0.30	ug/L	U	0.077	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2334
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Calcium (Dis	60.3	ug/L	J	J 43.4	100	100	SW-846 6020A Dissolved	MS	05/19/13 1144
Chromium (D	1.24	ug/L		0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Cobalt (Diss	0.20	ug/L	U	0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Copper (Diss	0.72	ug/L	J	J 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Iron (Dissolv	6.58	ug/L	J	J 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 1144
Lead (Dissol	0.036	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Magnesium (	20.0	ug/L	U	5.22	20.0	100	SW-846 6020A Dissolved	MS	05/19/13 1144
Manganese (	1.00	ug/L	U	0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/16/13 1826
Nickel (Disso	0.51	ug/L	J	J 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Potassium (	10.4	ug/L	J	J 9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 1144
Selenium (Di	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Sodium (Diss	21.3	ug/L	J	J 8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/19/13 2334
Thallium (Dis	0.080	ug/L	J	J 0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1144
Vanadium (D	0.30	ug/L	U	0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 2334
Zinc (Dissolv	1.85	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1144

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 50MW02

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090404

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 1225

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	519	ug/L		J 1.66	6.00	20.0	SW-846 6020A	MS	05/21/13 0037
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 0037
Arsenic	0.36	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A	MS	05/21/13 0037
Barium	105	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/20/13 0146
Beryllium	0.068	ug/L	J	J 0.049	0.10	1.00	SW-846 6020A	MS	05/21/13 0037
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/21/13 0037
Calcium	87300	ug/L		J 434	1000	1000	SW-846 6020A	MS	05/20/13 0146
Chromium	5.01	ug/L		J 0.030	0.10	1.00	SW-846 6020A	MS	05/21/13 0037
Cobalt	0.39	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A	MS	05/21/13 0037
Copper	2.09	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/21/13 0037
Iron	652	ug/L		J 3.04	10.0	100	SW-846 6020A	MS	05/21/13 0037
Lead	5.27	ug/L		J 0.025	0.10	1.00	SW-846 6020A	MS	05/21/13 0037
Magnesium	36100	ug/L		52.2	200	1000	SW-846 6020A	MS	05/20/13 0146
Manganese	12.8	ug/L		J 0.27	1.00	5.00	SW-846 6020A	MS	05/21/13 0037
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/16/13 1817
Nickel	3.74	ug/L		J 0.26	1.00	1.00	SW-846 6020A	MS	05/21/13 0037
Potassium	2190	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/21/13 0037
Selenium	0.36	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/21/13 0037
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/21/13 0037
Sodium	15200	ug/L		80.0	300	10000	SW-846 6020A	MS	05/20/13 0146
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/21/13 0037
Vanadium	2.16	ug/L		B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 0037
Zinc	13.2	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/21/13 0037

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 50MW02

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090404

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 1225

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	4.00	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1038
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Barium (Diss	102	ug/L		0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/19/13 0918
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2228
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Calcium (Dis	80000	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 0918
Chromium (D	1.0	ug/L	J	J 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Cobalt (Diss	0.082	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Copper (Diss	0.90	ug/L	J	J 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Iron (Dissolv	23.1	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 1038
Lead (Dissol	0.20	ug/L	J	0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Magnesium (	30300	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 0918
Manganese (	2.30	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/16/13 1828
Nickel (Disso	2.28	ug/L		B 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Potassium (	1930	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 1038
Selenium (Di	0.30	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Sodium (Diss	13600	ug/L		J 80.0	300	10000	SW-846 6020A Dissolved	MS	05/19/13 0918
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1038
Vanadium (D	0.19	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/21/13 1925
Zinc (Dissolv	6.09	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1038

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW1

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090405

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 0945

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	1730	ug/L		1.66	6.00	20.0	SW-846 6020A	MS	05/21/13 0044
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 0044
Arsenic	1.12	ug/L		0.094	0.30	1.00	SW-846 6020A	MS	05/21/13 0044
Barium	134	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/20/13 0153
Beryllium	0.091	ug/L	J	J 0.049	0.10	1.00	SW-846 6020A	MS	05/21/13 0044
Cadmium	0.027	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A	MS	05/21/13 0044
Calcium	53600	ug/L		J 434	1000	1000	SW-846 6020A	MS	05/20/13 0153
Chromium	31.6	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/21/13 0044
Cobalt	4.54	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/21/13 0044
Copper	8.59	ug/L		0.093	0.30	1.00	SW-846 6020A	MS	05/21/13 0044
Iron	2870	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/21/13 0044
Lead	1.54	ug/L		0.025	0.10	1.00	SW-846 6020A	MS	05/21/13 0044
Magnesium	40900	ug/L		52.2	200	1000	SW-846 6020A	MS	05/20/13 0153
Manganese	49.4	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/21/13 0044
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/16/13 1819
Nickel	21.3	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/21/13 0044
Potassium	2280	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/21/13 0044
Selenium	0.59	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/21/13 0044
Silver	0.69	ug/L	J	J 0.017	0.060	1.00	SW-846 6020A	MS	05/21/13 0044
Sodium	16100	ug/L		80.0	300	10000	SW-846 6020A	MS	05/20/13 0153
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/21/13 0044
Vanadium	3.74	ug/L		J 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 0044
Zinc	30.5	ug/L		1.31	5.00	20.0	SW-846 6020A	MS	05/21/13 0044

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW1

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090405

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/08/13 | Time: 0945

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	5.38	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 2341
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Arsenic (Diss	0.10	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Barium (Diss	104	ug/L		0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/19/13 1024
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2341
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Calcium (Dis	43900	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 1024
Chromium (D	1.27	ug/L		0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Cobalt (Diss	0.75	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Copper (Diss	1.79	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Iron (Dissolv	19.3	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 1151
Lead (Dissol	0.031	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Magnesium (	32100	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 1024
Manganese (	6.11	ug/L		0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/16/13 1830
Nickel (Disso	9.57	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Potassium (	1620	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 1151
Selenium (Di	0.35	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Sodium (Diss	14600	ug/L		80.0	300	10000	SW-846 6020A Dissolved	MS	05/19/13 1024
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1151
Vanadium (D	0.30	ug/L	U	0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 2341
Zinc (Dissolv	20.0	ug/L		1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1151

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW03

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090406

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/07/13 | Time: 1455

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	39.2	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/21/13 0051
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 0051
Arsenic	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A	MS	05/21/13 0051
Barium	191	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/20/13 0200
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/21/13 0051
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/21/13 0051
Calcium	50700	ug/L		J 434	1000	1000	SW-846 6020A	MS	05/20/13 0200
Chromium	17.3	ug/L		J 0.030	0.10	1.00	SW-846 6020A	MS	05/21/13 0051
Cobalt	2.00	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/21/13 0051
Copper	2.83	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/21/13 0051
Iron	142	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/21/13 0051
Lead	0.12	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A	MS	05/21/13 0051
Magnesium	22700	ug/L		52.2	200	1000	SW-846 6020A	MS	05/20/13 0200
Manganese	6.58	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/21/13 0051
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/16/13 1821
Nickel	8.27	ug/L		J 0.26	1.00	1.00	SW-846 6020A	MS	05/21/13 0051
Potassium	1870	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/21/13 0051
Selenium	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A	MS	05/21/13 0051
Silver	2.45	ug/L		0.017	0.060	1.00	SW-846 6020A	MS	05/21/13 0051
Sodium	2180	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/21/13 0051
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/21/13 0051
Vanadium	0.59	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 0051
Zinc	8.29	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/21/13 0051

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW03

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050904

Level: (low / med) | % Solids: | Lab Sample ID: 21305090406

Date Received: 05/09/13 | Time: 0915 | Date Collected: 05/07/13 | Time: 1455

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (D	4.19	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 2349
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Barium (Diss	171	ug/L		0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/19/13 1031
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2349
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Calcium (Dis	43300	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 1031
Chromium (D	1.18	ug/L		0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Cobalt (Diss	0.75	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Copper (Diss	1.15	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Iron (Dissolv	13.3	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 1159
Lead (Dissol	0.10	ug/L	U	0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Magnesium (	18400	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 1031
Manganese (	3.69	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/16/13 1831
Nickel (Disso	3.88	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Potassium (	1630	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 1159
Selenium (Di	0.40	ug/L	U	0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Sodium (Diss	2040	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/19/13 2349
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 1159
Vanadium (D	0.30	ug/L	U	0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 2349
Zinc (Dissolv	5.27	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 1159

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: RFAAP Data Validation – Methane, Ethane, and Ethene
GCAL Laboratories, Inc., SDG 213050904

DATE: July 8, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013. The samples were analyzed for methane, ethane, and ethene using laboratory method RSK-175. A total of five aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49TM01	213050904-01	50MW02	213050904-04
49TM02	213050904-02	48MW1	213050904-05
RB050813	213050904-03		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
	X	Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable.

Eric Malarek, Chemist

7/8/13
Date

RFAAP VALIDATION REPORT
DISSOLVED GASES REVIEW
SDG 213050904

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For methane, ethane, and ethene, aqueous samples are cooled @ 4°C ± 2°C; the maximum holding time is 7 days un-preserved and 14 days preserved to pH<2 with HCl from sample collection to analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/07/13, the coolers were received by the laboratory (GCAL) on 05/09/13 at 4.5°C and 5.4°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 05/07/13. They were prepped and analyzed for the dissolved gases on 05/20/13. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the calibration factors on which the quantitations are based. If linear regression is used for quantification, the correlation coefficient must be ≥0.995 for linearity fit (DoD QSM). If calibration factor method is used, the %RSD should be ≤20% (DoD QSM). All ICVs should be within 80-120% recovery limits (DoD QSM).

- For initial calibration performed on 03/04/13 on instrument GCV8, methane, ethane, and ethene were calibrated using calibration factors. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), and 48MW1 (213050904-05) apply to this initial calibration.

III-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis. If calibration factor method is used, the percent difference (%D) should all fall within the control criteria of ≤20% (DoD QSM). All CCVs should be within 80-120% recovery limits (DoD QSM).

- For initial calibration verification for methane, ethane, and ethene performed on 03/04/13 @17:20 on instrument GCV8, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. No groundwater samples were reported using this initial calibration verification.

- For continuing calibration for methane, ethane, and ethene performed on 05/20/13 @12:15 on instrument GCT GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this continuing calibration.

- For continuing calibration for methane, ethane, and ethene performed on 05/20/13 @15:06 on instrument GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. No groundwater samples were reported using this continuing calibration.

IV-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. The rinse blank RB050813 (213050904-03) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples (For this SDG)
05/16/13	MB1192265	All target <½MRL	NA	NA	None
05/20/13	RB050813	All target <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

V-System Monitoring Compound (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD aqueous surrogate recovery limits are specified in the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. .

Aqueous Criteria: Propene (43-143%)

- All criteria were met. No qualifiers were applied.

VI-Laboratory Control Sample

Data for laboratory control samples (LCS) are evaluated to determine long-term accuracy of the analytical method on various matrices. DoD LCS aqueous recovery limits are specified in the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. Percent recoveries (%Rs) should be within the specified control limits.

- Sample LCS1193375 was used as LCS for methane, ethane, and ethene analysis performed on 05/20/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), and 48MW1 (213050904-05) apply to this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM MS and MSD recovery limits use the LCS criteria, which currently is the use of in-house specified limits (DoD, 2010).

- Sample 48MW3 (213051016-15) was used as MS/MSD for methane, ethane, and ethene analysis performed on 05/20/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), and 48MW1 (213050904-05) apply to this MS/MSD.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established in the Groundwater Monitored Natural Attenuation (GWMNA) QAPP at 50% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213051016-13) and 49TM01 (213050904-01) was analyzed for methane, ethane, and ethene analysis in this SDG. All target analytes were non-detect for the duplicate pair. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 50MW02 (213050904-04) and 49TM02 (213050904-02) was analyzed for methane, ethane, and ethene analysis in this SDG. All target analytes were non-detect for the duplicate pair. All criteria were met. No qualifiers were applied.

IX-Quantitation Verification and Data Review
The accuracy of analytical results was verified and data results reviewed. The following was determined:

- The percent difference (%D) between the calculated and the reported values should be within 10% through the calculation from the raw data provided. The calculation verification was confirmed within 10% difference.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J".

- The extraction sample volume is already accounted in the conversion of the ICAL standards from µl/L to µg/L. Both the ICAL standards and the samples are prepared in the same manner. Therefore, concentration of the sample calculated is based on the average response factor and the area counts of the analyte only.

Sample: LCS1193375, ethene

Conc. µg/L = (Ax * DF) / (CF)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
CF = Average relative calibration factor for compound being measured (from ICAL)
DF = Dilution factor

Conc. µg/L = (1230331 * 1) / (407896) = 3.02 µg/L
Reported Value = 3.02 µg/L

% Difference = 0.0%
Values were within 10% difference

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994).

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL

Lab Code: LA024 Case No.:

Matrix: Water

Sample wt/vol: 5 Units: mL

Level: (low/med)

% Moisture: decanted: (Y/N)

GC Column: GS-Q 30 ID: .53 (mm)

Concentrated Extract Volume: 5000 (µL)

Soil Aliquot Volume: (µL)

Injection Volume: 1 (µL)

GPC Cleanup: (Y/N) N pH:

Prep Batch: Analytical Batch: 507632

CONCENTRATION UNITS: ug/L

Sample ID: 49TM01

Contract:

SAS No.: SDG No.: 213050904

Lab Sample ID: 21305090401

Date Collected: 05/07/13 Time: 1455

Date Received: 05/09/13

Date Extracted:

Date Analyzed: 05/20/13 Time: 1325

Dilution Factor: 1 Analyst: BMR

Prep Method:

Analytical Method: RSK-175

Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A

Lab File ID: 2130520/v8007

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL

Lab Code: LA024 Case No.:

Matrix: Water

Sample wt/vol: 5 Units: mL

Level: (low/med)

% Moisture: decanted: (Y/N)

GC Column: GS-Q 30 ID: .53 (mm)

Concentrated Extract Volume: 5000 (µL)

Soil Aliquot Volume: (µL)

Injection Volume: 1 (µL)

GPC Cleanup: (Y/N) N pH:

Prep Batch: Analytical Batch: 507632

CONCENTRATION UNITS: ug/L

Sample ID: 49TM02

Contract:

SAS No.: SDG No.: 213050904

Lab Sample ID: 21305090402

Date Collected: 05/08/13 Time: 1225

Date Received: 05/09/13

Date Extracted:

Date Analyzed: 05/20/13 Time: 1331

Dilution Factor: 1 Analyst: BMR

Prep Method:

Analytical Method: RSK-175

Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A

Lab File ID: 2130520/v8008

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507632

Sample ID: RB050813
Contract:
SAS No.: SDG No.: 213050904
Lab Sample ID: 21305090403
Date Collected: 05/08/13 Time: 1320
Date Received: 05/09/13
Date Extracted:
Date Analyzed: 05/20/13 Time: 1337
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130520/v8009

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507632

Sample ID: 50MW02
Contract:
SAS No.: SDG No.: 213050904
Lab Sample ID: 21305090404
Date Collected: 05/08/13 Time: 1225
Date Received: 05/09/13
Date Extracted:
Date Analyzed: 05/20/13 Time: 1343
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130520/v8010

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507632

Sample ID: 48MW1
Contract:
SAS No.: SDG No.: 213050904
Lab Sample ID: 21305090405
Date Collected: 05/08/13 Time: 0945
Date Received: 05/09/13
Date Extracted:
Date Analyzed: 05/20/13 Time: 1359
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130520/v8011

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Chloride, Nitrate, and Sulfate
GCAL Laboratories, Inc., SDG 213050904

DATE: July 10, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013. Samples were analyzed for the anions chloride, nitrate, and sulfate using USEPA 300.0. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49TM01	213050904-01	50MW02	213050904-04
49TM02	213050904-02	48MW1	213050904-05
RB050813	213050904-03	49MW03	213050904-06

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), and method-specific criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial and Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Laboratory Duplicate Sample
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate Sample
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/10/13
Date

RFAAP VALIDATION REPORT
ANIONS REVIEW
SDG 213050904

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool 4°C±2°C and 28 days for sulfate and chloride and Cool to 4°C±2°C with H_2SO_4 to pH<2 and 2 days for nitrate. The dates and times were compared between the sample collection and laboratory analysis (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/07/13, the coolers were received by the laboratory (GCAL) on 05/09/13 at 4.5°C and 5.4°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: Samples were collected on 05/07/13. The samples were prepped and analyzed on 05/09/13 for nitrate analysis, on 05/09/13, 05/10/13, and 05/15/13 for chloride analysis, and on 05/09/13 and 05/10/13 for sulfate analysis. Sample collection dates may be found on the attached form 1s. All holding time criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration
Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

Anions: 1 – blank
5 – standards ($r \geq 0.995$ or $r^2 \geq 0.99$)
ICV/CCV (90-110%)
Method Reporting Limit (MRL) (75-125%)

- Chloride, sulfate, and nitrate analysis was calibrated on 03/27/13 using linear equation techniques. All correlation coefficients were ≥0.995 for chloride, sulfate, and nitrate. All ICV/CCV/MRL criteria were met for all anions and runs. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to these initial and continuing calibrations.

III-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) and <2MDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters, or 5 times (5x) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/L	Action Level mg/L	B qualified samples (for this SDG)
05/09/13	Sulfate	ICB/CCBs	<LOD	NA	None
05/09/13	Nitrate	ICB/CCBs	<LOD	NA	None
05/10/13	Chloride	ICB/CCBs	<LOD	NA	None
05/10/13	Sulfate	ICB/CCBs	<LOD	NA	None
05/10/13	Nitrate	ICB/CCBs	<LOD	NA	None
05/15/13	Chloride	ICB/CCBs	<LOD	NA	None
05/08/13	Sulfate	MB1189869	<½MRL	NA	None
05/08/13	Nitrate	MB1189869	<½MRL	NA	None
05/09/13	Chloride	MB1190253	<½MRL	NA	None
05/09/13	Sulfate	MB1190253	<½MRL	NA	None
05/09/13	Nitrate	MB1190253	<½MRL	NA	None
05/14/13	Chloride	MB1191465	<½MRL	NA	None
05/09/13	Chloride	RB050813	0.040J	0.20	None
05/09/13	Sulfate	RB050813	0.047J	0.24	None
05/09/13	Nitrate	RB050813	<½MRL	NA	None

J = Estimated Value >MDL and <MRL
LOD = Limit of Detection
MRL = Method Reporting Limit
MDL = Method Detection Limit
NA = Not Applicable

IV-Laboratory Control Sample

The laboratory control sample (LCS) serve as a monitor of the overall performance of each step during the analysis, including the sample preparation. LCS are generated to determine long-term accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Per DoD QSM, all LCS results must fall within the specified control limits:

Anions: 80-120% (DOD QSM = 80-120%)

- Sample LCS1189870 was used as the aqueous LCS for sulfate and nitrate analysis on 05/08/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01) and 49MW03 (213050904-06) apply to this LCS.

- Sample LCS1190254 was used as the aqueous LCS for chloride, sulfate, and nitrate analysis on 05/09/13. All criteria were met. No qualifiers were applied. For chloride, samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this LCS. For sulfate and nitrate, samples 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), and 48MW1 (213050904-05) apply to this LCS.

- Sample LCS1191466 was used as the aqueous LCS for chloride analysis on 05/14/13. All criteria were met. No qualifiers were applied. Sample 50MW02 (213050904-04) applies to this LCS.

V-Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is performed to generate data in order to determine the long-term precision of the analytical method on various matrices. Per DoD QSM, RPDs must be within established control limits (≤25%RPD).

- No site lab duplicate was performed with this SDG; therefore, was not evaluated.

VI-Matrix Spike and Matrix Spike Duplicate
Matrix spikes (MSs) and MSDs are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples or preparatory batch of similar matrix. Per DoD QSM, MS/MSD recoveries and RPDs should be within the specified limits:

Anions: 75-125%; RPD≤25% (DOD QSM = 80-120%; RPD≤20%)

- Sample GW-9 (213050814-01) was used as the aqueous MS/MSD for sulfate analysis on 05/08/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated.

- Sample 50MW02 (213050904-04) was used as the aqueous MS/MSD for sulfate and nitrate analysis on 05/09-10/13. All criteria were met. No qualifiers were applied. Samples 49TM01 (213050904-01), 49TM02 (213050904-02), RB050813 (213050904-03), 50MW02 (213050904-04), 48MW1 (213050904-05), and 49MW03 (213050904-06) apply to this MS/MSD.

VII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213050904-06) and 49TM01 (213050904-01) was analyzed for chloride, sulfate, and nitrate analysis in this SDG. Chloride was detected at 5.93 mg/L in the parent sample and at 6.09 mg/L in the duplicate pair, resulting in a RPD of 2.7%. Nitrate was detected at 1.06 mg/L in the parent sample and at 1.02 mg/L in the duplicate pair, resulting in a RPD of 3.9%. Sulfate was detected at 2.93 mg/L in the parent sample and at 2.88 mg/L in the duplicate pair, resulting in a RPD of 1.7%. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 50MW02 (213050904-04) and 49TM02 (213050904-02) was analyzed for chloride, sulfate, and nitrate analysis in this SDG. Chloride was detected at 8.12 mg/L in the parent sample and at 7.57 mg/L in the duplicate pair, resulting in a RPD of 7.0%. Nitrate was detected at 2.31 mg/L in the parent sample and at 2.30 mg/L in the duplicate pair, resulting in a RPD of 0.4%. Sulfate was detected at 73.6 mg/L in the parent sample and at 69.9 mg/L in the duplicate pair, resulting in a RPD of 5.2%. All criteria were met. No qualifiers were applied.

VIII-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 49TM02 (213050904-02), sulfate

$Y = mX + b$

Y = Sample Area
m = slope of curve
X = Concentration (mg/L)
b = Y-intercept
DF = Dilution Factor

Given:
m = 0.2076
b = 0.0
Y = Area = 0.764
DF = 20

X = 3.68 mg/L * DF = 3.68 mg/L * 20 = 73.6 mg/L

Reported concentration = 73.6 mg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090401	49TM01	Water	05/07/2013 14:55	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/09/2013 10:26	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	1.02	0.500	0.020	mg/L
14808-79-8	Sulfate	2.88	0.200	0.020	mg/L

213050904 208

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090401	49TM01	Water	05/07/2013 14:55	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/09/2013 17:24	AEL	507006

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	6.09	0.200	0.020	mg/L

213050904 209

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090402	49TM02	Water	05/08/2013 12:25	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/09/2013 17:42	AEL	507006

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	2.31	0.500	0.020	mg/L

213050904 211

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090402	49TM02	Water	05/08/2013 12:25	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/10/2013 10:25	JEM	507006

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	8.12	0.200	0.020	mg/L

213050904 212

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090402	49TM02	Water	05/08/2013 12:25	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	05/10/2013 10:42	JEM	507006

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	73.6	4.00	0.400	mg/L

213050904 213

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090403	RB050813	Water	05/08/2013 13:20	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/09/2013 17:59	AEL	507006

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	**Chloride**	**0.040J** J	**0.100**	**0.010**	**mg/L**
14797-55-8	Nitrate	0.200U	0.500	0.020	mg/L
14808-79-8	**Sulfate**	**0.047J** J	**0.200**	**0.020**	**mg/L**

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090404	50MW02	Water	05/08/2013 12:25	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/09/2013 18:16	AEL	507006

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	2.30	0.500	0.020	mg/L

213050904 217

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090404	50MW02	Water	05/08/2013 12:25	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	05/15/2013 04:36	AEL	507284

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	7.57	0.500	0.050	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090404	50MW02	Water	05/08/2013 12:25	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			50	05/10/2013 12:09	JEM	507006

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	69.9	10.0	1.00	mg/L

213050904 219

Form 1 Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090405	48MW1	Water	05/08/2013 09:45	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/09/2013 19:09	AEL	507006

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	4.14	0.100	0.010	mg/L
14797-55-8	Nitrate	1.67	0.500	0.020	mg/L

213050904 221

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
213050904-05	48MW1	Water	05/08/2013 09:45	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	05/10/2013 13:36	JEM	507006

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	56.7	4.00	0.400	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090406	49MW03	Water	05/07/2013 14:55	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/09/2013 10:09	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	1.06	0.500	0.020	mg/L
14808-79-8	Sulfate	2.93	0.200	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305090406	49MW03	Water	05/07/2013 14:55	05/09/2013 09:15

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/09/2013 20:01	AEL	507006

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	5.93	0.200	0.020	mg/L

213050904 225

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: RFAAP Data Validation – Dioxin Furans
Cape Fear Laboratories, Inc. SDG 4817
(GCAL Laboratories, Inc., SDG 213050904)

DATE: July 10, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 07, 2013. The samples were analyzed for Dioxin Furan compounds using USEPA SW-846 Method 3520C/8290A High Resolution Gas Chromatography/High Resolution Mass Spectroscopy (HRGC/HRMS). A total of three aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Lab Sample ID
49TM02	4817-001	213050904-02
RB050813	4817-002	213050904-03
50MW02	4817-003	213050904-04

Data were reviewed and validated using a combination of project QAPP, *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Blank Analysis
	X	Instrument Performance Check
	X	Initial Calibration
	X	Continuing Calibration
	X	Internal Standards (IS) Recovery Standard Solutions
	X	Cleanup Standards
	X	Laboratory Control Standard or Ongoing Precision Result (OPR)
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/10/13
Date

RFAAP VALIDATION REPORT
DIOXIN AND FURAN REVIEW
SDG 4817
(GCAL SDG 213050904)

I-Holding Times and Preservation

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample extraction and analysis. Holding time criteria: For dioxin furan compounds in cooled @4°C ± 2°C aqueous samples, the maximum holding time is 30 days from sample collection to preparative extraction and 45 days from preparative extraction to determinative analysis (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/07/13, the coolers were received by the laboratory (GCAL) on 05/09/13 at 4.5°C and 5.4°C. The dioxin subcontract laboratory (Cape Fear Laboratories, Inc.) received the samples from GCAL on 05/13/12 recorded at 1.5°C. Even though the cooler temperature was below criteria; there were no impacts for the sample analysis and no qualifiers were applied based upon this outlier. For the remaining coolers, all criteria were met.

- Holding Time Review: The groundwater samples were collected on 05/07/13. The samples were extracted on 05/14/13 and analyzed on 05/17/13. The prep and analysis dates for each sample may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Blank Analysis

The purpose of laboratory (or field) blank analyses is to determine the existence and magnitude of contamination problems resulting from field and laboratory activities. No contamination should be found in any of the blanks >EDL. The DoD QSM criteria specifies all concentrations should be less than LOD (i.e. <2EDL). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants OCDD or OCDF, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank RB050813 (4817-002; 213050904-03) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. pg/L	Action Level pg/L	B qualified samples (for this SDG)
05/17/13	MB-12008126	All target <EDL	NA	NA	None
05/17/13	RB050813	All target <EDL	NA	NA	None

EDL = Estimated Detection Limit
NA = Not Applicable
SDG= Sample Delivery Group

III-Instrument Performance Check
Instrument must be tuned with perfluorokerosene (PFK) to achieve a static resolving power of at least 10,000 (10% valley) and lock-mass ion between lowest and highest masses for each descriptor and level of reference compound ≤10%. Documentation of the mass spectrometer resolving power is accomplished by recording the peak profile of the high-mass reference signal (typically m/z 330.9792) obtained during a peak examination by using the low-mass PFK ion at m/z 292.9825 or lower in mass as reference. At the beginning of the each 12-hour period, the chromatographic resolution is verified in the same fashion as in the initial calibration through the analysis of HRCC solution on the DB-5 (or equivalent) column or through the analysis of the column performance solution on the SP-2331 or SP-225 (or equivalent) column. A 25% valley must be achieved between the close eluters.

- All PFK forms were verified and found to be in compliance with method specification. No qualifiers were applied.

IV-Initial Calibration
Once the window defining mix has been analyzed and the descriptor switching times have been verified, the five point calibration solutions can be analyzed prior to sample analysis. Per method and DoD QSM, the initial calibration criteria are as follows:

  - The percent relative standard deviations for the mean response factors RRF(n) from the 17 unlabeled standards must not exceed ±20%, and those for the labeled reference compounds must not exceed ±20%;
  - The signal to noise ratio ≥10% for all target ions;
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- For initial calibration performed on 05/13/13 for all target compounds on instrument HRP750_2, all criteria were met. No qualifiers were applied. Samples 49TM02 (4817-001; 213050904-02), RB050813 (4817-002; 213050904-03), and 50MW02 (4817-003; 213050904-04) apply to this initial calibration.

V-Continuing Calibration
The continuing calibration consists of two parts: evaluation of the mass resolution and retention time check. Per method and DoD QSM, the following stipulates the continuing calibration criteria.

  - The signal signal-to-noise ratio (S/N) must be at least 10:1 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard for each analyte.
  - The relative response factor of each analyte for the unlabeled standard must be within ±20% of the average RF obtained from the initial calibration, and the RRF of each labeled standard must be within ±30% of the average RRF established during initial calibration. This is expressed in term of percent difference %D.
  - Ion abundance ratios must be within the specified control limits in Table 8 (SW846 Method 8290).

- For continuing calibration performed on 05/16/13 @09:56 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 05/16/13 @21:05 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 05/17/13 @08:23 on instrument HRP750_2, all criteria were met. No qualifiers were applied. Samples 49TM02 (4817-001; 213050904-02), RB050813 (4817-002; 213050904-03), and 50MW02 (4817-003; 213050904-04) apply to this continuing calibration.

- For continuing calibration performed on 05/17/13 @16:30 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 05/18/13 @03:48 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 05/18/13 @14:18 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 05/19/13 @01:36 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

- For continuing calibration performed on 05/19/13 @09:42 on instrument HRP750_2, all criteria were met. No qualifiers were applied. No samples reported apply to this continuing calibration.

VI-Internal Standards (IS) Recovery Standard Solutions
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: Recoveries of the isotopically-labeled recovery standards to fall within the 40 to 135 percent range for the tetra- through octachlorinated congeners, or as stated in the data package (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VII-Cleanup Standards
Cleanup standards are added to every sample, blank, quality control sample, and calibration solution. This compound is added to the samples after extraction but prior to cleanup and is used to verify the percent recovery obtained using the isotope dilution technique. The control limits are 40 to 135 percent (DoD QSM limits 40-135%).

- All criteria were met. No qualifiers were applied.

VIII-Laboratory Control Standard (LCS) or Ongoing Precision Result (OPR)
LCSs and LCS duplicates (LCSD) are used to monitor laboratory accuracy and precision by calculating the percent recoveries of the spiked compounds. Per DoD QSM, the percent recoveries (%Rs) must be within the specified in-house control limits (70-130%) and the relative percent difference RPD ≤20%.

- Samples LCS-12008127 and LCS-12008128 were used as LCS/LCSD. All criteria were met. No qualifiers were applied. Samples 49TM02 (4817-001; 213050904-02), RB050813 (4817-002; 213050904-03), and 50MW02 (4817-003; 213050904-04) apply to this LCS/LCSD.

IX-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Per DoD QSM, the percent recoveries (%Rs) must be within the specified in-house control limits (70-130%) and the relative percent difference RPD ≤20%.

- No project aqueous MS/MSD was analyzed for dioxin and furans with this SDG; therefore, it was not evaluated. See Section VIII for lab accuracy and precision statements using LCS/LCSD.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples. Analytical results were qualified as estimated (J) for any RPDs exceeding criteria.

- Field groundwater sample duplicate pair 50MW02 (4817-003; 213050904-04) and 49TM02 (4817-001; 213050904-02) was collected for dioxin and furans. Target 1,2,3,4,6,7,8,9-OCDD was non-detect at <6.21 pg/L (PQL=133 pg/L) in the parent sample and detected at trace levels at 43.1J pg/L (PQL=108 pg/L). No qualifiers were applied based upon this outlier. All other target compounds were non-detect. All criteria were met. No qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results was verified through the calculation for a target compound concentration. The percent difference (%D) between the calculated and the reported values should be within 10%. Any sample value >EDL and <MRL was qualified as estimated, "J." Any value reported by the laboratory as estimated "A" based on an analyte to internal standard ratio below the calibration curve was qualified as estimated "J". The signal signal-to-noise ratio (S/N) must be greater than 2.5 for each selected ion current profile (SICP) and for each GC signal representing the elution of a target analyte or labeled standard. Any detected value with ether interference (I-lab flag) was qualified as estimated "J". For where the ion ratio failed the 25% criteria, the estimated maximum possible concentration (EMPC) was reported and flagged estimated "J". The following calculations were performed for verification.

Note: The sample form 1 data attached to this report are reported as pg/L. For conversion, 1,000,000 pg/L is equal to 1,000 ng/L is equal to 1 µg/L.

Sample: 49TM02 (4817-001; 213050904-02), 1,2,3,4,6,7,8,9-OCDD

A(x) = sum of the integrated ion abundances of the quantitation ions for the unlabeled ions;
A(is) = sum of the integrated ion abundances of the quantitation ions for the labeled ions;
Q(is) = quantity, in ng/ul, of the internal standard added to the sample before extraction;
W = weight, in g, of the sample (solid or organic liquid) as dry weight, or volume in mL of an aqueous sample; and
Avg. RRF(n) = calculated mean relative response factor for the unlabeled analyte.

$$\text{Conc. (ng/L)} = \frac{(A(x)) * Q(is) * 1000}{A(is) * W * \text{Avg. RRF}} = \frac{(1100+1260) * 4.0 * 1000}{(107000+116000) * 928.5 * 1.0556} = 0.0432 \text{ ng/L}$$

Reported Value = 0.0432 ng/L = 43.2 pg/L
% Difference = 0.0%
Values were within 10% difference

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
E	Identifies compounds whose concentrations exceed the upper level of the calibration range (organics) or Reported value is estimated because of the presence of interferences.
D	Indicates sample was analyzed at a dilution.
EMPC	The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).
P	Target analyte confirmation >40% RPD for detected compound between the primary and secondary columns.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with USEPA conventions and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate.
[2]The USEPA data validation qualifiers are referenced from *USEPA Region III Dioxin/Furan Data Validation Guidance* (March, 1999) and *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994).

Form I Copy

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	213050904	**Client:**	GCAL001	**Project:**	GCAL00111
Lab Sample ID:	4817001	**Date Collected:**	05/08/2013 12:25	**Matrix:**	WATER
Client Sample:	8290 Water	**Date Received:**	05/10/2013 11:05		
Client ID:	49TM02			**Prep Basis:**	As Received
Batch ID:	23498	**Method:**	SW846 8290A		
Run Date:	05/17/2013 10:07	**Analyst:**	MJC	**Instrument:**	HRP750
Data File:	A16MAY13A_3-2			**Dilution:**	1
Prep Batch:	23495	**Prep Method:**	SW846 3520C		
Prep Date:	14-MAY-13	**Aliquot:**	928.5 mL		

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.27		pg/L	1.27	10.8
40321-76-4	1,2,3,7,8-PeCDD	U	1.68		pg/L	1.68	53.9
39227-28-6	1,2,3,4,7,8-HxCDD	U	2.95		pg/L	2.95	53.9
57653-85-7	1,2,3,6,7,8-HxCDD	U	2.74		pg/L	2.74	53.9
19408-74-3	1,2,3,7,8,9-HxCDD	U	2.95		pg/L	2.95	53.9
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	4.09		pg/L	4.09	53.9
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	43.1		pg/L	14.4	108
51207-31-9	2,3,7,8-TCDF	U	1.54		pg/L	1.54	10.8
57117-41-6	1,2,3,7,8-PeCDF	U	1.82		pg/L	1.82	53.9
57117-31-4	2,3,4,7,8-PeCDF	U	1.8		pg/L	1.80	53.9
70648-26-9	1,2,3,4,7,8-HxCDF	U	1.45		pg/L	1.45	53.9
57117-44-9	1,2,3,6,7,8-HxCDF	U	1.31		pg/L	1.31	53.9
60851-34-5	2,3,4,6,7,8-HxCDF	U	1.43		pg/L	1.43	53.9
72918-21-9	1,2,3,7,8,9-HxCDF	U	1.74		pg/L	1.74	53.9
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	1.61		pg/L	1.61	53.9
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	2.2		pg/L	2.20	53.9
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	8.12		pg/L	8.12	108
41903-57-5	Total Tetrachlorodibenzo-p-dioxin	U	1.27		pg/L	1.27	10.8
36088-22-9	Total Pentachlorodibenzo-p-dioxin	U	1.68		pg/L	1.68	53.9
34465-46-8	Total Hexachlorodibenzo-p-dioxin	U	2.74		pg/L	2.74	53.9
37871-00-4	Total Heptachlorodibenzo-p-dioxin	U	4.09		pg/L	4.09	53.9
30402-14-3	Total Tetrachlorodibenzofuran	U	1.54		pg/L	1.54	10.8
30402-15-4	Total Pentachlorodibenzofuran	U	1.24		pg/L	1.24	53.9
55684-94-1	Total Hexachlorodibenzofuran	U	1.31		pg/L	1.31	53.9
38998-75-3	Total Heptachlorodibenzofuran	U	1.61		pg/L	1.61	53.9
3333-30-0	TEQ WHO2005 ND=0		0.0129	0.0129	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		2.63	2.63	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1790	2150	pg/L	83.2	(40%-135%)
13C-1,2,3,7,8-PeCDD		1810	2150	pg/L	84.1	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1610	2150	pg/L	74.8	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1780	2150	pg/L	82.6	(40%-135%)
13C-OCDD		3150	4310	pg/L	73.1	(40%-135%)
13C-2,3,7,8-TCDF		1820	2150	pg/L	84.4	(40%-135%)
13C-1,2,3,7,8-PeCDF		1880	2150	pg/L	87.3	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1560	2150	pg/L	72.3	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1690	2150	pg/L	78.3	(40%-135%)

Comments:

J Value is estimated

U Analyte was analyzed for , but not detected above the specified detection limit.

Form I Copy

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	213050904	**Client:**	GCAL001	**Project:**	GCAL00111
Lab Sample ID:	4817002	**Date Collected:**	05/08/2013 13:20	**Matrix:**	WATER
Client Sample:	8290 Water	**Date Received:**	05/10/2013 11:50		
Client ID:	RB050813			**Prep Basis:**	As Received
Batch ID:	23498	**Method:**	SW846 8290A		
Run Date:	05/17/2013 10:55	**Analyst:**	MJC	**Instrument:**	HRP750
Data File:	A16MAY13A_3-3			**Dilution:**	1
Prep Batch:	23495	**Prep Method:**	SW846 3520C		
Prep Date:	14-MAY-13	**Aliquot:**	962.3 mL		

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.12		pg/L	1.12	10.4
40321-76-4	1,2,3,7,8-PeCDD	U	1.17		pg/L	1.17	52.0
39227-28-6	1,2,3,4,7,8-HxCDD	U	2.81		pg/L	2.81	52.0
57653-85-7	1,2,3,6,7,8-HxCDD	U	2.62		pg/L	2.62	52.0
19408-74-3	1,2,3,7,8,9-HxCDD	U	2.83		pg/L	2.83	52.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	3.99		pg/L	3.99	52.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	6.46		pg/L	6.46	104
51207-31-9	2,3,7,8-TCDF	U	1.43		pg/L	1.43	10.4
57117-41-6	1,2,3,7,8-PeCDF	U	1.42		pg/L	1.42	52.0
57117-31-4	2,3,4,7,8-PeCDF	U	1.4		pg/L	1.40	52.0
70648-26-9	1,2,3,4,7,8-HxCDF	U	1.14		pg/L	1.14	52.0
57117-44-9	1,2,3,6,7,8-HxCDF	U	1.02		pg/L	1.02	52.0
60851-34-5	2,3,4,6,7,8-HxCDF	U	1.12		pg/L	1.12	52.0
72918-21-9	1,2,3,7,8,9-HxCDF	U	1.36		pg/L	1.36	52.0
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	1.21		pg/L	1.21	52.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	1.65		pg/L	1.65	52.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	5.42		pg/L	5.42	104
41903-57-5	Total Tetrachlorodibenzo-p-dioxin	U	1.12		pg/L	1.12	10.4
36088-22-9	Total Pentachlorodibenzo-p-dioxin	U	1.17		pg/L	1.17	52.0
34465-46-8	Total Hexachlorodibenzo-p-dioxin	U	2.62		pg/L	2.62	52.0
37871-00-4	Total Heptachlorodibenzo-p-dioxin	U	3.99		pg/L	3.99	52.0
30402-14-3	Total Tetrachlorodibenzofuran	U	1.43		pg/L	1.43	10.4
30402-15-4	Total Pentachlorodibenzofuran	U	1.4		pg/L	1.40	52.0
55684-94-1	Total Hexachlorodibenzofuran	U	1.02		pg/L	1.02	52.0
38998-75-3	Total Heptachlorodibenzofuran	U	1.21		pg/L	1.21	52.0
3333-30-0	TEQ WHO2005 ND=0		0.00	0.00	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		2.13	2.13	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1910	2080	pg/L	91.9	(40%-135%)
13C-1,2,3,7,8-PeCDD		2000	2080	pg/L	96.0	(40%-135%)
13C-1,2,3,6,7,8-HxCDD		1750	2080	pg/L	84.2	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		1810	2080	pg/L	87.3	(40%-135%)
13C-OCDD		3050	4160	pg/L	73.3	(40%-135%)
13C-2,3,7,8-TCDF		1930	2080	pg/L	93.0	(40%-135%)
13C-1,2,3,7,8-PeCDF		1960	2080	pg/L	94.3	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1690	2080	pg/L	81.5	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		1780	2080	pg/L	85.4	(40%-135%)

Comments:

U Analyte was analyzed for , but not detected above the specified detection limit.

Form I Copy

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	213050904	**Client:**	GCAL001	**Project:**	GCAL00111
Lab Sample ID:	4817003	**Date Collected:**	05/08/2013 12:25	**Matrix:**	WATER
Client Sample:	8290 Water	**Date Received:**	05/10/2013 11:50		
Client ID:	50MW02			**Prep Basis:**	As Received
Batch ID:	23498	**Method:**	SW846 8290A		
Run Date:	05/17/2013 11:43	**Analyst:**	MJC	**Instrument:**	HRP750
Data File:	A16MAY13A_3-4			**Dilution:**	1
Prep Batch:	23495	**Prep Method:**	SW846 3520C		
Prep Date:	14-MAY-13	**Aliquot:**	753.7 mL		

CAS No.	Parmname	Qual	Result	EMPC	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.48		pg/L	1.48	13.3
40321-76-4	1,2,3,7,8-PeCDD	U	1.73		pg/L	1.73	66.3
39227-28-6	1,2,3,4,7,8-HxCDD	U	3.9		pg/L	3.90	66.3
57653-85-7	1,2,3,6,7,8-HxCDD	U	3.66		pg/L	3.66	66.3
19408-74-3	1,2,3,7,8,9-HxCDD	U	3.93		pg/L	3.93	66.3
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	4.94		pg/L	4.94	66.3
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	6.21		pg/L	6.21	133
51207-31-9	2,3,7,8-TCDF	U	1.95		pg/L	1.95	13.3
57117-41-6	1,2,3,7,8-PeCDF	U	1.95		pg/L	1.95	66.3
57117-31-4	2,3,4,7,8-PeCDF	U	1.92		pg/L	1.92	66.3
70648-26-9	1,2,3,4,7,8-HxCDF	U	1.74		pg/L	1.74	66.3
57117-44-9	1,2,3,6,7,8-HxCDF	U	1.56		pg/L	1.56	66.3
60851-34-5	2,3,4,6,7,8-HxCDF	U	1.72		pg/L	1.72	66.3
72918-21-9	1,2,3,7,8,9-HxCDF	U	2.08		pg/L	2.08	66.3
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	1.54		pg/L	1.54	66.3
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	2.11		pg/L	2.11	66.3
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	8.2		pg/L	8.20	133
41903-57-5	Total Tetrachlorodibenzo-p-dioxin	U	1.48		pg/L	1.48	13.3
36088-22-9	Total Pentachlorodibenzo-p-dioxin	U	1.73		pg/L	1.73	66.3
34465-46-8	Total Hexachlorodibenzo-p-dioxin	U	3.66		pg/L	3.66	66.3
37871-00-4	Total Heptachlorodibenzo-p-dioxin	U	4.94		pg/L	4.94	66.3
30402-14-3	Total Tetrachlorodibenzofuran	U	1.95		pg/L	1.95	13.3
30402-15-4	Total Pentachlorodibenzofuran	U	1.26		pg/L	1.26	66.3
55684-94-1	Total Hexachlorodibenzofuran	U	1.56		pg/L	1.56	66.3
38998-75-3	Total Heptachlorodibenzofuran	U	1.54		pg/L	1.54	66.3
3333-30-0	TEQ WHO2005 ND=0		0.00	0.00	pg/L		
3333-30-1	TEQ WHO2005 ND=0.5		2.99	2.99	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		2240	2650	pg/L	84.4	(40%-135%)
13C-1,2,3,7,8-PeCDD		2280	2650	pg/L	86.0	(40%-135%)
13C-1,2,3;6,7,8-HxCDD		2030	2650	pg/L	76.4	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDD		2230	2650	pg/L	84.2	(40%-135%)
13C-OCDD		3990	5310	pg/L	75.2	(40%-135%)
13C-2,3,7,8-TCDF		2260	2650	pg/L	85.3	(40%-135%)
13C-1,2,3,7,8-PeCDF		2300	2650	pg/L	86.8	(40%-135%)
13C-1,2,3,6,7,8-HxCDF		1920	2650	pg/L	72.3	(40%-135%)
13C-1,2,3,4,6,7,8-HpCDF		2130	2650	pg/L	80.3	(40%-135%)

Comments:

U Analyte was analyzed for , but not detected above the specified detection limit.

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Total Organic Carbon
GCAL Laboratories, Inc., SDG 213050810

DATE: July 3, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 06, 2013. Samples were analyzed for Total Organic Carbon (TOC) using SM 5310B. A total of seven aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW04	213050810-01	13MW4	213050810-05
13MW2	213050810-02	13MW3	213050810-06
49MW05	213050810-03	48MW06	213050810-07
13MW5	213050810-04		

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), and method-specific criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial and Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample and Laboratory Control Sample Duplicate
	X	Matrix Spike and Spike Duplicate
	X	Laboratory Duplicate
	X	Field Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/3/13
Date

RFAAP VALIDATION REPORT
TOC REVIEW
SDG 213050810

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool 4°C±2°C, HCl pH<2, 28 days for TOC (USEPA criteria). The dates and times were compared between the sample collection and laboratory analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/06/13, the cooler was received by the laboratory (GCAL) on 05/08/13 at 2.9°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The samples were collected on 05/06/13. The TOC analysis was run on 05/08/13. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifier was applied.

II-Initial and Continuing Calibration
Bench and run summary sheets were reviewed to determine whether calibration was performed at the beginning of sample analysis using the following criteria. Percent recoveries for initial and continuing calibration (90-110%) must be within limits.

TOC: 1 - blank
5 - standards ($r \geq 0.995$)
ICV/CCV (90-110%)

- The TOC analysis was run on 05/08/13. The initial calibration for TC was analyzed on 03/06/13 with a coefficient of determination of 0.9997. The initial calibration for TIC was analyzed on 03/06/13 with a coefficient of determination of 0.9994. The ICV and CCVs were evaluated for where they bracketed reported samples. All ICV/CCVs that bracketed reported samples were within criteria. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to these initial and continuing calibrations.

III-Blank Analysis
The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½ MRL (<MRL for common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) and <LOD (i.e. <2MDL) for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters, or 5 times (5x) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/L	Action Level mg/L	B qualified samples (For this SDG)
05/08/13	TOC	ICB/CCBs	<LOD	NA	None
05/08/13	TOC	MB1189736	<½MRL	NA	None
05/10/13	TOC	RB050813	<½MRL	NA	None

LOD = Limit of Detection
MRL = Method Reporting Limit
MDL = Method Detection Limit
NA = Not Applicable

IV-Laboratory Control Sample and Laboratory Control Sample Duplicate
The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) serve as a monitor of the overall performance of each step during the analysis, including the sample preparation. LCS and LCSD are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. All aqueous LCS results must fall within the control limits (80-120%; RPD≤25%).

- Samples LCS1189737 and LCS1189738 were used as the aqueous LCS/LCSD for TOC analysis on 05/08/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LCS/LCSD.

V-Matrix Spike and Spike Duplicate
Matrix spikes (MSs) and matrix spike duplicates (MSDs) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. The percent recoveries (%Rs or RPD) must be within the specified control limits (75-125%; RPD≤25%).

- Sample was 13MW3 (213050810-06) was used as the aqueous MS/MSD for TOC analysis on 05/08/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this MS/MSD.

- Sample was PZ-PRW1 (213050808-01) was used as the aqueous MS/MSD for TOC analysis on 05/09/13. The spiked sample was not a site specific sample; therefore, was not evaluated.

VI-Laboratory Duplicate Sample Analysis
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits (≤25%RPD).

- No aqueous laboratory duplicate was analyzed for TOC with this SDG; therefore, it was not evaluated. See Section IV for lab precision statements using LCS/LCSD.

VII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- No site field groundwater sample duplicate pair was analyzed for TOC analysis in this SDG; therefore, was not evaluated.

VIII-Quantitation Verification and Data Review

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 49MW04 (213050810-01), TOC

TC: Y = m*X (mg/L) + b	TIC: Y = m*X (mg/L) + b
m = 4.532	m = 4.754
b = -1.173	b = -2.213
Y = 242.8	Y = 243.8
DF = 1	DF = 1
X = (53.83 mg/L) * 1 = 53.83 mg/L	X = (51.75 mg/L) * 1 = 51.75 mg/L

TOC (mg/L) = TC (mg/L) – TIC (mg/L) = 53.83 – 51.75 = 2.08 mg/L = 2.1 mg/L

Reported Value = 2.1 mg/L
% Difference = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081001	49MW04	Water	05/06/2013 09:20	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 20:17	AEL	506905

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	2.1	1.0	0.30	mg/L

213050810 180

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081002	13MW2	Water	05/06/2013 10:55	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 20:40	AEL	506905

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	1.0U	1.0	0.30	mg/L

213050810 183

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
213050810003	49MW05	Water	05/06/2013 12:35	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 21:03	AEL	506905

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	2.8	1.0	0.30	mg/L

213050810 186

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081004	13MW5	Water	05/06/2013 13:50	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 21:23	AEL	506905

CAS#	Parameter	Result		RDL	MDL	Units
C-012	Total Organic Carbon	0.66J	J	1.0	0.30	mg/L

213050810 190

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081005	13MW4	Water	05/06/2013 15:10	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 21:46	AEL	506905

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	1.0U	1.0	0.30	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081006	13MW3	Water	05/08/2013 16:20	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 22:06	AEL	506905

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	1.0U	1.0	0.30	mg/L

213050810 198

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081007	48MW06	Water	05/07/2013 10:33	05/08/2013 09:20

SM 5310B TOC

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	05/09/2013 09:03	AEL	506905

CAS#	Parameter	Result	RDL	MDL	Units
C-012	Total Organic Carbon	55.3	10.0	3.0	mg/L

213050810 202

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: PTA Data Validation – TAL Metals
GCAL Laboratories, Inc., SDG 213050810

DATE: July 3, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 06, 2013. The aqueous samples were analyzed for total and dissolved target analyte list (TAL) metals using USEPA SW-846 3005A/3010A/6020A and for mercury using SW-846 7470A. A total of seven aqueous samples were validated. The sample Ids are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW04	213050810-01	13MW4	213050810-05
13MW2	213050810-02	13MW3	213050810-06
49MW05	213050810-03	48MW06	213050810-07
13MW5	213050810-04		

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	ICPMS Performance Check Sample
X		Initial and Continuing Calibration
X		Blank Analysis
	X	ICPMS Interference Check Sample (ICS)
	X	Laboratory Control Sample (LCS)
	X	Laboratory Duplicate
	X	Matrix Spike (MS) and Spike Duplicate (MSD)
	X	Field Duplicate
X		Serial Dilution
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/3/13
Date

RFAAP VALIDATION REPORT
METALS REVIEW
SDG 213050810

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. For TAL metals analysis, aqueous samples are received and stored at cool @4°C±2°C and preserved to pH<2 with nitric acid with a maximum holding time of 180 days for ICPMS metals (28 days for mercury) from collection (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/06/13, the cooler was received by the laboratory (GCAL) on 05/08/13 at 2.9°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 05/06/13 for TAL metals. For ICPMS metals, the aqueous samples were digested on 05/08/13 and analyzed on 05/19/13 and 05/21/13 (V, Sb, and Na). For mercury, the aqueous samples were digested on 05/08/13 and analyzed on 05/09/13. The analysis dates for each sample may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each run during which samples are analyzed.

- The instrument performance checks 7-lithium, 89-yttrium, 140-cerium, and 205-thallium met the tuning criteria. No qualification was applied.

III-Initial and Continuing Calibration
Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

ICPMS:	1- blank (DoD QSM <1/2MRL)	Hg:	1- blank (DoD QSM <1/2MRL)
	3 – standards (r≥0.995)		5 – standards (r≥0.995)
	ICV/CCV (90-110%) (DoD QSM 90-110%)		ICV (85-115%) (DoD QSM 90-110%)
	LLCCV (80-120% for 6020) (DoD QSM 80-120%)		CCV (85-115%) (DoD QSM 80-120%)
			LLCCV (70-130%) (DoD QSM None Specified)

- For ICPMS metals, the aqueous samples were analyzed on 05/19/13 and 05/21/13 (V, Sb, and Na). All ICPMS metals were calibrated using 5 point calibrations with correlation coefficients >0.995. Mercury was analyzed for the aqueous samples on 05/09/13 with a correlation coefficient of 0.9998.

- For ICPMS total metals LLCCV analyzed on 05/10/13 @14:07, calcium (122%) was outside criteria. No samples were bracketed by this CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals LLCCV analyzed on 05/19/13 @01:23, copper (121%) and sodium (219%) were outside criteria. Total copper was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Total sodium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier. Samples 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LLCCV standard.

- For ICPMS total metals LLCCV analyzed on 05/19/13 @04:55, sodium (136%) was outside criteria. Total sodium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier..

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @06:44, sodium (173%) was outside criteria. Dissolved sodium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @08:19, sodium (121%) was outside criteria. Dissolved sodium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals ICV analyzed on 05/21/13 @14:14, cobalt (111%) was outside criteria. No samples were bracketed by this CCV; therefore, no qualifiers were applied based upon this outlier.

- For ICPMS total metals LLCCV analyzed on 05/21/13 @19:03, vanadium (121%) was outside criteria. Total vanadium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Sample 48MW06 (213050810-07) applies to this LLCCV standard.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @19:55, sodium (124%) and vanadium (128%) were outside criteria. Dissolved sodium was qualified estimated "J" for detections and no qualification for non-detections based upon the high recovery. Sample 13MW5 (213050810-04) applies to this LLCCV standard.

- For ICPMS dissolved metals LLCCV analyzed on 05/19/13 @23:05, calcium (121%) was outside criteria. Dissolved calcium was analyzed under a different LLCCV; therefore, no qualifiers were applied based upon this outlier.

- All other ICV/CCV/MRL criteria were met for all metals and runs.

IV-Blanks

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters) and <LOD (i.e. <2MDL) for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters, or 5 times (5X) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. µg/L	Action Level µg/L	B qualified samples (for this SDG)
05/10/13	ICPMS-Sb (Total)	ICB/CCBs	0.53J	2.65	None
05/18-19/13	ICPMS-Ba (Total)	ICB/CCBs	0.096J	0.48	None
05/18-19/13	ICPMS-Cr (Total)	ICB/CCBs	0.038J	0.19	None
05/18-19/13	ICPMS-Cu (Total)	ICB/CCBs	0.22J	1.10	48MW06
05/18-19/13	ICPMS-Mg (Total)	ICB/CCBs	21.4J	107	None
05/18-19/13	ICPMS-Na (Total)	ICB/CCBs	217J	1085	None
05/18-19/13	ICPMS-Tl (Total)	ICB/CCBs	0.17J	0.85	49MW05
05/21/13	ICPMS-V (Total)	ICB/CCBs	0.28J	1.40	13MW2, 13MW3, 13MW4, 13MW5, 48MW06, 49MW04
05/19/13	ICPMS-Na (Diss.)	ICB/CCBs	27.5J	138	None
05/09/13	Hg (Total)	ICB/CCBs	<LOD	NA	None
05/09/13	Hg (Diss.)	ICB/CCBs	<LOD	NA	None
05/21/13	ICPMS-Al (Total)	RB050813	16.0J	80.0	13MW2, 13MW3, 13MW4, 13MW5, 48MW06, 49MW04
05/21/13	ICPMS-Ba (Total)	RB050813	0.18J	0.90	None
05/21/13	ICPMS-Ca (Total)	RB050813	74.8J	374	None
05/21/13	ICPMS-Cr (Total)	RB050813	0.10J	0.50	None
05/21/13	ICPMS-Co (Total)	RB050813	0.066J	0.33	13MW2, 13MW4, 13MW5
05/21/13	ICPMS-Cu (Total)	RB050813	0.18J	0.90	48MW06
05/21/13	ICPMS-Fe (Total)	RB050813	3.21J	16.1	None
05/21/13	ICPMS-Pb (Total)	RB050813	0.038J	0.19	48MW06, 49MW04
05/21/13	ICPMS-Mg (Total)	RB050813	7.79J	39.0	None
05/21/13	ICPMS-Mn (Total)	RB050813	0.30J	1.50	None
05/21/13	ICPMS-Na (Total)	RB050813	20.4J	102	None
05/21/13	ICPMS-V (Total)	RB050813	0.62J	3.1	13MW2, 13MW3, 13MW4, 13MW5, 48MW06, 49MW04
05/19/13	ICPMS-Ca (Diss.)	RB050813	60.3J	302	None
05/19/13	ICPMS-Cr (Diss.)	RB050813	1.24J	6.2	13MW3, 13MW4, 13MW5, 48MW06, 49MW04, 49MW05
05/19/13	ICPMS-Cu (Diss.)	RB050813	0.72J	3.6	48MW06, 49MW05
05/19/13	ICPMS-Fe (Diss.)	RB050813	6.58J	32.9	13MW2, 13MW3, 13MW4, 13MW5, 48MW06, 49MW04, 49MW05
05/19/13	ICPMS-Pb (Diss.)	RB050813	0.036J	0.18	13MW2, 13MW3, 13MW4, 13MW5, 49MW04
05/19/13	ICPMS-Ni (Diss.)	RB050813	0.51J	2.55	13MW2, 13MW5, 49MW05
05/19/13	ICPMS-K (Diss.)	RB050813	10.4J	52.0	None
05/19/13	ICPMS-Na (Diss.)	RB050813	21.3J	107	None
05/19/13	ICPMS-Tl (Diss.)	RB050813	0.080J	0.40	13MW5
05/19/13	ICPMS-Zn (Diss.)	RB050813	1.85J	9.25	48MW06, 49MW05
05/16/13	Hg (Total)	RB050813	<LOD	NA	None
05/16/13	Hg (Diss.)	RB050813	<LOD	NA	None
05/10/13	ICPMS-Sb (Total)	MB1189776	0.51J	2.65	None
05/10/13	ICPMS-Al (Total)	MB1189776	2.26J	11.3	None
05/10/13	ICPMS-As (Total)	MB1189776	0.18J	0.90	13MW2, 13MW3, 13MW4, 13MW5, 48MW06, 49MW04, 49MW05
05/10/13	ICPMS-Cr (Total)	MB1189776	0.044J	0.22	None
05/19/13	ICPMS-Na (Diss)	MB1189654	107J	535	None
05/19/13	ICPMS-Tl (Diss)	MB1189654	0.17J	0.85	49MW05
05/09/13	Hg (Total)	MB1189778	<LOD	NA	None

J = Estimated Value <MRL and >LOD.
LOD = Limit of Detection
MRL = Method Reporting Limit
NA = Not Applicable
SDG= Sample Delivery Group

V-ICPMS Interference Check Sample (ICS)

The ICPMS interference check sample (ICS) verifies inter-element and background correction factors. ICPMS Interference Check is performed at the beginning and end of each sample analysis run. Control limits are 80-120% (DoD QSM limits 80-120%).

- All criteria were met for all other runs. No qualifiers were applied.

VI-Laboratory Control Samples (LCS)
The laboratory control sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. The DoD QSM aqueous LCS criteria are specified in Table G-18 of the DoD QSM (DoD, 2010) and are 80-120% and RPD≤20% for TAL metals. For non-TAL metals, the laboratory control limits should be used.

- Sample LCS1189777 was used as aqueous LCS for ICPMS total metals analysis dated 05/10/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LCS.

- Sample LCS1189655 was used as aqueous LCS for ICPMS dissolved metals analysis dated 05/19/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LCS.

- Sample LCS1189779 was used as aqueous LCS for mercury analysis dated 05/09/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LCS.

VII-Laboratory Duplicate
Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is also performed to generate data in order to determine the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. The DoD QSM aqueous limits for metals are 20% RPD for ICPMS metals and mercury.

- No aqueous laboratory duplicate was analyzed with this SDG; therefore, it was not evaluated. See Section VIII for lab accuracy and precision statements using MS/MSD and Section VI for lab accuracy using LCS..

VIII-Matrix Spike (MS) and Spike Duplicate (MSD)
MS and MSD are generated to determine long-term accuracy and precision of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples of similar matrix. MS/MSD recoveries and relative percent differences between MS recoveries should be within the specified limits. The DoD MS and MSD aqueous recovery limits use the LCS criteria specified in Table G-18 of the DoD QSM (DoD, 2010) and are 80-120% and RPD≤20% for TAL metals. Post digestion spikes aqueous and solid limits are 75-125% for ICPMS metals. For non-TAL metals, the laboratory control limits should be used.

- Sample GW-9 (213050814-02) was used as the aqueous MS/MSD for the ICPMS total metals analysis on 05/19/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this MS/MSD.

- Sample GW,S (213050803-01) was used as the aqueous MS/MSD for the ICPMS dissolved metals analysis on 05/19/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this MS/MSD.

- Sample GW-9 (213050814-02) was used as the aqueous MS/MSD for the mercury analysis on 05/09/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this MS/MSD.

IX-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- No field groundwater sample duplicate pair was collected for TAL metals with this SDG; therefore, it was not evaluated.

X-Serial Dilution
A serial dilution is performed to determine whether significant physical or chemical interferences exist due to sample matrix at high concentrations. An analysis of a 5-fold dilution should agree within 10% difference of the original result when the concentration in sample is a factor of 100 above MDL for ICPMS and 50 above MDL for mercury.

- The serial dilution for ICPMS total metals was analyzed on 05/19/13 using aqueous sample GW-9 (213050814-01). Aluminum (13.3%), calcium (18.1%), copper (15.2%), nickel (41.6%), selenium (12.8%), thallium (2940%), and zinc (65.8%) were outside of criteria limits. All other metals were within of criteria limits. Sample concentrations were <100 times MDL for calcium, copper, nickel, selenium, thallium, and zinc; therefore, no qualifiers were applied based upon these outliers. Aluminum was qualified estimated "J" for detections and no qualifier for non-detections based upon the high %D. Sample in-homogeneity and/or matrix effects are probable causes for this outlier. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this serial dilution.

- The serial dilution for ICPMS dissolved metals was analyzed on 05/19/13 using aqueous sample GW,S (213050803-01). Arsenic (100%), cadmium (100%), chromium (100%), copper (170%), lead (100%), nickel (100%), silver (100%), and zinc (100%) were outside of criteria limits. Sample concentrations were <100 times MDL for arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc; therefore, no qualifiers were applied based upon these outliers. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this serial dilution.

- The serial dilution for mercury was analyzed on 05/09/13 using aqueous sample GW082312R1 (D3943-07). All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this serial dilution.

XI-Quantitation Verification and Data Review

The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any value >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, "J."

- The total and dissolved fractions were compared. The metals data results for samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) are presented in **Table 3**. Data qualification was applied based upon professional judgment. Generally, if the concentrations are greater than the MRL and the dissolved concentration is greater than its total concentration by >10%D, then both results have been flagged as estimated with a "J."

Table 3 Total/Dissolved Summary

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
49MW04	Aluminum	20	34.5	3.52J	NA	None
49MW04	Antimony	1.00	1.00U	1.00U	NA	None
49MW04	Arsenic	1.00	0.25J	0.18J	NA	None
49MW04	Barium	1.00	82.0	76.2	NA	None
49MW04	Beryllium	1.00	0.10U	0.10U	NA	None
49MW04	Cadmium	1.00	0.10U	0.026J	NA	None
49MW04	Calcium	1000	73000	66000	NA	None
49MW04	Chromium	1.00	5.56	0.52J	NA	None
49MW04	Cobalt	1.00	0.35J	0.24J	NA	None
49MW04	Copper	1.00	14.8	12.2	NA	None
49MW04	Iron	100	66.8J	18.7J	NA	None
49MW04	Lead	1.00	0.17J	0.041J	NA	None
49MW04	Magnesium	1000	40600	36300	NA	None
49MW04	Manganese	5.00	4.99J	3.65J	NA	None
49MW04	Nickel	1.00	4.74	3.76	NA	None
49MW04	Potassium	100	4860	4520	NA	None
49MW04	Selenium	1.00	0.33J	0.35J	5.7	None
49MW04	Silver	1.00	0.060U	0.060U	NA	None
49MW04	Sodium	1000	2180	2140	NA	None
49MW04	Thallium	1.00	0.20U	0.20U	NA	None
49MW04	Vanadium	1.00	0.62J	0.27J	NA	None
49MW04	Zinc	20	21.3	20.7	NA	None
49MW04	Mercury	0.00020	0.00020U	0.00020U	NA	None
13MW2	Aluminum	20	53.8	6.33J	NA	None
13MW2	Antimony	1.00	1.00U	1.00U	NA	None
13MW2	Arsenic	1.00	0.28J	0.20J	NA	None
13MW2	Barium	1.00	185	171	NA	None
13MW2	Beryllium	1.00	0.10U	0.10U	NA	None
13MW2	Cadmium	1.00	0.094J	0.052J	NA	None
13MW2	Calcium	1000	91100	82700	NA	None
13MW2	Chromium	1.00	9.15	6.90	NA	None
13MW2	Cobalt	1.00	0.22J	0.10J	NA	None
13MW2	Copper	1.00	15.9	13.0	NA	None
13MW2	Iron	100	122	22.1J	NA	None
13MW2	Lead	1.00	0.29J	0.044J	NA	None
13MW2	Magnesium	1000	43200	39000	NA	None
13MW2	Manganese	5.00	65.0	1.23J	NA	None
13MW2	Nickel	1.00	2.50	1.90	NA	None
13MW2	Potassium	100	1050	901	NA	None
13MW2	Selenium	1.00	0.42J	0.42J	0.0	None
13MW2	Silver	1.00	0.060U	0.060U	NA	None
13MW2	Sodium	1000	3970	3760	NA	None
13MW2	Thallium	1.00	0.20U	0.20U	NA	None
13MW2	Vanadium	1.00	1.18	0.66J	NA	None
13MW2	Zinc	20	48.7	38.2	NA	None
13MW2	Mercury	0.00020	0.00020U	0.00020U	NA	None

Table 3 Total/Dissolved Summary, Continued

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
49MW05	Aluminum	20	1530	5.40J	NA	None
49MW05	Antimony	1.00	1.00U	1.00U	NA	None
49MW05	Arsenic	1.00	0.74J	0.29J	NA	None
49MW05	Barium	1.00	170	115	NA	None
49MW05	Beryllium	1.00	0.099J	0.10U	NA	None
49MW05	Cadmium	1.00	0.10U	0.10U	NA	None
49MW05	Calcium	1000	65600	55300	NA	None
49MW05	Chromium	1.00	6.88	0.40J	NA	None
49MW05	Cobalt	1.00	1.06	0.26J	NA	None
49MW05	Copper	1.00	2.30	0.33J	NA	None
49MW05	Iron	100	2080	16.3J	NA	None
49MW05	Lead	1.00	1.51	0.10U	NA	None
49MW05	Magnesium	1000	33900	27000	NA	None
49MW05	Manganese	5.00	65.1	25.7	NA	None
49MW05	Nickel	1.00	4.52	2.06	NA	None
49MW05	Potassium	100	2140	1820	NA	None
49MW05	Selenium	1.00	0.41J	0.16J	NA	None
49MW05	Silver	1.00	0.060U	0.060U	NA	None
49MW05	Sodium	1000	2060	2000	NA	None
49MW05	Thallium	1.00	0.16J	0.20U	NA	None
49MW05	Vanadium	1.00	3.79	0.22J	NA	None
49MW05	Zinc	20	8.01J	5.36J	NA	None
49MW05	Mercury	0.00020	0.00020U	0.00020U	NA	None
13MW5	Aluminum	20	49.2	2.09J	NA	None
13MW5	Antimony	1.00	1.00U	1.00U	NA	None
13MW5	Arsenic	1.00	0.11J	0.095J	NA	None
13MW5	Barium	1.00	79.2	76.3	NA	None
13MW5	Beryllium	1.00	0.10U	0.10U	NA	None
13MW5	Cadmium	1.00	0.044J	0.053J	17.0	J
13MW5	Calcium	1000	88700	81100	NA	None
13MW5	Chromium	1.00	9.71	3.89	NA	None
13MW5	Cobalt	1.00	0.21J	0.092J	NA	None
13MW5	Copper	1.00	14.6	11.2	NA	None
13MW5	Iron	100	128	23.2J	NA	None
13MW5	Lead	1.00	0.74J	0.087J	NA	None
13MW5	Magnesium	1000	31800	28100	NA	None
13MW5	Manganese	5.00	4.45J	1.25J	NA	None
13MW5	Nickel	1.00	4.05	1.77	NA	None
13MW5	Potassium	100	1340	1240	NA	None
13MW5	Selenium	1.00	1.56	1.80	13.3	J
13MW5	Silver	1.00	0.060U	0.060U	NA	None
13MW5	Sodium	1000	11600	11800	1.7	None
13MW5	Thallium	1.00	0.20U	0.14J	NA	None
13MW5	Vanadium	1.00	0.71J	0.38J	NA	None
13MW5	Zinc	20	42.3	45.5	7.0	None
13MW5	Mercury	0.00020	0.00020U	0.00020U	NA	None

Table 3 Total/Dissolved Summary, Continued

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
13MW4	Aluminum	20	40.4	6.00U	NA	None
13MW4	Antimony	1.00	1.00U	1.00U	NA	None
13MW4	Arsenic	1.00	0.16J	0.099J	NA	None
13MW4	Barium	1.00	56.1	51.2	NA	None
13MW4	Beryllium	1.00	0.10U	0.10U	NA	None
13MW4	Cadmium	1.00	0.16J	0.11J	NA	None
13MW4	Calcium	1000	46200	40900	NA	None
13MW4	Chromium	1.00	2.87	1.73	NA	None
13MW4	Cobalt	1.00	0.29J	0.18J	NA	None
13MW4	Copper	1.00	15.7	10.5	NA	None
13MW4	Iron	100	86.1J	13.1J	NA	None
13MW4	Lead	1.00	0.73J	0.068J	NA	None
13MW4	Magnesium	1000	18100	16000	NA	None
13MW4	Manganese	5.00	4.10J	1.14J	NA	None
13MW4	Nickel	1.00	2.26	2.69	16.0	J
13MW4	Potassium	100	1000	892	NA	None
13MW4	Selenium	1.00	0.55J	0.54J	NA	None
13MW4	Silver	1.00	0.060U	0.060U	NA	None
13MW4	Sodium	1000	16700	16200	NA	None
13MW4	Thallium	1.00	0.20U	0.20U	NA	None
13MW4	Vanadium	1.00	0.68J	0.32J	NA	None
13MW4	Zinc	20	34.6	30.9	NA	None
13MW4	Mercury	0.00020	0.00020U	0.00020U	NA	None
13MW3	Aluminum	20	56.1	6.00U	NA	None
13MW3	Antimony	1.00	1.00U	1.00U	NA	None
13MW3	Arsenic	1.00	0.10J	0.30U	NA	None
13MW3	Barium	1.00	99.8	91.0	NA	None
13MW3	Beryllium	1.00	0.10U	0.10U	NA	None
13MW3	Cadmium	1.00	0.10U	0.10U	NA	None
13MW3	Calcium	1000	83200	74100	NA	None
13MW3	Chromium	1.00	13.1	1.15	NA	None
13MW3	Cobalt	1.00	1.58	1.16	NA	None
13MW3	Copper	1.00	10.5	4.21	NA	None
13MW3	Iron	100	168	19.7J	NA	None
13MW3	Lead	1.00	0.72J	0.034J	NA	None
13MW3	Magnesium	1000	33500	28900	NA	None
13MW3	Manganese	5.00	11.7	9.28	NA	None
13MW3	Nickel	1.00	6.65	4.90	NA	None
13MW3	Potassium	100	2020	1800	NA	None
13MW3	Selenium	1.00	0.41J	0.39J	NA	None
13MW3	Silver	1.00	1.43	0.060U	NA	None
13MW3	Sodium	1000	15100	14700	NA	None
13MW3	Thallium	1.00	0.20U	0.20U	NA	None
13MW3	Vanadium	1.00	0.84J	0.22J	NA	None
13MW3	Zinc	20	17.5J	19.7J	11.2	J
13MW3	Mercury	0.00020	0.00020U	0.00020U	NA	None

Table 3 Total/Dissolved Summary, Continued

Sample ID	Analyte	MRL (µg/L)	Total Fraction (µg/L)	Dissolved Fraction (µg/L)	%D	Qualifier
49MW06	Aluminum	20	14.7J	6.00U	NA	None
49MW06	Antimony	1.00	1.00U	1.00U	NA	None
49MW06	Arsenic	1.00	0.14J	0.30U	NA	None
49MW06	Barium	1.00	129	193	33.2	J
49MW06	Beryllium	1.00	0.10U	0.10U	NA	None
49MW06	Cadmium	1.00	0.10U	0.10U	NA	None
49MW06	Calcium	1000	102000	93000	NA	None
49MW06	Chromium	1.00	0.70J	1.06	34.0	J
49MW06	Cobalt	1.00	0.83J	0.36J	NA	None
49MW06	Copper	1.00	0.77J	0.35J	NA	None
49MW06	Iron	100	56.4J	24.7J	NA	None
49MW06	Lead	1.00	0.037J	0.10U	NA	None
49MW06	Magnesium	1000	49900	45100	NA	None
49MW06	Manganese	5.00	19.7	15.9	NA	None
49MW06	Nickel	1.00	5.61	8.59	34.7	J
49MW06	Potassium	100	6040	5550	NA	None
49MW06	Selenium	1.00	0.56J	0.53J	NA	None
49MW06	Silver	1.00	0.060U	0.060U	NA	None
49MW06	Sodium	1000	79800	77600	NA	None
49MW06	Thallium	1.00	0.20U	0.20U	NA	None
49MW06	Vanadium	1.00	0.22J	0.12J	NA	None
49MW06	Zinc	20	5.61J	4.35J	NA	None
49MW06	Mercury	0.00020	0.00020U	0.00020U	NA	None

J = Estimated value
U = Value Non-detect as <MRL
NA = Not Applicable

Sample: 49MW04 (213050810-01), Zinc

Conc. (µg/L) = (conc. µg/L) * (Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (21.3178 µg/L) * (50 mL) * (1) / (50 mL) = 21.3 µg/L

Reported concentration = 21.3 µg/L
%D = 0.0%
Values were within 10% difference.

Sample: LCS1189779, Mercury

Conc. (µg/L) = (conc. µg/L) * (Final Volume mL) * (DF) / (Volume Sample mL)

Conc. (µg/L) = (5.224 µg/L) * (20 mL) * (1) / (20 mL) = 5.2 µg/L

Reported concentration = 5.2 µg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW04

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081001

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 0920

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	34.5	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0102
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/19/13 0102
Arsenic	0.25	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0102
Barium	82.0	ug/L		0.077	0.30	1.00	SW-846 6020A	MS	05/19/13 0102
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0102
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0102
Calcium	73000	ug/L		434	1000	1000	SW-846 6020A	MS	05/19/13 0010
Chromium	5.56	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0102
Cobalt	0.35	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0102
Copper	14.8	ug/L		0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0102
Iron	66.8	ug/L	J	J 3.04	10.0	100	SW-846 6020A	MS	05/19/13 0102
Lead	0.17	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0102
Magnesium	40600	ug/L		52.2	200	1000	SW-846 6020A	MS	05/19/13 0010
Manganese	4.99	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0102
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1209
Nickel	4.74	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0102
Potassium	4860	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0102
Selenium	0.33	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0102
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0102
Sodium	2180	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/19/13 0102
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0102
Vanadium	0.62	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1812
Zinc	21.3	ug/L		1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0102

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW04

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081001

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 0920

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	3.52	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0750
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Arsenic (Diss	0.18	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Barium (Diss	76.2	ug/L		0.077	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2207
Cadmium (Di	0.026	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Calcium (Dis	66000	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 0659
Chromium (D	0.52	ug/L	J	B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Cobalt (Disso	0.24	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Copper (Diss	12.2	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Iron (Dissolv	18.7	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0750
Lead (Dissolv	0.041	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Magnesium (	36300	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 0659
Manganese (	3.65	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1211
Nickel (Disso	3.76	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Potassium (D	4520	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0750
Selenium (Di	0.35	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Sodium (Diss	2140	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/19/13 2207
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Vanadium (Di	0.27	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0750
Zinc (Dissolv	20.7	ug/L		1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0750

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW2

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081002

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1055

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	53.8	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0109
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/19/13 0109
Arsenic	0.28	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0109
Barium	185	ug/L		1.54	6.00	20.0	SW-846 6020A	MS	05/19/13 0018
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0109
Cadmium	0.094	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0109
Calcium	91100	ug/L		868	2000	2000	SW-846 6020A	MS	05/19/13 0018
Chromium	9.15	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0109
Cobalt	0.22	ug/L	J	B 0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0109
Copper	15.9	ug/L		0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0109
Iron	122	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/19/13 0109
Lead	0.29	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0109
Magnesium	43200	ug/L		104	400	2000	SW-846 6020A	MS	05/19/13 0018
Manganese	65.0	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0109
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1212
Nickel	2.50	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0109
Potassium	1050	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0109
Selenium	0.42	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0109
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0109
Sodium	3970	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/19/13 0109
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0109
Vanadium	1.18	ug/L		B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1819
Zinc	48.7	ug/L		1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0109

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW2

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081002

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1055

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	6.33	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0757
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Arsenic (Diss	0.20	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Barium (Diss	171	ug/L		1.54	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0706
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2214
Cadmium (Di	0.052	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Calcium (Dis	82700	ug/L		868	2000	2000	SW-846 6020A Dissolved	MS	05/19/13 0706
Chromium (D	6.90	ug/L		0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Cobalt (Disso	0.10	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Copper (Diss	13.0	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Iron (Dissolv	22.1	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0757
Lead (Dissolv	0.044	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Magnesium (	39000	ug/L		104	400	2000	SW-846 6020A Dissolved	MS	05/19/13 0706
Manganese (	1.23	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1218
Nickel (Disso	1.90	ug/L		B 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Potassium (D	901	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0757
Selenium (Di	0.42	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Sodium (Diss	3760	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/19/13 2214
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Vanadium (Di	0.66	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0757
Zinc (Dissolv	38.2	ug/L		1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0757

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW05

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081003

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1235

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	1530	ug/L		J 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0138
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/21/13 1827
Arsenic	0.74	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0138
Barium	170	ug/L		0.77	3.00	10.0	SW-846 6020A	MS	05/19/13 0025
Beryllium	0.099	ug/L	J	J 0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0138
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0138
Calcium	65600	ug/L		434	1000	1000	SW-846 6020A	MS	05/19/13 0025
Chromium	6.88	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0138
Cobalt	1.06	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0138
Copper	2.30	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0138
Iron	2080	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/19/13 0138
Lead	1.51	ug/L		0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0138
Magnesium	33900	ug/L		52.2	200	1000	SW-846 6020A	MS	05/19/13 0025
Manganese	65.1	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0138
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1219
Nickel	4.52	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0138
Potassium	2140	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0138
Selenium	0.41	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0138
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0138
Sodium	2060	ug/L		8.00	30.0	1000	SW-846 6020A	MS	05/21/13 1827
Thallium	0.16	ug/L	J	B 0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0138
Vanadium	3.79	ug/L		0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1827
Zinc	8.01	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0138

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 49MW05

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081003

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1235

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	5.40	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0805
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Arsenic (Diss	0.29	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Barium (Diss	115	ug/L		0.77	3.00	10.0	SW-846 6020A Dissolved	MS	05/19/13 0713
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 2221
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Calcium (Dis	55300	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 0713
Chromium (D	0.40	ug/L	J	B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Cobalt (Disso	0.26	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Copper (Diss	0.33	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Iron (Dissolv	16.3	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0805
Lead (Dissolv	0.10	ug/L	U	0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Magnesium (	27000	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 0713
Manganese (	25.7	ug/L		0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1221
Nickel (Disso	2.06	ug/L		B 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Potassium (D	1820	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0805
Selenium (Di	0.16	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Sodium (Diss	2000	ug/L		8.00	30.0	1000	SW-846 6020A Dissolved	MS	05/19/13 2221
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Vanadium (Di	0.22	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0805
Zinc (Dissolv	5.36	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0805

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW5

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081004

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1350

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	49.2	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0145
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/19/13 0145
Arsenic	0.11	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0145
Barium	79.2	ug/L		0.077	0.30	1.00	SW-846 6020A	MS	05/19/13 0145
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0145
Cadmium	0.044	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0145
Calcium	88700	ug/L		434	1000	1000	SW-846 6020A	MS	05/19/13 0032
Chromium	9.71	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0145
Cobalt	0.21	ug/L	J	B 0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0145
Copper	14.6	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0145
Iron	128	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/19/13 0145
Lead	0.74	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0145
Magnesium	31800	ug/L		52.2	200	1000	SW-846 6020A	MS	05/19/13 0032
Manganese	4.45	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0145
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1223
Nickel	4.05	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0145
Potassium	1340	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0145
Selenium	1.56	ug/L		J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0145
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0145
Sodium	11600	ug/L		80.0	300	10000	SW-846 6020A	MS	05/19/13 0032
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0145
Vanadium	0.71	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1834
Zinc	42.3	ug/L		1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0145

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW5

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081004

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1350

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	2.09	ug/L	J	J 1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0834
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Arsenic (Diss	0.095	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Barium (Diss	76.3	ug/L		0.077	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Cadmium (Di	0.053	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Calcium (Dis	81100	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 0721
Chromium (D	3.89	ug/L		B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Cobalt (Disso	0.092	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Copper (Diss	11.2	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Iron (Dissolv	23.2	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0834
Lead (Dissolv	0.087	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Magnesium (	28100	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 0721
Manganese (	1.25	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1225
Nickel (Disso	1.77	ug/L		B 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Potassium (D	1240	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0834
Selenium (Di	1.80	ug/L		J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Sodium (Diss	11800	ug/L		J 80.0	300	10000	SW-846 6020A Dissolved	MS	05/19/13 2115
Thallium (Dis	0.14	ug/L	J	B 0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Vanadium (Di	0.38	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0834
Zinc (Dissolv	45.5	ug/L		1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0834

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW4

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081005

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1510

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	40.4	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0153
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/19/13 0153
Arsenic	0.16	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0153
Barium	56.1	ug/L		0.077	0.30	1.00	SW-846 6020A	MS	05/19/13 0153
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0153
Cadmium	0.16	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0153
Calcium	46200	ug/L		434	1000	1000	SW-846 6020A	MS	05/19/13 0040
Chromium	2.87	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0153
Cobalt	0.29	ug/L	J	B 0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0153
Copper	15.7	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0153
Iron	86.1	ug/L	J	J 3.04	10.0	100	SW-846 6020A	MS	05/19/13 0153
Lead	0.73	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0153
Magnesium	18100	ug/L		52.2	200	1000	SW-846 6020A	MS	05/19/13 0040
Manganese	4.10	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0153
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1226
Nickel	2.26	ug/L		J 0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0153
Potassium	1000	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0153
Selenium	0.55	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0153
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0153
Sodium	16700	ug/L		80.0	300	10000	SW-846 6020A	MS	05/19/13 0040
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0153
Vanadium	0.68	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1841
Zinc	34.6	ug/L		1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0153

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW4

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081005

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1510

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	6.00	ug/L	U	1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0841
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Arsenic (Diss	0.099	ug/L	J	J 0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Barium (Diss	51.2	ug/L		0.077	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Cadmium (Di	0.11	ug/L	J	J 0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Calcium (Dis	40900	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 0728
Chromium (D	1.73	ug/L		B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Cobalt (Disso	0.18	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Copper (Diss	10.5	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Iron (Dissolv	13.1	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0841
Lead (Dissolv	0.068	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Magnesium (	16000	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 0728
Manganese (	1.14	ug/L	J	J 0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1228
Nickel (Disso	2.69	ug/L		J 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Potassium (D	892	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0841
Selenium (Di	0.54	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Sodium (Diss	16200	ug/L		80.0	300	10000	SW-846 6020A Dissolved	MS	05/19/13 2145
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Vanadium (Di	0.32	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0841
Zinc (Dissolv	30.9	ug/L		1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0841

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW3

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081006

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1620

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	56.1	ug/L		B 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0200
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/19/13 0200
Arsenic	0.10	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0200
Barium	99.8	ug/L		0.077	0.30	1.00	SW-846 6020A	MS	05/19/13 0200
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0200
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0200
Calcium	83200	ug/L		434	1000	1000	SW-846 6020A	MS	05/19/13 0047
Chromium	13.1	ug/L		0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0200
Cobalt	1.58	ug/L		0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0200
Copper	10.5	ug/L		J 0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0200
Iron	168	ug/L		3.04	10.0	100	SW-846 6020A	MS	05/19/13 0200
Lead	0.72	ug/L	J	J 0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0200
Magnesium	33500	ug/L		52.2	200	1000	SW-846 6020A	MS	05/19/13 0047
Manganese	11.7	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0200
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1230
Nickel	6.65	ug/L		0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0200
Potassium	2020	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0200
Selenium	0.41	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0200
Silver	1.43	ug/L		0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0200
Sodium	15100	ug/L		80.0	300	10000	SW-846 6020A	MS	05/19/13 0047
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0200
Vanadium	0.84	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1848
Zinc	17.5	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0200

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 13MW3

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081006

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/06/13 | Time: 1620

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	6.00	ug/L	U	1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0848
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Barium (Diss	91.0	ug/L		0.077	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Calcium (Dis	74100	ug/L		434	1000	1000	SW-846 6020A Dissolved	MS	05/19/13 0735
Chromium (D	1.15	ug/L		0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Cobalt (Disso	1.16	ug/L		0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Copper (Diss	4.21	ug/L		0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Iron (Dissolv	19.7	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0848
Lead (Dissolv	0.034	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Magnesium (	28900	ug/L		52.2	200	1000	SW-846 6020A Dissolved	MS	05/19/13 0735
Manganese (	9.28	ug/L		0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1232
Nickel (Disso	4.90	ug/L		0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Potassium (D	1800	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0848
Selenium (Di	0.39	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Sodium (Diss	14700	ug/L		80.0	300	10000	SW-846 6020A Dissolved	MS	05/19/13 2152
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Vanadium (Di	0.22	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0848
Zinc (Dissolv	19.7	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0848

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL | Sample ID: 48MW06

Lab Code: LA024 | Case No.: | Contract:

Matrix: (soil / water) Water | SAS No.: | SDG No.: 213050810

Level: (low / med) | % Solids: | Lab Sample ID: 21305081007

Date Received: 05/08/13 | Time: 0920 | Date Collected: 05/07/13 | Time: 1033

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum	14.7	ug/L	J	B 1.66	6.00	20.0	SW-846 6020A	MS	05/19/13 0207
Antimony	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A	MS	05/19/13 0207
Arsenic	0.14	ug/L	J	B 0.094	0.30	1.00	SW-846 6020A	MS	05/19/13 0207
Barium	129	ug/L		J 1.54	6.00	20.0	SW-846 6020A	MS	05/19/13 0054
Beryllium	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A	MS	05/19/13 0207
Cadmium	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A	MS	05/19/13 0207
Calcium	102000	ug/L		868	2000	2000	SW-846 6020A	MS	05/19/13 0054
Chromium	0.70	ug/L	J	J 0.030	0.10	1.00	SW-846 6020A	MS	05/19/13 0207
Cobalt	0.83	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A	MS	05/19/13 0207
Copper	0.77	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A	MS	05/19/13 0207
Iron	56.4	ug/L	J	J 3.04	10.0	100	SW-846 6020A	MS	05/19/13 0207
Lead	0.037	ug/L	J	B 0.025	0.10	1.00	SW-846 6020A	MS	05/19/13 0207
Magnesium	49900	ug/L		104	400	2000	SW-846 6020A	MS	05/19/13 0054
Manganese	19.7	ug/L		0.27	1.00	5.00	SW-846 6020A	MS	05/19/13 0207
Mercury	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A	AV	05/09/13 1234
Nickel	5.61	ug/L		J 0.26	1.00	1.00	SW-846 6020A	MS	05/19/13 0207
Potassium	6040	ug/L		9.98	30.0	100	SW-846 6020A	MS	05/19/13 0207
Selenium	0.56	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A	MS	05/19/13 0207
Silver	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A	MS	05/19/13 0207
Sodium	79800	ug/L		160	600	20000	SW-846 6020A	MS	05/19/13 0054
Thallium	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A	MS	05/19/13 0207
Vanadium	0.22	ug/L	J	B 0.085	0.30	1.00	SW-846 6020A	MS	05/21/13 1918
Zinc	5.61	ug/L	J	J 1.31	5.00	20.0	SW-846 6020A	MS	05/19/13 0207

Form I Copy

INORGANIC ANALYSIS DATA SHEET

Lab Name: GCAL
Sample ID: 48MW06
Lab Code: LA024
Case No.:
Contract:
Matrix: (soil / water) Water
SAS No.:
SDG No.: 213050810
Level: (low / med)
% Solids:
Lab Sample ID: 21305081007
Date Received: 05/08/13
Time: 0920
Date Collected: 05/07/13
Time: 1033

Analyte	Conc.	Units	C	MDL	LOD	LOQ	Method	Type	Analyzed
Aluminum (Di	6.00	ug/L	U	1.66	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0856
Antimony (Di	1.00	ug/L	U	0.48	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Arsenic (Diss	0.30	ug/L	U	0.094	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Barium (Diss	193	ug/L		J 1.54	6.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0743
Beryllium (Di	0.10	ug/L	U	0.049	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Cadmium (Di	0.10	ug/L	U	0.026	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Calcium (Dis	93000	ug/L		868	2000	2000	SW-846 6020A Dissolved	MS	05/19/13 0743
Chromium (D	1.06	ug/L		B 0.030	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Cobalt (Disso	0.36	ug/L	J	J 0.053	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Copper (Diss	0.35	ug/L	J	B 0.093	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Iron (Dissolv	24.7	ug/L	J	B 3.04	10.0	100	SW-846 6020A Dissolved	MS	05/19/13 0856
Lead (Dissolv	0.10	ug/L	U	0.025	0.10	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Magnesium (	45100	ug/L		104	400	2000	SW-846 6020A Dissolved	MS	05/19/13 0743
Manganese (	15.9	ug/L		0.27	1.00	5.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Mercury (Dis	0.00020	mg/L	U	0.000068	0.00020	0.00020	SW-846 7470A Dissolved	AV	05/09/13 1239
Nickel (Disso	8.59	ug/L		J 0.26	1.00	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Potassium (D	5550	ug/L		9.98	30.0	100	SW-846 6020A Dissolved	MS	05/19/13 0856
Selenium (Di	0.53	ug/L	J	J 0.11	0.40	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Silver (Dissol	0.060	ug/L	U	0.017	0.060	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Sodium (Diss	77600	ug/L		160	600	20000	SW-846 6020A Dissolved	MS	05/19/13 2159
Thallium (Dis	0.20	ug/L	U	0.060	0.20	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Vanadium (Di	0.12	ug/L	J	J 0.085	0.30	1.00	SW-846 6020A Dissolved	MS	05/19/13 0856
Zinc (Dissolv	4.35	ug/L	J	B 1.31	5.00	20.0	SW-846 6020A Dissolved	MS	05/19/13 0856

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: RFAAP Data Validation – Methane, Ethane, and Ethene
GCAL Laboratories, Inc., SDG 213050810

DATE: July 1, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 06, 2013. The samples were analyzed for methane, ethane, and ethene using laboratory method RSK-175. A total of six aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW04	213050810-01	13MW4	213050810-05
13MW2	213050810-02	13MW3	213050810-06
13MW5	213050810-04	48MW06	213050810-07

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	System Monitoring Compounds
	X	Laboratory Control Sample/Sample Duplicate
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/1/13
Date

RFAAP VALIDATION REPORT
DISSOLVED GASES REVIEW
SDG 213050810

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For methane, ethane, and ethene, aqueous samples are cooled @ 4°C ± 2°C; the maximum holding time is 7 days un-preserved and 14 days preserved to pH<2 with HCl from sample collection to analysis.

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/06/13, the cooler was received by the laboratory (GCAL) on 05/08/13 at 2.9°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 05/06/13. They were prepped and analyzed for the dissolved gases on 05/16/13. Sample collection dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the calibration factors on which the quantitations are based. If linear regression is used for quantification, the correlation coefficient must be ≥0.995 for linearity fit (DoD QSM). If calibration factor method is used, the %RSD should be ≤20% (DoD QSM). All ICVs should be within 80-120% recovery limits (DoD QSM).

- For initial calibration performed on 03/04/13 on instrument GCV8, methane, ethane, and ethene were calibrated using calibration factors. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this initial calibration.

III-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis. If calibration factor method is used, the percent difference (%D) should all fall within the control criteria of ≤20% (DoD QSM). All CCVs should be within 80-120% recovery limits (DoD QSM).

- For initial calibration verification for methane, ethane, and ethene performed on 03/04/13 @17:20 on instrument GCV8, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. No groundwater samples were reported using this initial calibration verification.

- For continuing calibration for methane, ethane, and ethene performed on 05/16/13 @14:44 on instrument GCT GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). No groundwater samples were reported using this continuing calibration.

- For continuing calibration for methane, ethane, and ethene performed on 05/16/13 @16:50 on instrument GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this continuing calibration.

- For continuing calibration for methane, ethane, and ethene performed on 05/16/13 @17:55 on instrument GCV8, all criteria were met (%D≤20%; %Drift≤20%; RRF≥0.05). No qualifiers were applied. No groundwater samples were reported using this continuing calibration.

IV-Blank Analysis

The purpose of laboratory or field blank analyses is to determine the existence and magnitude of contamination problems resulting from laboratory or field activities. One method blank per analytical batch must be run on each instrument used to analyze samples. No contaminants should be present in the blanks. The DoD QSM criterion specifies all concentrations should be less than one-half MRL. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤5 times (5x) the maximum amount for explosive target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. The rinse blank RB050813 (213050904-03) applies to all samples in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples (For this SDG)
05/16/13	MB1192265	All target <½MRL	NA	NA	None
05/20/13	RB050813	All target <½MRL	NA	NA	None

MRL = Method Reporting Limit
NA = Not Applicable

V-System Monitoring Compound (Surrogates)

Laboratory performance on individual samples is established by means of spiking activities. The percent recovery (%R) for all samples and blanks must be within the laboratory control limits. DoD aqueous surrogate recovery limits are specified in the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. .

Aqueous Criteria: Propene (43-143%)

- All criteria were met. No qualifiers were applied.

VI-Laboratory Control Sample and Laboratory Control Sample Duplicate

Data for laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) are evaluated to determine long-term precision and accuracy of the analytical method on various matrices. DoD LCS/LCSD aqueous recovery limits are specified in the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. Percent recoveries (%Rs) should be within the specified control limits.

- Samples LCS1192266 and LCSD1192267 were used as LCS/LCSD for methane, ethane, and ethene analysis performed on 05/16/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LCS/LCSD.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. DoD QSM MS and MSD recovery limits use the LCS criteria, which currently is the use of in-house specified limits (DoD, 2010).

- No project specific aqueous MS/MSD was analyzed for the methane, ethane, and ethene analysis on 05/16/13; therefore, was not evaluated.

VIII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established in the Groundwater Monitored Natural Attenuation (GWMNA) QAPP at 50% RPD for the aqueous samples.

- No project specific aqueous field duplicate was analyzed for the methane, ethane, and ethene analysis on 05/16/13; therefore, was not evaluated.

IX-Quantitation Verification and Data Review
The accuracy of analytical results was verified and data results reviewed. The following was determined:

- The percent difference (%D) between the calculated and the reported values should be within 10% through the calculation from the raw data provided. The calculation verification was confirmed within 10% difference.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J".

- The extraction sample volume is already accounted in the conversion of the ICAL standards from µl/L to µg/L. Both the ICAL standards and the samples are prepared in the same manner. Therefore, concentration of the sample calculated is based on the average response factor and the area counts of the analyte only.

Sample: 49MW04 (213050810-01), ethene

Conc. µg/L = (Ax * DF) / (CF)

where: Conc. = Sample concentration in µg/L
Ax = Area of characteristic ion for compound being measured.
CF = Average relative calibration factor for compound being measured (from ICAL)
DF = Dilution factor

Conc. µg/L = (333508 * 1) / (407896) = 0.818 µg/L
Reported Value = 0.818 µg/L

% Difference = 0.0%
Values were within 10% difference

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994).

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 49MW04
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081001
Date Collected: 05/06/13 Time: 0920
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1657
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8016

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.818	J	J 0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

213050810 8

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 13MW2
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081002
Date Collected: 05/06/13 Time: 1055
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1704
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8017

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 49MW05
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081003
Date Collected: 05/06/13 Time: 1235
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1713
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8018

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D
ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 13MW5
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081004
Date Collected: 05/06/13 Time: 1350
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1720
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8019

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 13MW4
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081005
Date Collected: 05/06/13 Time: 1510
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1726
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8020

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D

ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 13MW3
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081006
Date Collected: 05/06/13 Time: 1620
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1737
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8021

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

Form I Copy

1D
ORGANICS ANALYSIS DATA SHEET

Lab Name: GCAL
Lab Code: LA024 Case No.:
Matrix: Water
Sample wt/vol: 5 Units: mL
Level: (low/med)
% Moisture: decanted: (Y/N)
GC Column: GS-Q 30 ID: .53 (mm)
Concentrated Extract Volume: 5000 (µL)
Soil Aliquot Volume: (µL)
Injection Volume: 1 (µL)
GPC Cleanup: (Y/N) N pH:
Prep Batch: Analytical Batch: 507448

Sample ID: 48MW06
Contract:
SAS No.: SDG No.: 213050810
Lab Sample ID: 21305081007
Date Collected: 05/07/13 Time: 1033
Date Received: 05/08/13
Date Extracted:
Date Analyzed: 05/16/13 Time: 1743
Dilution Factor: 1 Analyst: BMR
Prep Method:
Analytical Method: RSK-175
Sulfur Cleanup: (Y/N) N Instrument ID: GCV8A
Lab File ID: 2130516/v8022

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
74-84-0	Ethane	0.220	U	0.135	0.220	1.00
74-85-1	Ethene	0.290	U	0.157	0.290	1.00
74-82-8	Methane	1.09	U	0.486	1.09	5.00

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, Shaw E&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, Shaw E&I Project Chemist

SUBJECT: RFAAP Data Validation – Chloride, Nitrate, and Sulfate
GCAL Laboratories, Inc., SDG 213050810

DATE: July 10, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 06, 2013. Samples were analyzed for the anions chloride, nitrate, and sulfate using USEPA 300.0. A total of seven aqueous samples were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW04	213050810-01	13MW4	213050810-05
13MW2	213050810-02	13MW3	213050810-06
49MW05	213050810-03	48MW06	213050810-07
13MW5	213050810-04		

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010), and method-specific criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Initial and Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Laboratory Duplicate Sample
	X	Matrix Spike and Spike Duplicate
	X	Field Duplicate Sample
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/10/13
Date

RFAAP VALIDATION REPORT
ANIONS REVIEW
SDG 213050810

I-Holding Times and Preservation
The primary objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of sample analysis. Holding time criteria: Cool 4°C±2°C and 28 days for sulfate and chloride and Cool to 4°C±2°C with H_2SO_4 to pH<2 and 2 days for nitrate. The dates and times were compared between the sample collection and laboratory analysis (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For samples collected on 05/06/13, the cooler was received by the laboratory (GCAL) on 05/08/13 at 2.9°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: Samples were collected on 05/06/13. The samples were prepped and analyzed on 05/08/13 for nitrate analysis and 05/08/13 and 05/09/13 for chloride and sulfate analysis. Sample collection dates may be found on the attached form 1s. All holding time criteria were met. No qualifiers were applied.

II-Initial and Continuing Calibration
Requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification documents that the initial calibration is still valid.

Anions: 1 – blank
5 – standards ($r \geq 0.995$ or $r^2 \geq 0.99$)
ICV/CCV (90-110%)
Method Reporting Limit (MRL) (75-125%)

- Chloride, sulfate, and nitrate analysis was calibrated on 03/27/13 using linear equation techniques. All correlation coefficients were ≥0.995 for chloride, sulfate, and nitrate. All ICV/CCV/MRL criteria were met for all anions and runs. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to these initial and continuing calibrations.

III-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. One method blank per analytical batch must be run on each instrument used to analyze samples. Calibration blanks were analyzed initially and at a 10% frequency thereafter for each batch. No contaminants should be detected in any of the associated blanks >MDL. The DoD QSM criteria specifies all concentrations should be less than ½MRL (<MRL for common laboratory contaminants methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) and <2MDL for the calibration blanks. Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, 2-butanone, and phthalate esters, or 5 times (5x) the maximum amount for other target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213050904-03) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	Analysis	QC Blank ID	Max Conc. mg/L	Action Level mg/L	B qualified samples (for this SDG)
05/08/13	Chloride	ICB/CCBs	<LOD	NA	None
05/08/13	Sulfate	ICB/CCBs	<LOD	NA	None
05/08/13	Nitrate	ICB/CCBs	<LOD	NA	None
05/08/13	Chloride	MB1189869	<½MRL	NA	None
05/08/13	Sulfate	MB1189869	<½MRL	NA	None
05/08/13	Nitrate	MB1189869	<½MRL	NA	None
05/09/13	Chloride	RB050813	0.040J	0.20	None
05/09/13	Sulfate	RB050813	0.047J	0.24	None
05/09/13	Nitrate	RB050813	<½MRL	NA	None

J = Estimated Value >MDL and <MRL
LOD = Limit of Detection
MRL = Method Reporting Limit
MDL = Method Detection Limit
NA = Not Applicable

IV-Laboratory Control Sample

The laboratory control sample (LCS) serve as a monitor of the overall performance of each step during the analysis, including the sample preparation. LCS are generated to determine long-term accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Per DoD QSM, all LCS results must fall within the specified control limits:

Anions: 80-120% (DOD QSM = 80-120%)

- Sample LCS1189870 was used as the aqueous LCS for chloride, sulfate, and nitrate analysis on 05/08/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213050810-01), 13MW2 (213050810-02), 49MW05 (213050810-03), 13MW5 (213050810-04), 13MW4 (213050810-05), 13MW3 (213050810-06), and 48MW06 (213050810-07) apply to this LCS.

V-Duplicate Sample Analysis

Duplicate sample determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. Duplicate analysis is performed to generate data in order to determine the long-term precision of the analytical method on various matrices. Per DoD QSM, RPDs must be within established control limits (≤25%RPD).

- No site lab duplicate was performed with this SDG; therefore, was not evaluated.

VI-Matrix Spike and Matrix Spike Duplicate
Matrix spikes (MSs) and MSDs are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. Specific criteria include the analyses of matrix spike samples at a frequency of one MS/MSD per 20 samples or preparatory batch of similar matrix. Per DoD QSM, MS/MSD recoveries and RPDs should be within the specified limits:

Anions: 75-125%; RPD≤25% (DOD QSM = 80-120%; RPD≤20%)

- Sample GW-9 (213050814-01) was used as the aqueous MS/MSD for chloride, sulfate, and nitrate analysis on 05/08/13. The MS/MSD sample was not a site specific sample; therefore, was not evaluated.

VII-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were qualified rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 25% RPD for the aqueous samples.

- No site field groundwater sample duplicate pair was analyzed for chloride, sulfate, and nitrate analysis in this SDG; therefore, was not evaluated.

VIII-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%. The following calculations were performed for verification.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J."

Sample: 54MW13 (L13020681-01), sulfate

$Y = mX + b$

Y = Sample Area
m = slope of curve
X = Concentration (mg/L)
b = Y-intercept
DF = Dilution Factor

Given:
m = 0.2076
b = 0.0
Y = Area = 0.480
DF = 20

X = 2.31 mg/L * DF = 23.1 mg/L * 20 = 46.2 mg/L

Reported concentration = 46.3 mg/L
%D = 0.2%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Inorganic Data Review* (April, 1993).

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081001	49MW04	Water	05/06/2013 09:20	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 11:56	AEL	506921

CAS#	Parameter	Result		RDL	MDL	Units
14797-55-8	Nitrate	0.419J	J	0.500	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
213050810-01	49MW04	Water	05/06/2013 09:20	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	05/09/2013 00:24	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	46.3	4.00	0.400	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081001	49MW04	Water	05/06/2013 09:20	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/09/2013 00:41	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	5.77	0.200	0.020	mg/L

213050810 179

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081002	13MW2	Water	05/06/2013 10:55	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 10:29	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	4.38	0.100	0.010	mg/L
14797-55-8	Nitrate	0.329J	0.500	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081002	13MW2	Water	05/06/2013 10:55	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	05/08/2013 21:30	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	44.0	2.00	0.200	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081003	49MW05	Water	05/06/2013 12:35	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 10:46	AEL	506921

CAS#	Parameter	Result		RDL	MDL	Units
16887-00-6	Chloride	2.67		0.100	0.010	mg/L
14797-55-8	Nitrate	0.153J	J	0.500	0.020	mg/L

213050810 184

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081003	49MW05	Water	05/06/2013 12:35	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			10	05/08/2013 21:47	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	35.3	2.00	0.200	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081004	13MW5	Water	05/06/2013 13:50	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 11:04	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	1.54	0.500	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
213050810-04	13MW5	Water	05/06/2013 13:50	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	05/08/2013 22:05	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	110	4.00	0.400	mg/L

213050810 188

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081004	13MW5	Water	05/06/2013 13:50	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/08/2013 22:22	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	5.61	0.200	0.020	mg/L

213050810 189

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081005	13MW4	Water	05/06/2013 15:10	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 11:21	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	1.05	0.500	0.020	mg/L

213050810 191

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081005	13MW4	Water	05/06/2013 15:10	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	05/08/2013 22:39	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	51.3	4.00	0.400	mg/L

213050810 192

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081005	13MW4	Water	05/06/2013 15:10	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/08/2013 23:32	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	5.17	0.200	0.020	mg/L

213050810 193

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081006	13MW3	Water	05/06/2013 16:20	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 11:38	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	2.05	0.500	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081006	13MW3	Water	05/06/2013 16:20	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			20	05/08/2013 23:49	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	130	4.00	0.400	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081006	13MW3	Water	05/06/2013 16:20	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			2	05/09/2013 00:06	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	5.53	0.200	0.020	mg/L

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081007	48MW06	Water	05/07/2013 10:33	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			1	05/08/2013 12:13	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14797-55-8	Nitrate	4.50	0.500	0.020	mg/L

213050810 199

Form I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21305081007	48MW06	Water	05/07/2013 10:33	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			5	05/09/2013 00:59	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
16887-00-6	Chloride	12.3	0.500	0.050	mg/L

213050810 200

rom I Copy

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
213050810-07	48MW06	Water	05/07/2013 10:33	05/08/2013 09:20

EPA 300.0

Prep Date	Prep Batch	Prep Method	Dilution	Analyzed	By	Analytical Batch
			100	05/09/2013 01:16	AEL	506921

CAS#	Parameter	Result	RDL	MDL	Units
14808-79-8	Sulfate	195	20.0	2.00	mg/L

213050810 201

CB&I
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017
Tel: +1 (410) 273-7100
Fax: +1 (410) 273-7103
Eric.malarek@CBIfederalservices.com

MEMORANDUM

TO: Tim Leahy, CB&I Radford Army Ammunition Plant (RFAAP) Project Manager

FROM: Eric Malarek, CB&I RFAAP Project Chemist

SUBJECT: RFAAP Data Validation - Volatiles
GCAL Laboratories, Inc., SDG 213051016

DATE: July 11, 2013

The purpose of this memorandum is to present the data validation report for the samples collected at Main Manufacturing Area at RFAAP for SWMU48/49 RFI/MNA on May 06, 2013, May 07, 2013, May 08, 2013, and May 09, 2013. The samples were analyzed for volatile organic compounds (VOCs) using USEPA SW846 method 5030B/8260B for aqueous matrices. A total of seventeen aqueous samples were validated. The sample Id is:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
49MW04	213051016-01	RB050813	213051016-10
13MW2	213051016-02	50MW02	213051016-11
49MW05	213051016-03	48MW1	213051016-12
13MW5	213051016-04	49MW02	213051016-14
13MW4	213051016-05	48MW3	213051016-15
13MW3	213051016-06	48MW2	213051016-18
48MW06	213051016-07	49MW01	213051016-19
49TM01	213051016-08	TRIP BLANK	213051016-20
49TM02	213051016-09		

Data were reviewed by Eric Malarek and validated using a combination of project QAPP, *Quality Systems Manual for Environmental Laboratories, Final Version 4.2, October 25, 2010* (DoD, 2010) (DoD QSM), method-specific criteria, and laboratory SOP criteria. The data qualifier scheme was consistent with the *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacted project data have been qualified in accordance with USEPA Region III specifications.

Table 1 Laboratory Performance Criteria

Qualified		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
	X	Continuing Calibration
X		Blank Analysis
	X	Laboratory Control Sample and Laboratory Control Sample Duplicate
	X	Matrix Spike / Spike Duplicate Sample
	X	System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable with noted qualifications.

Eric Malarek, Chemist

7/11/13
Date

RFAAP VALIDATION REPORT
VOLATILES REVIEW
SDG 213051016

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples, VOC compounds are shipped cooled (@4°C ± 2°C) and preserved pH≤2 HCl with a maximum holding time of 14 days (7 days if no HCl) from sample collection to determinative analysis (USEPA criteria).

- Temperature Review: The temperature blank was sent with each cooler and recorded by the laboratory upon receipt. For VOC samples collected on 05/06/13, 05/07/13, 05/08/13, and 05/09/13, the coolers were received by the laboratory (GCAL) on 05/10/13 at 5.6°C and 4.3°C. All criteria were met. No qualifiers were applied.

- Holding Time Review: For the samples collected on 05/06/13, 05/07/13, 05/08/13, and 05/09/13, the aqueous VOCs were prepped and analyzed on 05/11/13 and 05/12/13. Sample collection and analysis dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria. No qualification was applied.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the relative response factors on which the quantitations are based. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99.

- For initial calibration performed on 05/09/13 on instrument MSV12.i, all target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). Bromform and 1,1,2,2-tetrachloroethane were quantified using linear equation with coefficients of determination >0.99. All criteria were met. No qualifiers were applied. Samples 49MW04 (213051016-01), 13MW2 (213051016-02), 49MW05 (213051016-03), 13MW5 (213051016-04), 13MW4 (213051016-05), 13MW3 (213051016-06), 48MW06 (213051016-07), 49TM01 (213051016-08), 49TM02 (213051016-09), RB050813 (213051016-10), 50MW02 (213051016-11), 48MW1 (213051016-12), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), 49MW01 (213051016-19), and TRIP BLANK (213051016-20) were analyzed using this initial calibration.

IV-Continuing Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. The initial calibration verification should be between 80-120% recoveries.

- For initial calibration verification for the VOC analysis performed on 05/09/13 @17:14 on instrument MSV12.i, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). No samples reported were analyzed using this initial calibration verification; therefore, no qualifiers were applied based upon this outlier.

- For continuing calibration for the VOC analysis performed on 05/11/13 @16:19 on instrument MSV12.i, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 13MW4 (213051016-05), 13MW3 (213051016-06), 48MW06 (213051016-07), 49TM01 (213051016-08), 49TM02 (213051016-09), RB050813 (213051016-10), 50MW02 (213051016-11), 48MW1 (213051016-12), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), 49MW01 (213051016-19), and TRIP BLANK (213051016-20) were analyzed using this continuing calibration.

- For continuing calibration for the VOC analysis performed on 05/12/13 @09:23 on instrument MSV12.i, all target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05). Samples 49MW04 (213051016-01), 13MW2 (213051016-02), 49MW05 (213051016-03), and 13MW5 (213051016-04) were analyzed using this continuing calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The DoD QSM criteria specifies all concentrations should be less than one-half MRL (<MRL for common laboratory contaminants methylene chloride, acetone, and 2-butanone). Positive sample results are reported and qualified "B", if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants methylene chloride, acetone, toluene, and 2-butanone (MEK), or 5 times (5X) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. Rinse blank sample RB050813 (213051016-10) applies to all groundwater samples collected in this SDG. Trip blank sample TRIP BLANK (213051016-20) applies to all groundwater samples collected in this SDG.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	B qualified samples (for this SDG)
05/11/13	MB1191036	All target <½MRL	NA	NA	None
05/12/13	MB1190946	All target <½MRL	NA	NA	None
05/11/13	RB050813	Acetone	3.96J	39.6	49MW02
05/12/13	TRIP BLANK	All target <½MRL	NA	NA	None

J = Estimated Value <LOD
NA = Not Applicable
MRL = Method Reporting Limit
LOD = Level of Detection

VI-Laboratory Control Sample and Laboratory Control Sample Duplicate
Data for laboratory control samples (LCS) and LCSD are evaluated to determine long-term precision and accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table G-4 of the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. The LCS/LCSD RPD should be ≤30%.

- Samples LCS1191037 and LCS1191038 were used as the aqueous LCS/LCSD for the VOC analysis on 05/11/13. All criteria were met. No qualifiers were applied. Samples 13MW4 (213051016-05), 13MW3 (213051016-06), 48MW06 (213051016-07), 49TM01 (213051016-08), 49TM02 (213051016-09), RB050813 (213051016-10), 50MW02 (213051016-11), 48MW1 (213051016-12), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), 49MW01 (213051016-19), and TRIP BLANK (213051016-20) apply to this LCS/LCSD.

- Samples LCS1190947 and LCS1190948 were used as the aqueous LCS/LCSD for the VOC analysis on 05/12/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213051016-01), 13MW2 (213051016-02), 49MW05 (213051016-03), and 13MW5 (213051016-04) apply to this LCS/LCSD.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table G-4 of the DoD QSM (DoD, 2010). If the compound is not listed, then the laboratory criteria shall be used. The MS/MSD RPD should be ≤30%.

- Sample 48MW3 (213051016-15) was used as the aqueous MS/MSD for the VOC analysis on 05/11/13. All criteria were met. No qualifiers were applied. Samples 49MW04 (213051016-01), 13MW2 (213051016-02), 49MW05 (213051016-03), 13MW5 (213051016-04), 13MW4 (213051016-05), 13MW3 (213051016-06), 48MW06 (213051016-07), 49TM01 (213051016-08), 49TM02 (213051016-09), RB050813 (213051016-10), 50MW02 (213051016-11), 48MW1 (213051016-12), 49MW02 (213051016-14), 48MW3 (213051016-15), 48MW2 (213051016-18), 49MW01 (213051016-19), and TRIP BLANK (213051016-20) apply to this MS/MSD.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits. DoD surrogate recovery limits are specified in Table G-3 of the DoD QSM (DoD, 2010). If the surrogate is not listed, then the laboratory criteria shall be used.

Aqueous Criteria:
4-Bromofluorobenzene (75-120%) (DoD QSM = 75-120%)
Dibromofluoromethane (85-115%) (DoD QSM = 85-115%)
Toluene-d8 (85-120%) (DoD QSM = 85-120%)
1,2-Dichloroethane-d4 (70-120%) (DoD QSM = 70-120%)

- All criteria were met. No qualifiers were applied.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples.

- Field groundwater sample duplicate pair 49MW03 (213050904-06) and 49TM01 (213051016-08) was analyzed for TCL VOC analysis in this SDG. Methylene chloride was detected in the parent sample at trace level 2.30J µg/L and non-detect in the duplicate pair at <0.50 µg/L. Toluene was detected in the duplicate pair sample at trace level 0.696J µg/L and non-detect in the parent sample at <0.20 µg/L. These are common lab contaminants. No qualifiers were applied based upon these outliers. All other target analytes were non-detect for the duplicate pair. All criteria were met. No qualifiers were applied.

- Field groundwater sample duplicate pair 50MW02 (213051016-11) and 49TM02 (213051016-09) was analyzed for TCL VOC analysis in this SDG. All detected VOCs found in the sample and its duplicate pair and associated %RPD are noted in **Table 3**. All other target analytes were non-detect for the duplicate pair. All criteria were met. No qualifiers were applied.

Table 3 Field Precision Analysis Summary for TCL VOCs for Duplicate Pair 50MW02 (213051016-11) and 49TM02 (213051016-09)

Compound	Original Sample (µg/L)	Duplicate Pair (µg/L)	%RPD
1,1,1-Trichloroethane	0.267J	0.251J	6.2
1,1-Dichloroethane	0.353J	0.344J	2.6
Carbon tetrachloride	0.911J	0.919J	0.9
Tetrachloroethene	0.312J	0.255J	20.1
Toluene	0.438J	0.726J	49.5
Trichloroethene	2.35	2.31	1.7
cis-1,2-Dichloroethene	0.419J	0.373J	11.6

J = Estimated value <MRL and >MDL. Data point qualified was estimated "J".
MDL = Method Detection Limit.
MRL = Method Reporting Limit.

XI-Quantitation Verification and Data Review
The accuracy of analytical results is verified through the calculation of several parameters. The percent difference (%D) between the calculated and the reported values should be within 10%.

- Any sample value >MDL and <MRL or <3*MDL (whichever is greater) was qualified as estimated, "J".

Sample: 49MW04 (213051016-01), chloroform

Conc. (µg/L) = (Ax)*(Is)*(DF) / (Ais)*(RRF)

where: Ax is the compound area
Ais is the corresponding internal standard area
Is is the corresponding internal standard concentration (µg/L)
DF is the dilution factor
RRF is the relative response factor.

Conc. µg/L = (3547 * 50 µg/L * 1) / (298489 * 0.47365) = 1.25 µg/L

Reported Conc. = 1.25 µg/L
%D = 0.0%
Values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region III Data Validation Qualifiers[2]	
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
B	Not detected substantially above the level of the reported in laboratory or field blanks.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
N	Tentative Identification. Consider present. Special methods may be to confirm its presence or absence in future sampling efforts.
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UL	Not detected, quantitation limit is probably higher.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994).

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW04

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305101601

Level: (low/med)

Lab File ID: 2130512/j5320d

% Moisture: not dec.

Date Collected: 05/06/13 Time: 0920

GC Column: RTX-VMS-30 ID: .25 (mm)

Date Received: 05/10/13

Instrument ID: MSV12

Date Analyzed: 05/12/13 Time: 1635

Soil Extract Volume: (µL)

Dilution Factor: 1 Analyst: LBH

Soil Aliquot Volume: (µL)

Prep Batch: Analytical Batch: 507142

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.664	J	J 0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	1.25		0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW04

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101601

Lab File ID: 2130512/j5320d

Date Collected: 05/06/13 Time: 0920

Date Received: 05/10/13

Date Analyzed: 05/12/13 Time: 1635

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507142

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW2

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL Lab Sample ID: 21305101602

Level: (low/med) Lab File ID: 2130512/j5321d

% Moisture: not dec. Date Collected: 05/06/13 Time: 1055

GC Column: RTX-VMS-30 ID: .25 (mm) Date Received: 05/10/13

Instrument ID: MSV12 Date Analyzed: 05/12/13 Time: 1656

Soil Extract Volume: (µL) Dilution Factor: 1 Analyst: LBH

Soil Aliquot Volume: (µL) Prep Batch: Analytical Batch: 507142

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW2

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101602

Lab File ID: 2130512/j5321d

Date Collected: 05/06/13 Time: 1055

Date Received: 05/10/13

Date Analyzed: 05/12/13 Time: 1656

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507142

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW05

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305101603

Level: (low/med)

Lab File ID: 2130512/j5322d

% Moisture: not dec.

Date Collected: 05/06/13 Time: 1235

GC Column: RTX-VMS-30 ID: .25 (mm)

Date Received: 05/10/13

Instrument ID: MSV12

Date Analyzed: 05/12/13 Time: 1718

Soil Extract Volume: (µL)

Dilution Factor: 1 Analyst: LBH

Soil Aliquot Volume: (µL)

Prep Batch: Analytical Batch: 507142

CONCENTRATION UNITS: ug/L

Analytical Method: SW-846 8260B

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW05

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305101603

Level: (low/med)

Lab File ID: 2130512/j5322d

% Moisture: not dec.

Date Collected: 05/06/13 Time: 1235

GC Column: RTX-VMS-30 ID: .25 (mm)

Date Received: 05/10/13

Instrument ID: MSV12

Date Analyzed: 05/12/13 Time: 1718

Soil Extract Volume: (µL)

Dilution Factor: 1 Analyst: LBH

Soil Aliquot Volume: (µL)

Prep Batch: Analytical Batch: 507142

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: *ug/L*

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW5

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305101604

Level: (low/med)

Lab File ID: 2130512/j5323d

% Moisture: not dec.

Date Collected: 05/06/13 Time: 1350

GC Column: RTX-VMS-30 ID: .25 (mm)

Date Received: 05/10/13

Instrument ID: MSV12

Date Analyzed: 05/12/13 Time: 1739

Soil Extract Volume: (µL)

Dilution Factor: 1 Analyst: JCK

Soil Aliquot Volume: (µL)

Prep Batch: Analytical Batch: 507142

CONCENTRATION UNITS: ug/L

Analytical Method: SW-846 8260B

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW5

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305101604

Level: (low/med)

Lab File ID: 2130512/j5323d

% Moisture: not dec.

Date Collected: 05/06/13 Time: 1350

GC Column: RTX-VMS-30 ID: .25 (mm)

Date Received: 05/10/13

Instrument ID: MSV12

Date Analyzed: 05/12/13 Time: 1739

Soil Extract Volume: (µL)

Dilution Factor: 1 Analyst: JCK

Soil Aliquot Volume: (µL)

Prep Batch: Analytical Batch: 507142

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW4

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101605

Lab File ID: 2130511/j5286

Date Collected: 05/06/13 Time: 1510

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2118

Dilution Factor: 1 Analyst: CLH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	1.08		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW4

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101605

Lab File ID: 2130511/j5286

Date Collected: 05/06/13 Time: 1510

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2118

Dilution Factor: 1 Analyst: CLH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW3

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101606

Lab File ID: 2130511/j5287

Date Collected: 05/06/13 Time: 1620

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2139

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	5.63		0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.453	J	"J" 0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	1.08		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

13MW3

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101606

Lab File ID: 2130511/j5287

Date Collected: 05/06/13 Time: 1620

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2139

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

48MW06

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101607

Lab File ID: 2130511/j5288

Date Collected: 05/07/13 Time: 1030

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2200

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	1.66		0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	5.86		0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.301	J	J 0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.801	J	J 0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	6.25		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	9.21		0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

48MW06

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101607

Lab File ID: 2130511/j5288

Date Collected: 05/07/13 Time: 1030

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2200

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49TM01

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101608

Lab File ID: 2130511/j5289

Date Collected: 05/07/13 Time: 1455

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2221

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.696	J	J 0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49TM01

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101608

Lab File ID: 2130511/j5289

Date Collected: 05/07/13 Time: 1455

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2221

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49TM02

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101609

Lab File ID: 2130511/j5290

Date Collected: 05/08/13 Time: 1225

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2243

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.267	J	J 0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.353	J	J 0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.911	J	J 0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.312	J	J 0.193	0.500	1.00
108-88-3	Toluene	0.438	J	J 0.122	0.200	1.00
79-01-6	Trichloroethene	2.35		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.419	J	J 0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49TM02

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101609

Lab File ID: 2130511/j5290

Date Collected: 05/08/13 Time: 1225

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2243

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

RB050813

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101610

Lab File ID: 2130511/j5291

Date Collected: 05/08/13 Time: 1320

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2304

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	3.96	J	J 0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.200	U	0.122	0.200	1.00
79-01-6	Trichloroethene	0.200	U	0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

RB050813

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101610

Lab File ID: 2130511/j5291

Date Collected: 05/08/13 Time: 1320

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2304

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

50MW02

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101611

Lab File ID: 2130511/j5292

Date Collected: 05/08/13 Time: 1225

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2325

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.251	J	J 0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.344	J	J 0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.919	J	J 0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.255	J	J 0.193	0.500	1.00
108-88-3	Toluene	0.726	J	J 0.122	0.200	1.00
79-01-6	Trichloroethene	2.31		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.373	J	J 0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

50MW02

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101611

Lab File ID: 2130511/j5292

Date Collected: 05/08/13 Time: 1225

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2325

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

48MW1

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101612

Lab File ID: 2130511/j5293

Date Collected: 05/08/13 Time: 0945

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2346

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.432	J	J 0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	1.03		0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	0.500	U	0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	0.200	U	0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	2.10		0.122	0.200	1.00
79-01-6	Trichloroethene	1.90		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.817	J	J 0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

48MW1

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101612

Lab File ID: 2130511/j5293

Date Collected: 05/08/13 Time: 0945

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 2346

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW02

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101614

Lab File ID: 2130511/j5294

Date Collected: 05/09/13 Time: 1000

Date Received: 05/10/13

Date Analyzed: 05/12/13 Time: 0008

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	2.41	J	B 0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	5.36		0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	7.79		0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	1.52		0.122	0.200	1.00
79-01-6	Trichloroethene	0.934	J	J 0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

49MW02

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101614

Lab File ID: 2130511/j5294

Date Collected: 05/09/13 Time: 1000

Date Received: 05/10/13

Date Analyzed: 05/12/13 Time: 0008

Dilution Factor: 1 Analyst: LBH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

48MW3

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Level: (low/med)

% Moisture: not dec.

GC Column: RTX-VMS-30 ID: .25 (mm)

Instrument ID: MSV12

Soil Extract Volume: (µL)

Soil Aliquot Volume: (µL)

Lab Sample ID: 21305101615

Lab File ID: 2130511/j5280

Date Collected: 05/09/13 Time: 1135

Date Received: 05/10/13

Date Analyzed: 05/11/13 Time: 1910

Dilution Factor: 1 Analyst: CLH

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
71-55-6	1,1,1-Trichloroethane	0.200	U	0.123	0.200	1.00
79-34-5	1,1,2,2-Tetrachloroethane	0.200	U	0.109	0.200	1.00
79-00-5	1,1,2-Trichloroethane	0.200	U	0.159	0.200	1.00
75-34-3	1,1-Dichloroethane	0.200	U	0.171	0.200	1.00
75-35-4	1,1-Dichloroethene	0.500	U	0.200	0.500	1.00
87-61-6	1,2,3-Trichlorobenzene	0.200	U	0.079	0.200	1.00
107-06-2	1,2-Dichloroethane	0.200	U	0.116	0.200	1.00
78-87-5	1,2-Dichloropropane	0.200	U	0.150	0.200	1.00
78-93-3	2-Butanone	0.500	U	0.142	0.500	5.00
591-78-6	2-Hexanone	1.00	U	0.122	1.00	5.00
108-10-1	4-Methyl-2-pentanone	0.500	U	0.120	0.500	5.00
67-64-1	Acetone	1.00	U	0.193	1.00	5.00
71-43-2	Benzene	0.200	U	0.111	0.200	1.00
75-27-4	Bromodichloromethane	0.200	U	0.083	0.200	1.00
75-25-2	Bromoform	0.500	U	0.215	0.500	1.00
74-83-9	Bromomethane	0.500	U	0.427	0.500	1.00
75-15-0	Carbon disulfide	0.500	U	0.190	0.500	1.00
56-23-5	Carbon tetrachloride	73.1		0.248	0.500	1.00
108-90-7	Chlorobenzene	0.200	U	0.083	0.200	1.00
75-00-3	Chloroethane	0.500	U	0.235	0.500	1.00
67-66-3	Chloroform	7.89		0.155	0.200	1.00
74-87-3	Chloromethane	0.200	U	0.144	0.200	1.00
124-48-1	Dibromochloromethane	0.200	U	0.054	0.200	1.00
100-41-4	Ethylbenzene	0.200	U	0.109	0.200	1.00
75-09-2	Methylene chloride	0.500	U	0.149	0.500	5.00
100-42-5	Styrene	0.200	U	0.089	0.200	1.00
127-18-4	Tetrachloroethene	0.500	U	0.193	0.500	1.00
108-88-3	Toluene	0.291	J	5 0.122	0.200	1.00
79-01-6	Trichloroethene	10.7		0.161	0.200	1.00
75-01-4	Vinyl chloride	0.200	U	0.127	0.200	1.00
156-59-2	cis-1,2-Dichloroethene	0.200	U	0.103	0.200	1.00

Form I Copy

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

48MW3

Lab Name: GCAL Contract:

Lab Code: LA024 Case No.: SAS No.: SDG No.: 213051016

Matrix: (soil/water) Water

Sample wt/vol: 5 (g/ml) mL

Lab Sample ID: 21305101615

Level: (low/med)

Lab File ID: 2130511/j5280

% Moisture: not dec.

Date Collected: 05/09/13 Time: 1135

GC Column: RTX-VMS-30 ID: .25 (mm)

Date Received: 05/10/13

Instrument ID: MSV12

Date Analyzed: 05/11/13 Time: 1910

Soil Extract Volume: (µL)

Dilution Factor: 1 Analyst: CLH

Soil Aliquot Volume: (µL)

Prep Batch: Analytical Batch: 507167

Analytical Method: SW-846 8260B

CONCENTRATION UNITS: ug/L

CAS NO.	COMPOUND	RESULT	Q	MDL	LOD	LOQ
10061-01-5	cis-1,3-Dichloropropene	0.200	U	0.124	0.200	1.00
136777-61-	m,p-Xylene	0.400	U	0.123	0.400	2.00
95-47-6	o-Xylene	0.200	U	0.055	0.200	1.00
156-60-5	trans-1,2-Dichloroethene	0.200	U	0.077	0.200	1.00
10061-02-6	trans-1,3-Dichloropropene	0.200	U	0.128	0.200	1.00

Appendix B

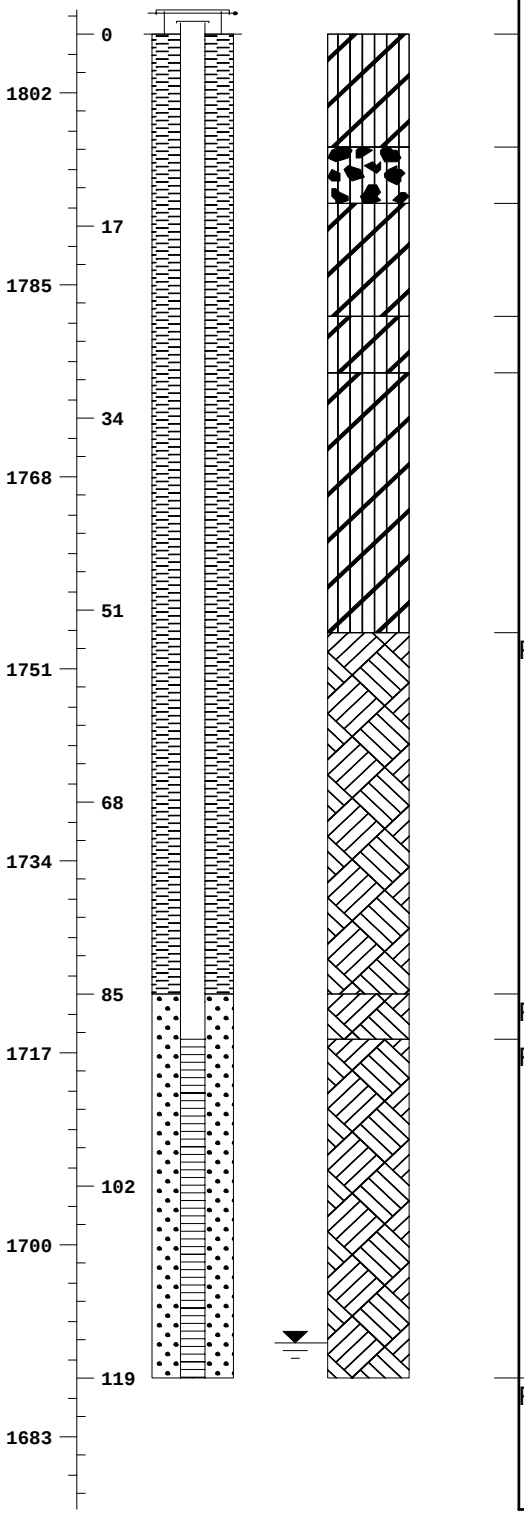
Lithologic Boring Logs,
Soil Gas Survey,
Well Purge Forms
2010 Supplemental Data Investigation Report

Appendix B-1 Lithologic Boring Logs
Appendix B-2 Soil Gas Survey Procedures and Results
Appendix B-3 2007 RFI Well Purge Forms
Appendix B-4 2010 Supplemental Data Investigation Report

DRILL HOLE LOG
DRILL HOLE NO.: 50MW02

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER: 115.9
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/09/07
TOC ELEV.: 1809.6
GS ELEV.: 1807.2
LOGGED BY: J. Choynowski
HOLE NO.: 50MW02



ELEVATION / DEPTH	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
		4" Protective case.			
0	CL-ML	Red brown silt & clay.			
		2" PVC well pipe.			
10	ML	Red brown silt, trace coarse gravel.			
15	CL-ML	Red brown silt, little (-) clay.			
25	CL-ML	Brown silt, some (-) clay, low plasticity.			
30	CL-ML	Yellow brown silt & clay, low plasticity.			
53	ROCK	Pale brown to olive brown. Competent rock.			
85	ROCK	Top of sand filter layer.			
89	ROCK	Top of well screen, 0.010" slot.			
119	ROCK	Bottom of screen and well.			

FIGURE NO.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silt
	Inorganic silts and clays
	Silty low plasticity clay
	Well graded gravel with silt
	Generic rock
	Low plasticity organic silts
	Well graded gravel and sand
	Variable gravel and silty sand mix
	Clayey sand
	Silty gravel
	Low plasticity clay
	Silty sand
	Clayey gravel
	Well graded sand
	Dolomite

Symbol	Description
	Well graded sand with clay
	Shale
	Clayey sand and gravel
	Shale and dolostone.
	Limestone
	Limestone and dolostone.
Misc. Symbols	
	Boring continues
	Water table at boring completion
Monitor Well Details	
	Capped riser with locking cover
	Bentonite pellets
	Silica sand, blank PVC
	Slotted pipe w/ sand

Notes:

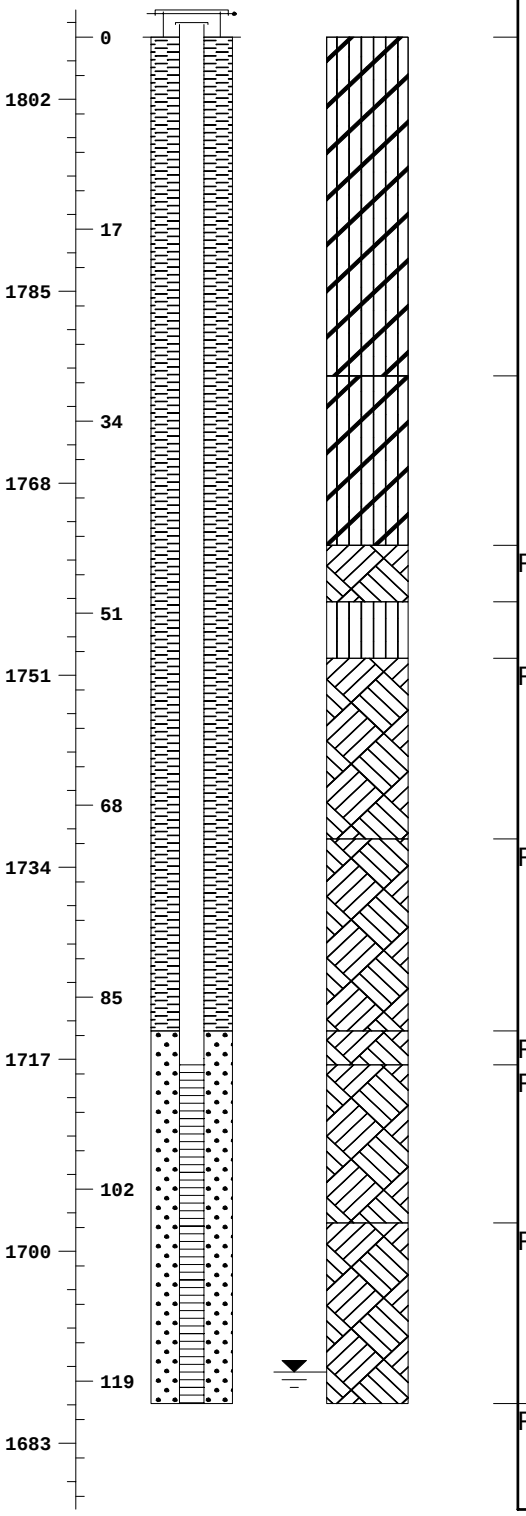
1. Borings were drilled on 8/10/07 using a 6-inch diameter air rotary T3 drill rig.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

DRILL HOLE LOG
DRILL HOLE NO.: 50MW01

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER: 118.2
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/08/07
TOC ELEV.: 1809.9
GS ELEV.: 1807.5
LOGGED BY: J. Choynowski
HOLE NO.: 50MW01



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
				4" Protective case. 0			
			CL-ML	Red brown clay and silt, low plasticity. 2" PVC well pipe.			
				30			
			CL-ML	Yellowish brown clay and silt, low plasticity.			
				45			
			ROCK	Competent rock, bedrock.			
				50			
			ML	Dark gray to brown silt filling void (soft drilling).			
				55			
			ROCK	Into pale brown dolostone (hard drilling).			
				71			
			ROCK	Pale brown to olive brown.			
				88			
			ROCK	Top of sand filter layer. 91			
			ROCK	Top of well screen, 0.010" slot.			
				105			
			ROCK	Dark grayish brown.			
				121			
			ROCK	Bottom of screen and well.			

FIGURE NO.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silt
	Inorganic silts and clays
	Silty low plasticity clay
	Well graded gravel with silt
	Generic rock
	Low plasticity organic silts
	Well graded gravel and sand
	Variable gravel and silty sand mix
	Clayey sand
	Silty gravel
	Low plasticity clay
	Silty sand
	Clayey gravel
	Well graded sand
	Dolomite

Symbol	Description
	Well graded sand with clay
	Shale
	Clayey sand and gravel
	Shale and dolostone.
	Limestone
	Limestone and dolostone.
Misc. Symbols	
	Boring continues
	Water table at boring completion
Monitor Well Details	
	Capped riser with locking cover
	Bentonite pellets
	Silica sand, blank PVC
	Slotted pipe w/ sand

Notes:

1. Borings were drilled on 8/10/07 using a 6-inch diameter air rotary T3 drill rig.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA

DTW FROM TOC: NA

DATE/TIME: NA

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48SB5

LOCATION: SWMU 48
LOWER DISPOSAL AREA

WEATHER: DAMP, 45° F

DATE/TIME START: 12/17/94 1140

DATE/TIME FINISH: 12/17/94 1510

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	HEADING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
1-2								SILT, SOME SAND, SOME CLAY, DARK ORANGE-BROWN		SURFACE ELEVATION 1823.5' (MSL)	1-2
3	1	100	NA	2.6	HS	MOSS SPOON					3
4-5							ML				4-5
6-7	2	75	NA	2.9	HS	MOSS SPOON					6-7
8-10											8-10
11	3	25	NA	10	HS	MOSS SPOON	GM/SM	SILT AND SAND, GRAVEL, ORANGE-BROWN, HYDROCARBON ODOR AT 10.5 FEET			11
12	4	10	30	1.9	HS	SS 11'-12'					12
13-14	5	35	100/3" 75,60	131	HS	SS 13'-15'	ML	SILT AND CLAY, SOME SAND, LIGHT BROWN, STRONG HYDROCARBON ODOR, SOME GRAVEL			13-14
15			19,16								15
16	6	0	38,74	—	—	SS 15'-17'					16
17			100/2"								17
18	7*	50	43,56	213	SS	SS 17'-19'	GM/ML	SILT AND SAND, YELLOW-BROWN, GRAVEL, STRONG HYDROCARBON ODOR			18
19			18,12								19
20	8	75	20,12	125	HS	SS 19'-21'	ML	SILT, SOME SAND, LITTLE CLAY, WEATHERED GREEN SILTSTONE, STRONG HYDROCARBON ODOR			20
21-25			9,11								21-25
26	9	95	5,10	201	HS	SS 25'-27'		CLAY AND SILT, ORANGE, INTERBEDDED WEATHERED SILTSTONE, HYDROCARBON ODOR DECREASING TO BOTTOM, MORE COMPETENT SILTSTONE, GREEN AT 35 FEET			26
27-30			15,30								27-30
31	10	95	7,12	180	HS	SS 30'-32'	CL				31
32-35			12,14								32-35
36	11*	95	20,31	3.4	HS	SS 35'-37'					36
37			42,42					END OF BORING AT 37 FEET			37
38-40											38-40

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH DIAMETER BORING
GROUTED TO SURFACE

CONTRACTOR: CT & E
GEOLOGIST: BACHOVCHIN/GLENNIE
DRILLING METHOD: HSA
DTW FROM TOC: NA
DATE/TIME: NA

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP
CLIENT: US AEC
PROJECT NO.: 722843

BORING NO: 48SB4
LOCATION: SWMU 48 UPPER DISPOSAL AREA
WEATHER: DAMP, 40° F
DATE/TIME START: 12/17/94 0850
DATE/TIME FINISH: 12/17/94 1050

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
1-2							GM	GRAVEL AND ASH, SOME SILT, BLACK		SURFACE ELEVATION 1830.4' (MSL)	1-2
3	1	100	NA	1.2	HS	MOSS SPOON		CLAY AND SILT, LITTLE SAND, BROWN-ORANGE, MICACEOUS AT 9 FEET			3
4-5											4-5
6							CL				6
7-8	2	100	NA	2.9	HS	MOSS SPOON					7-8
9-10											9-10
11								SAND AND SILT, LITTLE CLAY, ORANGE-BROWN			11
12	3*	75	NA	3.8	HS	MOSS SPOON	SM				12
13								HARD DRILLING AT 14 FEET DUE TO GRAVEL			13
14								GRAVEL, SAND AND SILT, BROWN, PEBBLE TO COBBLE SIZE GRAVEL			14
15	4	10	100/4"	0.0	HS	SS 14'-16'					15
16							GM/SM				16
17	5	0	100/2"			SS 16'-18'					17
18											18
19	6	0	46, 100/5"			SS 18'-19'					19
20											20
21	7*	10	37,64 100/3"7	2.0	SS	SS 20'-21'	ML	SILT, SOME SAND AND CLAY, YELLOW-BROWN			21
22								END OF BORING AT 21 FEET			22
23-24											23-24
25											25

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.
SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE
BH = BORE HOLE
GS = GRAB SAMPLE
HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH DIAMETER BORING GROUTED TO SURFACE

BORING 48SB2

Surface Elevation: **1,827.0** Feet, MSL
Location: Radford AAP, Virginia
Start: 14:15 on 8-16-91
Finish: 15:50 on 8-16-91

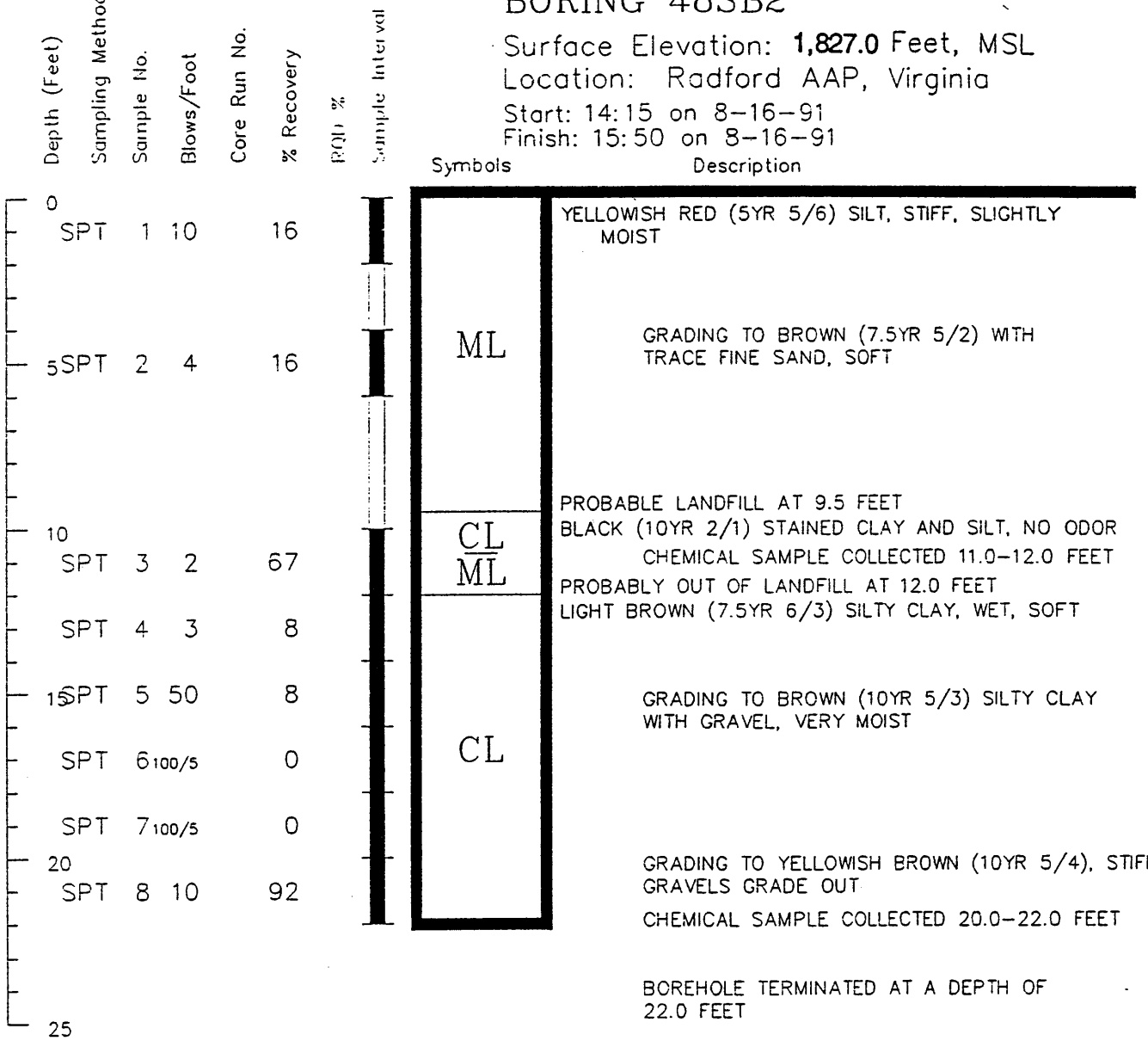


PLATE
LOG OF BORING

Dames & Moore

BORING 48SB1

Surface Elevation: **1,826.0** Feet, MSL
Location: Radford AAP, Virginia
Start: 08:06 on 8-19-91
Finish: 10:08 on 8-19-91

Depth (Feet)	Sampling Method	Sample No.	Blows/Foot	Core Run No.	% Recovery	RQD %	Sample Interval	Symbols	Description
0									
	C	1			40			ML	LIGHT BROWN (7.5YR 6/3) SANDY SILT, SLIGHTLY MOIST, FILL
5									
	C	2			50			GC	LIGHT BROWN (7.5YR 6/3) CLAYEY SILTY GRAVELS WITH COBBLES, PROBABLE LANDFILL BLACK STAINING – APPARENT OIL LANDFILL, WET CHEMICAL SAMPLE COLLECTED 8.0 FEET
10								CL	BROWN (7.5YR 5/4) SILTY CLAY, TRACE FINE SAND, WET SOME PLASTICITY, PROBABLY OUT OF LANDFILL AT 9.0 FEET BECOMING GRAVELLY AT 10.0 FEET
	C	3			50			SM	STRONG BROWN (7.5YR 5/8) SILTY SAND, SOME GRAVEL, WET CHEMICAL SAMPLE COLLECTED 13.0 FEET GRAVEL SEAM AT 14.5–15.0 FEET
15									BOREHOLE TERMINATED AT A DEPTH OF 15.0 FEET

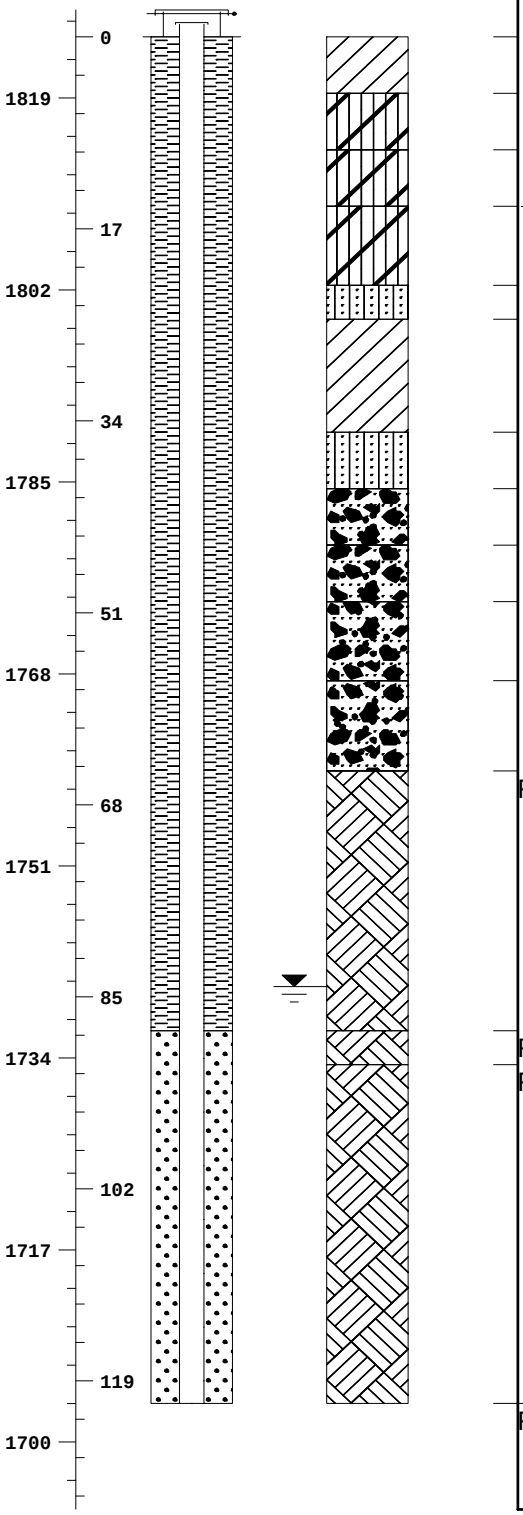
PLATE
LOG OF BORING

Dames & Moore

DRILL HOLE LOG
DRILL HOLE NO.: 48MW05

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER: 84.1
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/08/07
TOC ELEV.: 1826.8
GS ELEV.: 1824.4
LOGGED BY: J. Choynowski
HOLE NO.: 48MW05



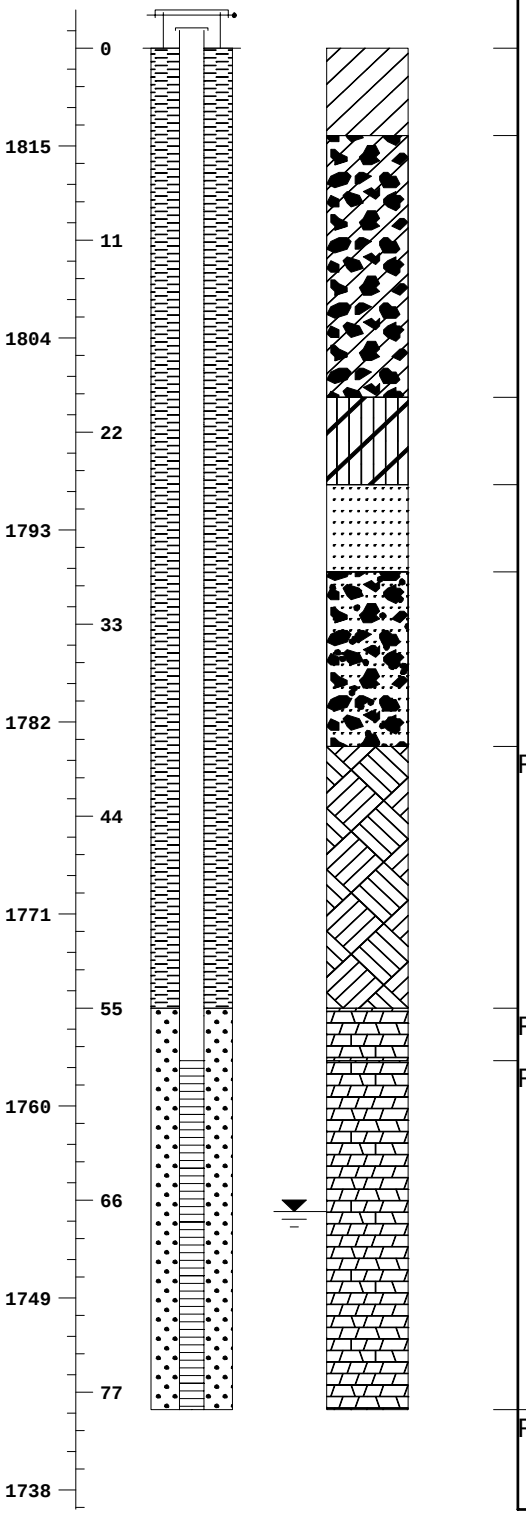
ELEVATION / DEPTH	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
		4" Protective case. 0			
	CL	Red brown clay, low plasticity, little fine sand.			
		2" PVC well pipe. 5			
	CL-ML	Yellowish brown clay & silt, low plasticity, trace gravel. 10			
	CL-ML	Same as above except some (+) gravel. 15			
	CL-ML	Brown clay & silt, low plasticity, little coarse sand. 22			
	SM	Pale brown silt & fine sand, little gravel. 25			
	CL	Yellowish brown clay w/ some weathered saprolite. 35			
	SM	Brown silt & fine sand, little saprolite. 40			
	GW-SW	yellowish brown sand & gravel, olive saprolite. 45			
	GW-SW	Same as above except little clay. 50			
	GW-SW	Same as above, some clay. 57			
	GW-SW	Same as above except little clay. 65			
	ROCK	Competent rock, bedrock. 88			
	ROCK	Top of sand filter layer. 91			
	ROCK	Top of well screen, 0.010" slot. 121			
	ROCK	Bottom of screen and well.			

FIGURE NO.

DRILL HOLE LOG
DRILL HOLE NO.: 48MW06

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER: 66.65
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/08/07
TOC ELEV.: 1822.8
GS ELEV.: 1820.6
LOGGED BY: J. Choynowski
HOLE NO.: 48MW06



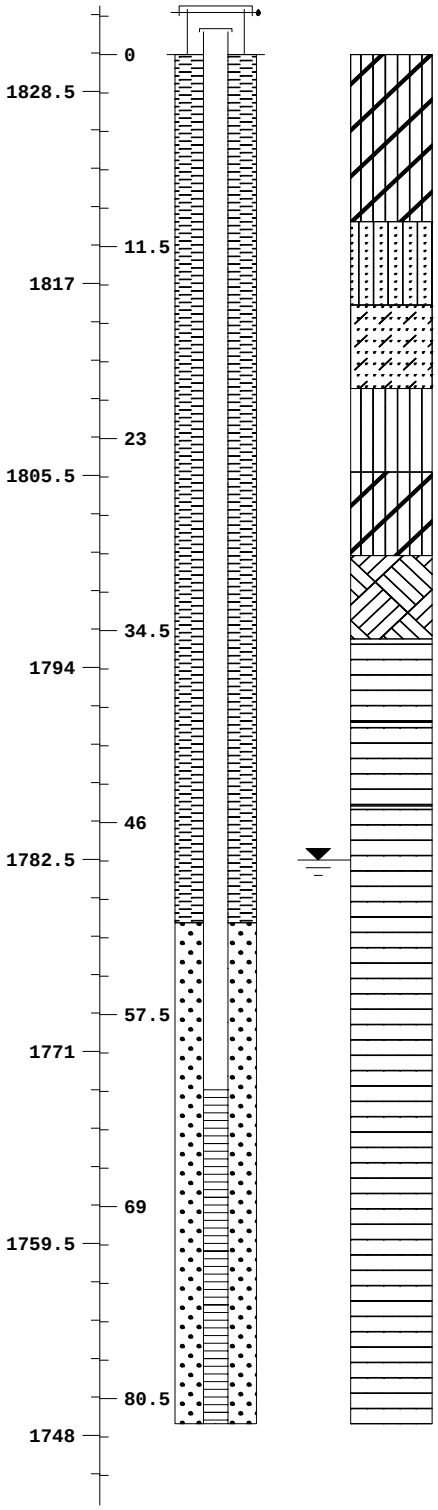
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
				4" Protective case.			
0			CL	Red brown clay, low plasticity, little silt.			
				2" PVC well pipe.			
5			GC	Same as above with some coarse gravel.			
20			CL-ML	Yellowish brown clay & silt, some coarse sand and gravel.			
25			SW	Strong brown fine to medium sand, little gravel.			
30			GW-SW	Yellowish brown gravel & sand w/ some silt and some olive saprolite.			
40			ROCK	Olive & yellow brown saprolite, very weathered.			
55			ROCK	2.5yr 6/6 olive yellow dolomite.			
58			ROCK	Top of sand filter layer. Top of well screen, 0.010" slot.			
78			ROCK	Bottom of screen and well.			

FIGURE NO.

DRILL HOLE LOG
DRILL HOLE NO.: 48MW07

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER: 48.24
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/07/07
TOC ELEV.: 1833.7
GS ELEV.: 1830.7
LOGGED BY: J. Choynowski
HOLE NO.: 48MW07



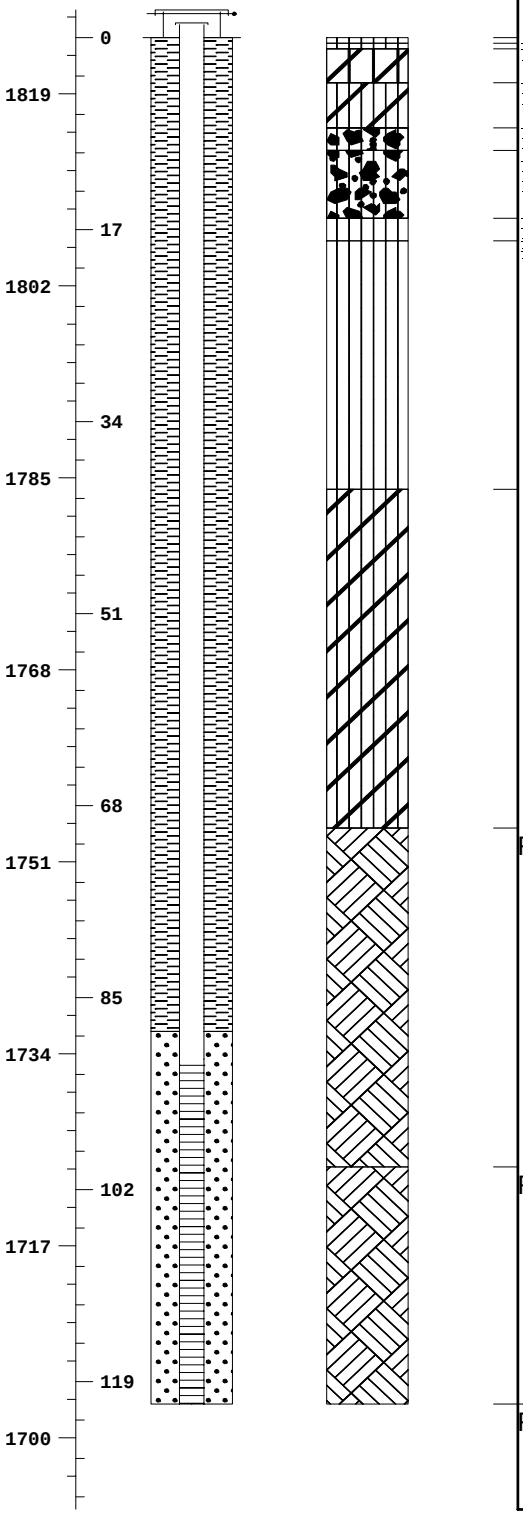
ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
				4" Protective case.			
				0			
			CL-ML	Yellowish red clay & silt. 2" PVC well pipe.			
				10			
			SM	Red brown silt & fine sand.			
				15			
			SW-SC	Yellow brown fine sand, little silt, little coarse gravel.			
				20			
			ML	Strong brown silt, little weathered saprolite.			
				25			
			CL-ML	Pale olive clay & silt.			
				30			
			ROCK	Competent saprolite, olive.			
				35			
			ROCK	Redish brown shale.			
				40			
			ROCK	Green shale.			
				45			
			ROCK	Yellowish brown shale. Pale brown. Top of sand filter layer. Olive. Red brown. Top of well screen, 0.010" slot. Olive brown, dust stopped. Pale olive. Dark olive.			
				82			
				Bottom of screen and well.			

FIGURE NO.

DRILL HOLE LOG
DRILL HOLE NO.: 49MW01

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER:
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/09/07
TOC ELEV.: 1826.4
GS ELEV.: 1823.98
LOGGED BY: J. Choynowski
HOLE NO.: 49MW01



ELEVATION / DEPTH	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
		4" Protective case.			
	ML	10yr 5/4 yellow-brown silt with roots.			
	ML	2" PVC well pipe.	A		
	CH-MH	10yr 5/6 yellow-brown silt, little rock.			
	CL-ML	2.5yr 5/8 red clay & silt, trace(+)fine sand. No splitspoon.	B		
	ML	2.5yr 5/8 red clay & silt, little(-) very fine sand.			
	GW-GM	2.5yr 7/6 Reddish yellow gravel, some sand & silt w/ little 2-3" diameter cobbles.	C		
	GW-GM	Same as above No splitspoon.			
	ML	2.5yr 6/7 Olive yellow silt, soft, little(-) clay.			
	ML	2.5yr 6/8 olive yellow silt with some clay, little(-) cobble, some very fine sand.			
	CL-ML	Yellowish brown silt & clay.			
	ROCK	Competent rock, bedrock, pale brown to olive brown.			
		Top of sand filter layer. Top of well screen, 0.010" slot.			
	ROCK	Olive yellow, damp.			
	ROCK	Bottom of screen and well.			

0
0.5
1
4
8
10
16
18
40
70
100
121

FIGURE NO.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silt
	Inorganic silts and clays
	Silty low plasticity clay
	Well graded gravel with silt
	Generic rock
	Low plasticity organic silts
	Well graded gravel and sand
	Variable gravel and silty sand mix
	Clayey sand
	Silty gravel
	Low plasticity clay
	Silty sand
	Clayey gravel
	Well graded sand
	Dolomite

Symbol	Description
	Well graded sand with clay
	Shale
	Clayey sand and gravel
	Shale and dolostone.
	Limestone
	Limestone and dolostone.
Misc. Symbols	
	Boring continues
	Water table at boring completion
Monitor Well Details	
	Capped riser with locking cover
	Bentonite pellets
	Silica sand, blank PVC
	Slotted pipe w/ sand

Notes:

1. Borings were drilled on 8/10/07 using a 6-inch diameter air rotary T3 drill rig.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 78.19 FT

DATE/TIME: 7/22/95 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW4

LOCATION: SWMU 48
CENTER OF UPPER DISPOSAL AREA

WEATHER: RAIN, 85° F

DATE/TIME START: 7/18/95 1100

DATE/TIME FINISH: 7/20/95 1830

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
1-4				0.1	BH		CL	CLAY AND SILT, LITTLE SAND, RED-BROWN
8-12				0.0	BH		GM	SILT AND GRAVEL, LITTLE SAND, ORANGE-BROWN
13-18				0.0	BH		CL	CLAY AND SILT, LITTLE SAND, RED-BROWN, MOIST
26-33				0.0	BH		ML	SILT AND CLAY, ORANGE-BROWN, MOIST ZONE AT 40-41 FEET
41-45				0.0	BH		GM	SAND AND GRAVEL, SOME SILT, BROWN, MOIST, GRAVEL LAYER AT 49 FEET

LITHOLOGIC COLUMN

WELL COMPLETION

TOC
1832.6
2.06'
STICK UP

GROUT
TO
SURFACE

DEPTH (FT)

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 78.19 FT

DATE/TIME: 7/22/95 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW4

LOCATION: SWMU 48

WEATHER: RAIN, 85° F

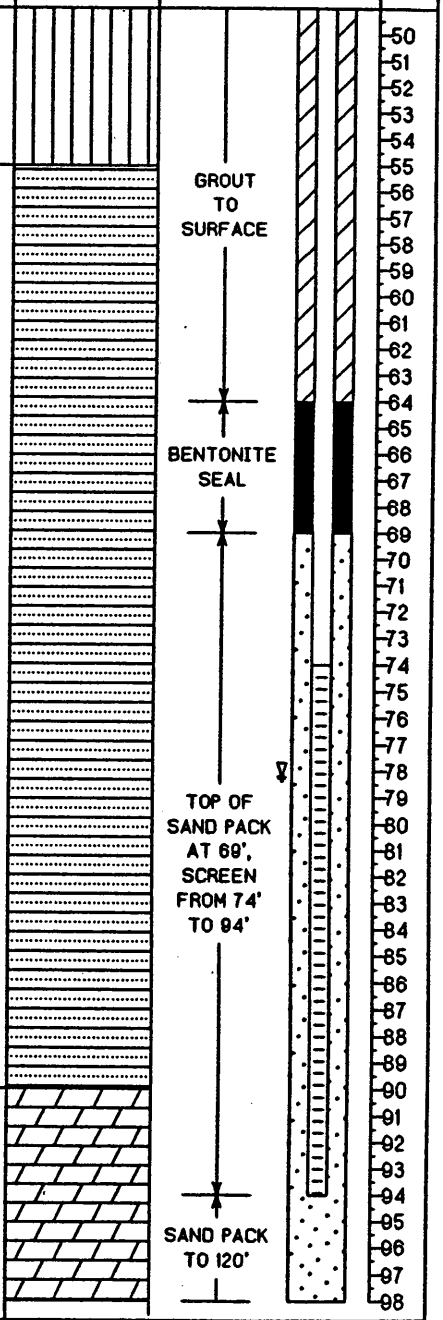
DATE/TIME START: 7/18/95 1100

DATE/TIME FINISH: 7/20/95 1830

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
50-55				0.0	BH		ML	SILT, BROWN, BECOMING MORE COMPETENT, SWITCHED TO AIR ROTARY DRILLING AT 55 FEET
55-90				0.0	BH		SLSN	SILTSTONE, WEATHERED, ALTERNATING RED AND GREEN LAYERS, INTERBEDDED DOLOMITE (SLIGHT HCL FIZZ)
90-98				0.0	BH		DLMT	DOLOMITE, GREEN-GRAY, AND INTERBEDDED DARK GRAY SILTSTONE, SOFT ZONE AT 100-108 FEET (WATER?)

LITHOLOGIC COLUMN

WELL COMPLETION



DEPTH (FT)

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 78.19 FT

DATE/TIME: 7/22/95 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW4

LOCATION: SWMU 48

WEATHER: RAIN, 85° F

DATE/TIME START: 7/18/95 1100

DATE/TIME FINISH: 7/20/95 1830

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
99–120				0.0	BH		DLMT	DOLOMITE, GREEN-GRAY, AND INTERBEDDED DARK GRAY SILTSTONE, SOFT ZONE AT 100-108 FEET (WATER?)		SAND PACK TO 120'	99–120
120								END OF BORING AT 120 FEET			120
121–147											121–147

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 119 FT (FROM SURFACE)

DATE/TIME: 1/08/95 1430

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW3

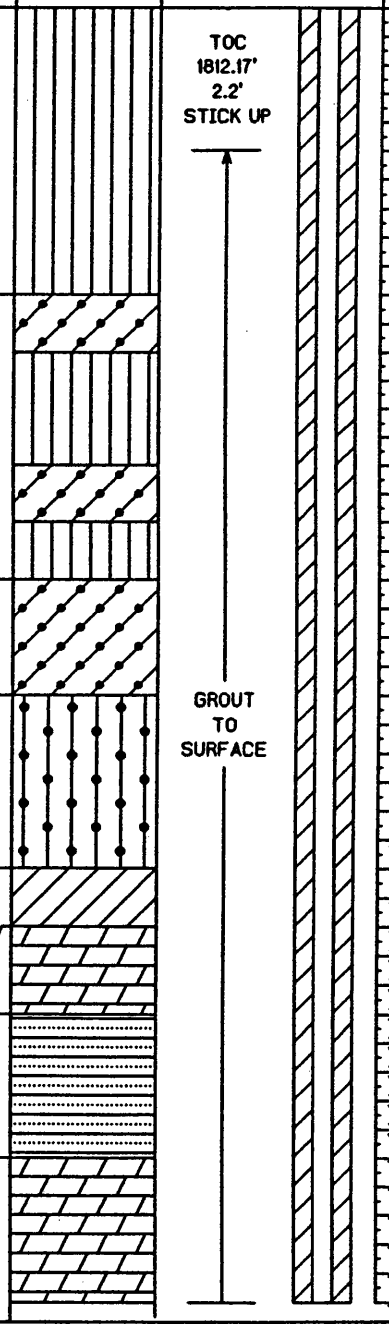
LOCATION: SWMU 48
SE OF LOWER DISPOSAL AREA

WEATHER: WET, COLD, 40° F

DATE/TIME START: 1/07/95 1237

DATE/TIME FINISH: 1/08/95 1430

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
1-10							ML	SILT AND CLAY, LITTLE SAND, ORANGE-BROWN
11-20	1	95	2,5 8,6	2.0	HS	SS	ML/SM	SILT, LITTLE SAND AND CLAY, ORANGE-BROWN
21-24	2*	95	2,6 6,5	3.5	SS	SS	SM	SILT AND SAND, LITTLE CLAY, ORANGE
25-30							GM	GRAVEL, SILTY
31-32	3*	90	8,26 50/2"	1.1	HS	SS	CL	CLAY AND SILT, YELLOW-BROWN, SWITCHED TO AIR HAMMER AT 32 FEET
32-35							DLMT	DOLOMITE, WEATHERED, LIGHT GRAY
35-40							SLSN	SILTSTONE, BROWN, INTERBEDDED WITH GRAY DOLOSTONE
40-45							DLMT	DOLOMITE, WEATHERED, GRAY, ARGILLACEOUS



HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 119 FT (FROM SURFACE)

DATE/TIME: 1/08/95 1430

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW3

LOCATION: SWMU 48

WEATHER: WET, COLD, 40° F

DATE/TIME START: 1/07/95 1237

DATE/TIME FINISH: 1/08/95 1430

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
46-90							DLMT	DOLOMITE, WEATHERED, GRAY, ARGILLACEOUS DRILLING RATE FROM 40-60 FEET (1 FOOT/1.8 MINUTES) LESS CLAY, LESS WEATHERING DRILLING RATE FROM 60-90 FEET (1 FOOT/6.3 MINUTES) DOLOMITE, LIGHT GRAY

LITHOLOGIC COLUMN

WELL COMPLETION: GROUT TO SURFACE; BENTONITE SEAL

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 119 FT (FROM SURFACE)

DATE/TIME: 1/08/95 1430

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW3

LOCATION: SWMU 48

WEATHER: WET, COLD, 40° F

DATE/TIME START: 1/07/95 1237

DATE/TIME FINISH: 1/08/95 1430

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
91-135							LMSN	LIMESTONE, LIGHT GRAY, DRILLING RATE (1 FOOT/4 MINUTES)
105-122							DLMT	DOLOMITE, LIGHT GRAY, POSSIBLE WET ZONE AT 112 FEET. DRILLING RATE (1 FOOT/3.5 MINUTES)
122								END OF BORING AT 122 FEET

LITHOLOGIC COLUMN

WELL COMPLETION: TOP OF SAND PACK AT 90', SCREEN FROM 100' TO 120'

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 126 FT (FROM SURFACE)

DATE/TIME: 1/07/95 0830

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW2

LOCATION: SWMU 48
SW OF LOWER DISPOSAL AREA

WEATHER: CLEAR, 25° F

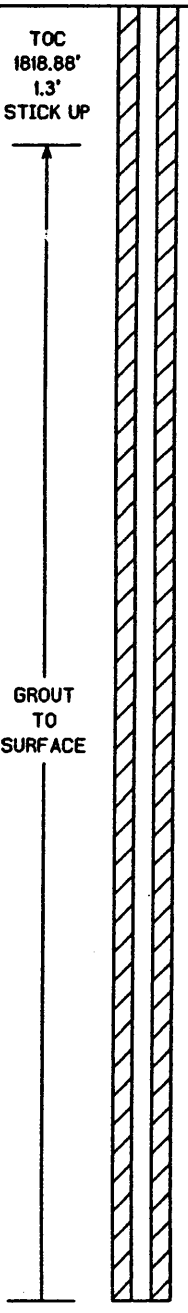
DATE/TIME START: 12/19/94 1630

DATE/TIME FINISH: 1/07/95 1200

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
6	1	60	8,12 15,16	0.0	HS	SS 5'-7'	ML	SILT, SOME SAND AND CLAY, RED-BROWN
11	2	75	7,5 5,4	0.0	HS	SS 10'-12'	SM	SILT AND SAND, BROWN VERY HARD DRILLING AT 17 FEET (GRAVEL)
21	3	5	100/ 2.5	0.0	HS	SS 20'-22'	GM/ML	SILT AND CLAY, SOME SAND, LIGHT BROWN, GRAVEL
31	4	30	10,8 5,4	0.0	HS	SS 30'-32'		
41	5*	90	18,25 25,28			SS 40'-42'	DLMT	DOLOMITE, WEATHERED, LIGHT GRAY, ARGILLACEOUS, INTERBEDDED SILTSTONE
45	6*	5	100/1			SS 44'-46'		SWITCHED TO AIR HAMMER AT 44 FT

LITHOLOGIC COLUMN

WELL COMPLETION



DEPTH (FT)

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE
HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
2 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 126 FT (FROM SURFACE)

DATE/TIME: 1/07/95 0830

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW2

LOCATION: SWMU 48

WEATHER: CLEAR, 25° F

DATE/TIME START: 12/19/94 1630

DATE/TIME FINISH: 1/07/95 1200

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
47-92								DOLOMITE, WEATHERED, LIGHT GRAY
							SLSN	SILTSTONE, LIGHT BROWN, WEATHERED, INTERBEDDED GRAY DOLOMITE DRILLING RATE (1 FOOT/3 MINUTES)
							DLMT	DOLOMITE, WEATHERED, LIGHT GRAY, ARGILLACEOUS DRILLING RATE (1 FOOT/2.3 MINUTES) NOTE: SOFT FORMATION NOT RETURNING CUTTINGS UP HOLE. MUST SET TEMPORARY CASING. HOLE IS STOPPED AT 80 FEET OVER HOLIDAY, RESUME DRILLING ON 1-5-95.
							LMSN	LIMESTONE, WEATHERED, GRAY-BROWN

LITHOLOGIC COLUMN

WELL COMPLETION: GROUT TO SURFACE

DEPTH (FT) 47-92

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
2 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 126 FT (FROM SURFACE)

DATE/TIME: 1/07/95 0830

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW2

LOCATION: SWMU 48

WEATHER: CLEAR, 25° F

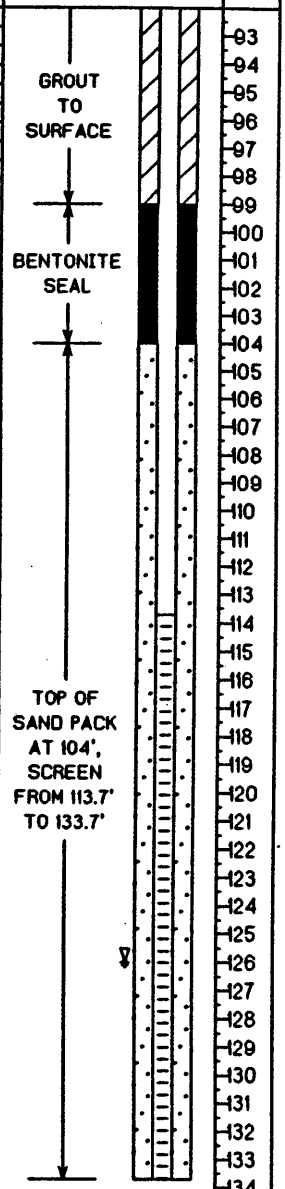
DATE/TIME START: 12/19/94 1630

DATE/TIME FINISH: 1/07/95 1200

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
93–110							LMSN	LIMESTONE, WEATHERED, GRAY-BROWN DRILLING RATE (1 FOOT/1.7 MINUTES)
110–134							DLMT	DOLOMITE, LIGHT GRAY, WEATHERED, ALTERNATING HARD AND SOFT, GRAY AND BROWN, LAYERS DRILLING RATE (1 FOOT/3.3 MINUTES)
134–138								END OF BORING AT 133.7 FEET

LITHOLOGIC COLUMN

WELL COMPLETION



DEPTH (FT) 93–138

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE

▽ = WATER LEVEL

COMMENTS:
2 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 122 FT (FROM SURFACE)

DATE/TIME: 12/19/94 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW1

LOCATION: SWMU 48
NW OF LOWER DISPOSAL AREA

WEATHER: DAMP, 45° F

DATE/TIME START: 12/17/94 1545

DATE/TIME FINISH: 12/19/94 1255

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
6	1	100	11,9 7,14	3.4	SS	SS 5'-7'	ML	SILT, SOME CLAY, SOME SAND, ORANGE-BROWN
11	2	100	3,3 4,6	3.5	HS	SS 10'-12'	GM/SM	SILT AND SAND, GRAVEL, ORANGE-BROWN, SLIGHT ODOR
								SILT AND CLAY, ORANGE-BROWN TO YELLOW-BROWN
								SILT BECOMING MORE COMPETENT, MORE RED, WEATHERED, LAYERED
21	3*	95	11,8 7,10	4.0	HS	SS 20'-22'	ML	
26	4	95	8,7 8,10	1.1	HS	SS 25'-27'		
31	5	80	13,9 10,11	0.0	HS	SS 30'-32'		
36	6	75	9,12 9,9	4.0	HS	SS 35'-37'		
41	7	95	7,9 10,9	0.0	HS	SS 40'-42'		

LITHOLOGIC COLUMN

WELL COMPLETION

TOC
1819.95'
2.2'
STICK UP

GROUT
TO
SURFACE

DEPTH (FT)

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 122 FT (FROM SURFACE)

DATE/TIME: 12/19/94 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW1

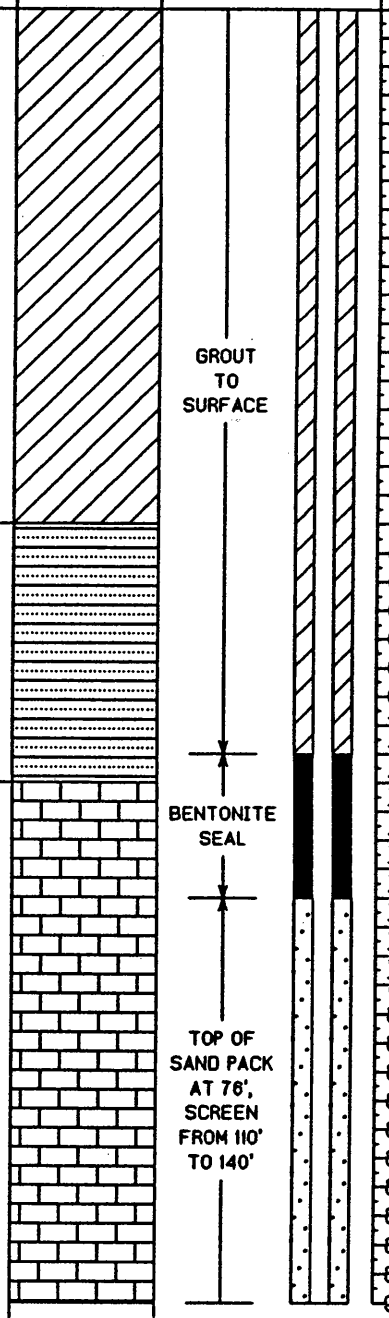
LOCATION: SWMU 48

WEATHER: DAMP, 45° F

DATE/TIME START: 12/17/94 1545

DATE/TIME FINISH: 12/19/94 1255

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
46-47	8	100	9,70 17,16	2.8	HS	SS 45'-47		CLAY AND SILT, TRACE SAND, BROWN, SLIGHTLY DAMP AT 52 FEET, WEATHERED
51-52	9	75	9,9 9,9	6.0	HS	SS 50'-52'	CL	
53-54	10*	75	16,8 9,8	6.0	HS	SS 52'-54		
61-62	11	60	10,10 10,10	4.5	HS	SS 60'-62		SWITCHED TO AIR ROTARY DRILLING AT 60 FEET
66-67	12	100	12,28 31,75	3.9	HS	SS 65'-67	SLSN	SILTSTONE, GREEN-BROWN, WEATHERED, VERY DAMP AT 66 FEET
								DISTINCT CHANGE AT 72 FEET
							LMSN	LIMESTONE, DARK BROWN CUTTINGS, ARGILLACEOUS



HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 122 FT (FROM SURFACE)

DATE/TIME: 12/19/94 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW1

LOCATION: SWMU 48

WEATHER: DAMP, 45° F

DATE/TIME START: 12/17/94 1545

DATE/TIME FINISH: 12/19/94 1255

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
91-135							LMSN	LIMESTONE, DARK BROWN CUTTINGS, ARGILLACEOUS STOPPED OVERNIGHT AT 94 FEET, NO WATER IN HOLE 12-19-94 DRILLING RATE IS APPROXIMATELY 1 FOOT/1.5 MINUTES
100-135							DLMT	DOLOMITE, GRAY, WEATHERED, SOFT DRILLING RATE IS APPROXIMATELY 1 FOOT/2.5 MINUTES

LITHOLOGIC COLUMN

WELL COMPLETION

TOP OF SAND PACK AT 76', SCREEN FROM 110' TO 140'

DEPTH (FT)

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E

GEOLOGIST: BACHOVCHIN/GLENNIE

DRILLING METHOD: HSA/AIR ROTARY

DTW FROM TOC: 122 FT (FROM SURFACE)

DATE/TIME: 12/19/94 1200

PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD

PROJECT NAME: RAAP

CLIENT: US AEC

PROJECT NO.: 722843

BORING NO: 48MW1

LOCATION: SWMU 48

WEATHER: DAMP, 45° F

DATE/TIME START: 12/17/94 1545

DATE/TIME FINISH: 12/19/94 1255

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS
136-180							DLMT	DOLOMITE, GRAY, WEATHERED, SOFT BECOMES HARDER AT 148 FEET, NO WATER TO END OF BORING, THEN WATER TO 122 FEET AFTER 1.5 HOURS END OF BORING AT 154 FEET

LITHOLOGIC COLUMN

WELL COMPLETION: TOP OF SAND PACK AT 76', SCREEN FROM 110' TO 140'

DEPTH (FT) 136-180

HSA = HOLLOW STEM AUGER
CAL = CALIBRATION
USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON
A = AUGER CUTTINGS
* = LAB SAMPLE

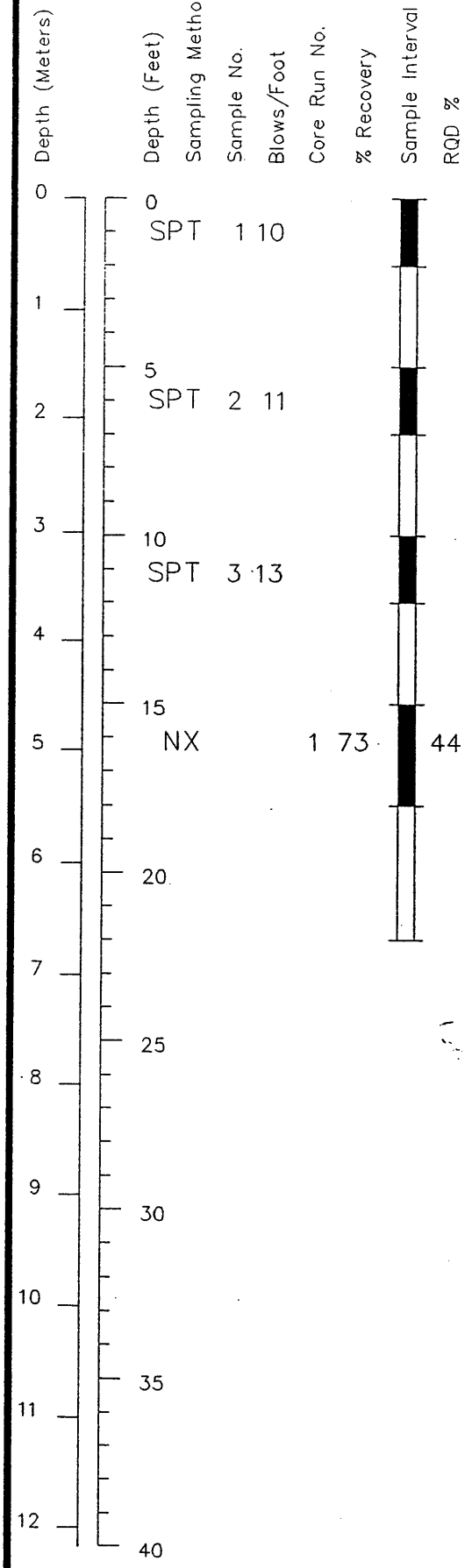
BH = BORE HOLE
GS = GRAB SAMPLE

HS = HEADSPACE
▽ = WATER LEVEL

COMMENTS:
4 INCH ID PVC, SCH 40
0.01 INCH SLOT SCREEN

BORING 13MW3

Location: Radford AAP, Virginia
Surface Elevation: 1693.4 Feet, MSL
Start: 07:58 on 8-27-91
Finish: 11:27 on 8-27-91



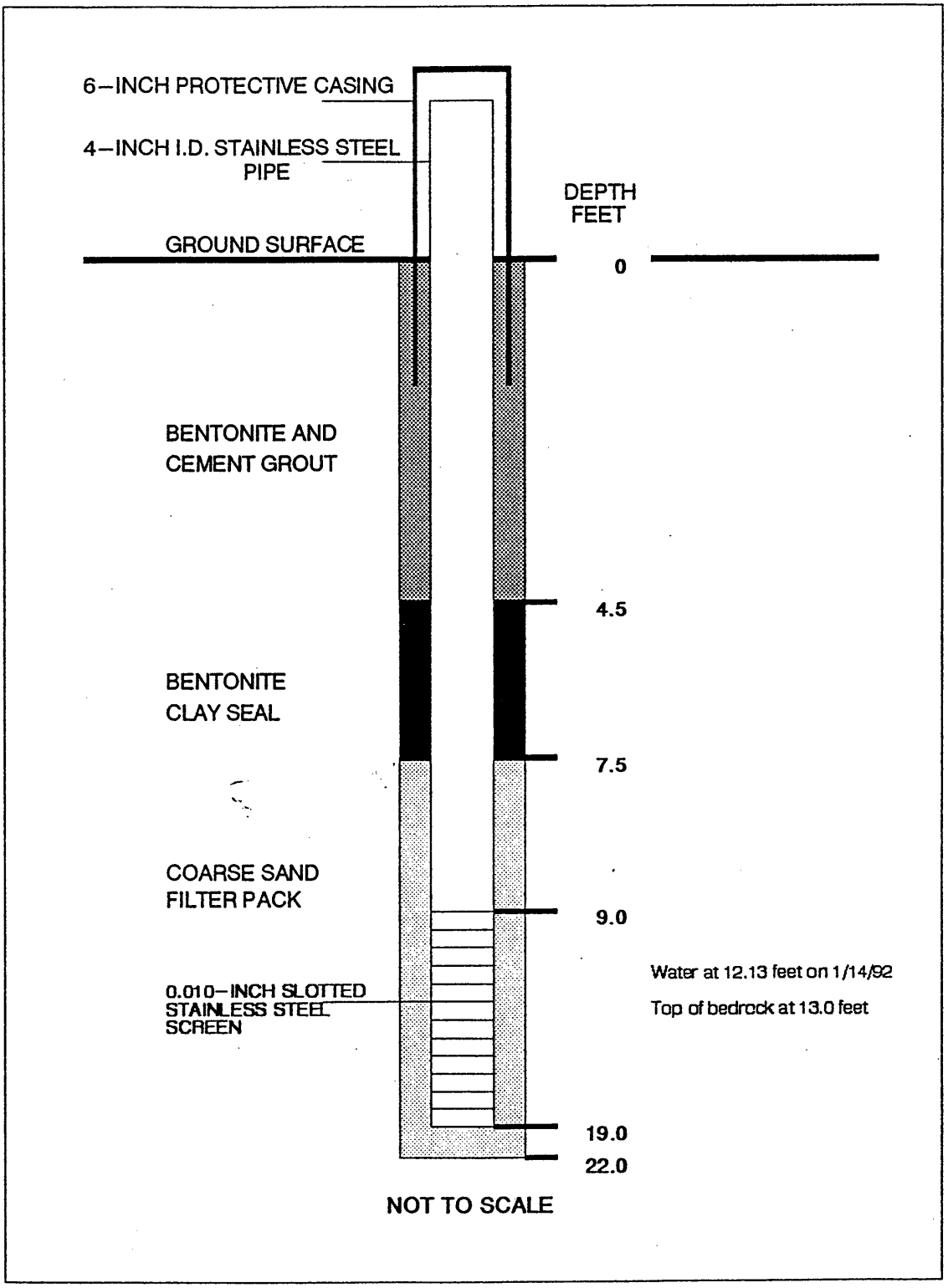
Symbols	Description
ML	DARK GRAYISH BROWN (10YR 3/2) SILT
SM	DARK GRAYISH BROWN (10YR 3/2) SILTY FINE SAND WITH SAND SEAMS, MOIST
	GRADES TO DARK BROWN (7.5YR 3/4) FINE SAND
SP	DARK BROWN (7.5YR 3/4) MEDIUM TO COARSE SAND WITH SOME GRAVEL AND TRACE SILT, MOIST
GP	GRAVELS AND COBBLES, MOIST TO WET
	WEATHERED BEDROCK AT 13.0 FEET, WET
LS	LIGHT GRAY AND GRAY SHALY LIMESTONE WITH BRECIATED SEAMS, WITH CALCITE VEINS
	GRADES TO HARD LIMESTONE WITH CALCITE
	AIR ROTARY DRILL WITHOUT CORING BELOW 18.0 FEET
	BOREHOLE TERMINATED AT A DEPTH OF 22.0 FEET

LOG OF BORING

Dames & Moore

WELL INSTALLATION DIAGRAM
FOR RCRA FACILITY INVESTIGATION
RADFORD AAP, VIRGINIA

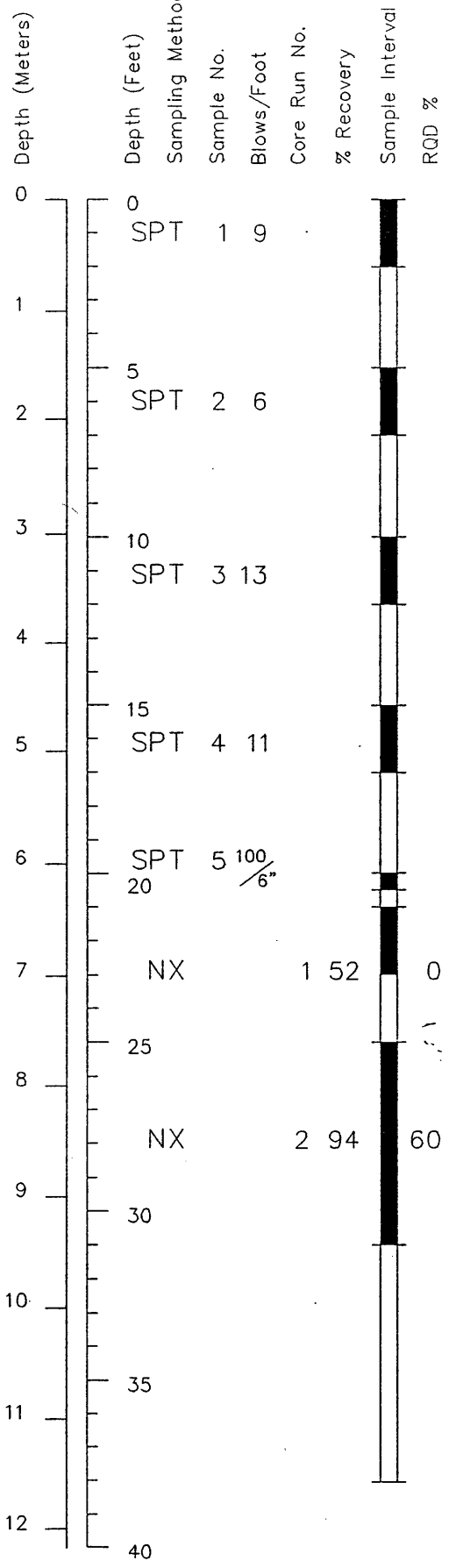
Location: 13MW3
Installation Date: 8/27/91
Surface Elevation: 1693.4 Feet
Top of SS Elevation: 1694.47 Feet



Dames & Moore

BORING 13MW2

Location: Radford AAP, Virginia
Surface Elevation: 1701.2 Feet, MSL
Start: 07:44 on 8-26-91
Finish: 12:00 on 8-26-91



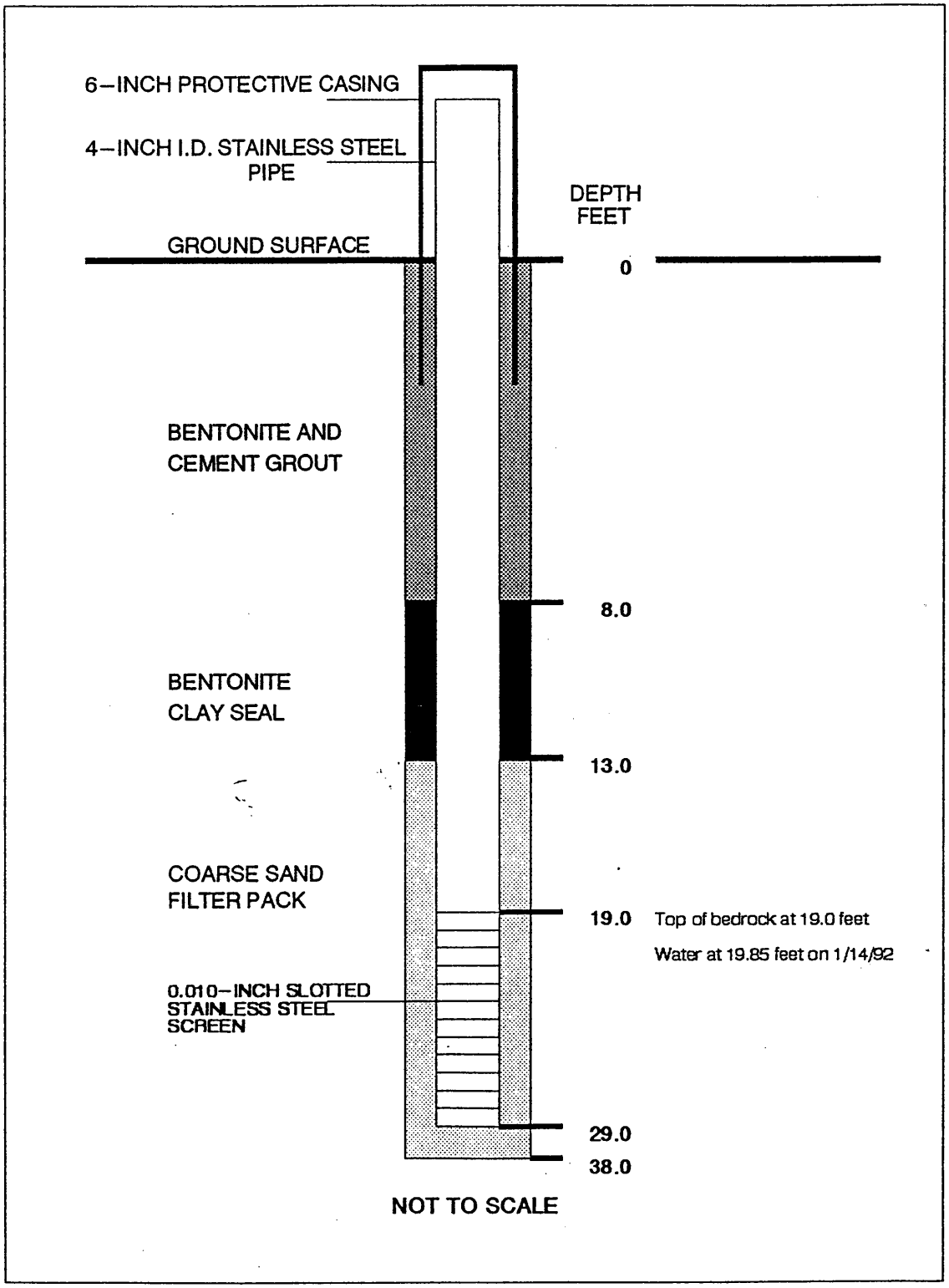
Symbols	Description
ML	DUSKY RED (2.5YR 3/2) SILT, MICACEOUS, MOIST
	GRADED CONTACT
SC/CL	DARK BROWN (7.5YR 4/4) SANDY CLAY WITH CLAY SEAMS
	GRADES TO DARK REDDISH BROWN (5YR 3/3) SILTY CLAY, MICACEOUS
	GRADED CONTACT
ML	REDDISH BROWN (5YR 4/3) CLAYEY SILT WITH FINE SAND, MICACEOUS, MOIST
	GRADED CONTACT
SM	DARK YELLOWISH BROWN (10YR 4/4) SILTY FINE SAND, MICACEOUS
	THIN LIMESTONE SEAM AT 16.8 FEET
	WEATHERED BEDROCK CONTACT AT 19.0 FEET
LS	DARK GRAY LIMESTONE WITH HORIZONTAL FRACTURES
	VERY FRACTURED SEAM
	NO RECOVERY 23.0 TO 25.6 FEET, MAYBE CLAY SEAM. LOST CORING WATER, POSSIBLE WATER TABLE
	DARK GRAY THINLY BEDDED LIMESTONE WITH ORANGE OXIDIZED SEAMS
	BECOMING RECEMENTED BRECIATED LIMESTONE
	WITH THIN CLAY SEAM
	OXIDIZED SEAMS LESS FREQUENT
	AIR ROTARY DRILL WITHOUT CORING BELOW 31.0 FEET
	BOREHOLE TERMINATED AT A DEPTH OF 38.0 FEET

LOG OF BORING

Dames & Moore

WELL INSTALLATION DIAGRAM
FOR RCRA FACILITY INVESTIGATION
RADFORD AAP, VIRGINIA

Location: 13MW2
Installation Date: 8/29/91
Surface Elevation: 1701.2 Feet
Top of SS Elevation: 1702.62 Feet

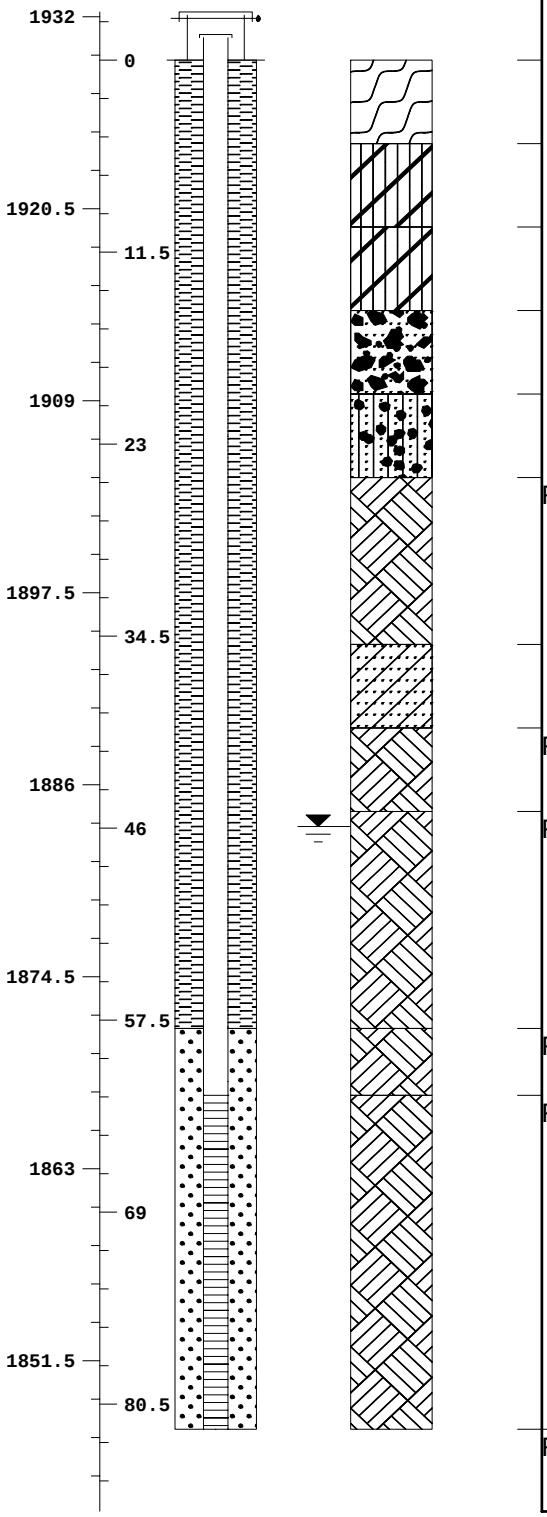


Dames & Moore

DRILL HOLE LOG
DRILL HOLE NO.: 59MW01

PROJECT: WPA 019 Groundwater Investigation
CLIENT/OWNER: RFAAP
HOLE LOCATION: RFAAP Radford, VA
DRILLER: Bedford Well Drilling
DRILL RIG: T3 Air Rotary
DEPTH TO WATER: 45.9
HOLE DIAMETER: 6 Inch

PROJECT NO.: 123461
DATE: 8/07/07
TOC ELEV.: 1831.2
GS ELEV.: 1929.4
LOGGED BY: J. Choynowski
HOLE NO.: 59MW01



ELEVATION / DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	DESCRIPTION	Sample Number	Recovery	Water Content
				4" Protective case.			
				0			
			OL	Black organic topsoil & roots turning to olive brown silty clay w/ little gravel.			
				2" PVC well pipe.			
			CL-ML	Olive brown silt & clay, little very fine sand.			
				5			
				10			
			CL-ML	Yellowish brown to olive brown clay w/ little silt, low plasticity.			
				15			
			GW-SW	Reddish brown gravel, coarse sands.			
				20			
			VG	Yellowish brown gravel, w/ little coarse sand, silt & clay.			
				25			
			ROCK	Olive weathered saprolite, gravel size.			
				35			
			SC	Pale brown sand & clay w/ some silt.			
				40			
			ROCK	Olive saprolite. Void.			
				45			
			ROCK	Olive saprolite.			
				58			
			ROCK	Top of sand filter layer.			
				62			
			ROCK	Top of well screen, 0.010" slot.			
				82			
			ROCK	Bottom of screen and well.			

FIGURE NO.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silt
	Inorganic silts and clays
	Silty low plasticity clay
	Well graded gravel with silt
	Generic rock
	Low plasticity organic silts
	Well graded gravel and sand
	Variable gravel and silty sand mix
	Clayey sand
	Silty gravel
	Low plasticity clay
	Silty sand
	Clayey gravel
	Well graded sand
	Dolomite

Symbol	Description
	Well graded sand with clay
	Shale
	Clayey sand and gravel
	Shale and dolostone.
	Limestone
	Limestone and dolostone.
Misc. Symbols	
	Boring continues
	Water table at boring completion
Monitor Well Details	
	Capped riser with locking cover
	Bentonite pellets
	Silica sand, blank PVC
	Slotted pipe w/ sand

Notes:

1. Borings were drilled on 8/10/07 using a 6-inch diameter air rotary T3 drill rig.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

TARGET ENVIRONMENTAL SERVICES, INC.

October 10, 1991

Ms. Grace Wood
DAMES & MOORE
2807 Parham Road
Suite 114
Richmond, VA 23229

Dear Ms. Wood:

Enclosed please find one (1) copy of the field and analytical procedures, and tables for the Soil Gas Survey performed by **TARGET** at the Radford Army Ammunition Plant in Radford, Virginia.

If you have any questions or comments about the above, please give me or Ken Ranlet a call at (301) 992-6622. We appreciate the opportunity to provide our services to you on this project.

Sincerely,

TARGET ENVIRONMENTAL SERVICES, INC.

Connie Thorne
Project Manager\Engineer

9180 RUMSEY ROAD, COLUMBIA, MARYLAND 21045 (301) 992-6622 Fax: (301) 992-0347

Field Procedures

Soil gas samples were collected at a total of 35 locations at the site, 27 from SWMU "O" and 8 from SWMU 48. To collect the samples a 1/2 inch hole was produced to a depth of approximately 4 feet by using a drive rod. Several samples (Samples 13, 27, 32) were collected at 3' due either to refusal or suction. The entire sampling system was purged with ambient air drawn through an organic vapor filter cartridge, and a stainless steel probe was inserted to the full depth of the hole and sealed off from the atmosphere. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and taken to **TARGET**'s mobile laboratory for analysis.

At the request of the client, two test samples were collected and analyzed. The first sample was a headspace collected from a sealed jar which contained a sample of contaminated soil. The second sample was the headspace of monitoring well S4W1 in SWMU "O".

Prior to the day's field activities all sampling equipment, slide hammer rods, and probes were decontaminated by washing with soapy water and rinsing thoroughly. Internal surfaces were flushed dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end

of each day's field activities. These QA/QC samples were obtained by filtering ambient air through a dust and organic vapor filter cartridge and collecting in the same manner as described above.

Laboratory Procedures

All of the samples were analyzed in **TARGET**'s climate controlled mobile laboratory on site according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (GC/FID), but using direct injection instead of purge and trap. Analytes selected for standardization were:

benzene
toluene
ethylbenzene
meta- and para- xylene
ortho-xylene

These compounds were chosen because of their utility in evaluating the presence of petroleum products such as fuels, lubricating oils, and non-halogenated solvents.

The analytical equipment was calibrated using an instrument-response curve and injection of known concentrations of the above standards. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples, and their response factors were used to calculate the analyte concentrations.

Total FID Volatiles values were generated by summing the areas of all integrated chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of Total FID Volatiles values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concen-

trations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors vary with concentration. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

The tabulated results of the laboratory analysis of the soil gas samples are reported in micrograms per liter (μg/l) in Table 1. Although "micrograms per liter" is equivalent to "parts per billion (v/v)" in water analyses, they are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices. The xylenes concentrations reported in the data table are the sum of the m- and p-xylene and o-xylene concentrations for each sample.

For QA/QC purposes, a duplicate analysis was performed on every tenth field sample. Laboratory blanks of carrier gas were also analyzed after every tenth field sample.

TABLE 1

ANALYTE CONCENTRATIONS (µg/l) VIA GC/FID IN SAMPLES TAKEN AT SWMU "O"

SAMPLE	PENTANE/ MTBE[1]	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
13	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
16	<1.0	<1.0	<1.0	<1.0	<1.0	3.8
17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
21	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
23	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
24	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
26	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
27	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
29	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
31	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
32	<1.0	<1.0	<1.0	<1.0	<1.0	4.3
33	<1.0	<1.0	<1.0	<1.0	<1.0	33
34	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
35	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
36	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
37	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
FIELD CONTROL SAMPLES						
1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY DUPLICATE ANALYSES						
18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
32	<1.0	<1.0	<1.0	<1.0	<1.0	4.3
32R	<1.0	<1.0	<1.0	<1.0	<1.0	4.2
36	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
36R	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY BLANKS						
18B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
28B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
36B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TESTB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

[1] CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2] CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 2

ANALYTE CONCENTRATIONS (µg/l) VIA GC/FID IN SAMPLE TAKEN AT SWMU "48"

SAMPLE	PENTANE/ MTBE[1]	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
211	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
212	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
213	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
214	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
215	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
216	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
217	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
218	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
FIELD CONTROL SAMPLES						
201	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
202	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

TABLE 3

ANALYTE CONCENTRATIONS µg/l) VIA GC/FID IN TEST SAMPLES

SAMPLE	PENTANE/ MTBE[1]	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	TOTAL FID VOLATILES[2]
TEST SAMPLE 1	<1.0	<1.0	<1.0	<1.0	<1.0	115
TEST SAMPLE 2	<1.0	<1.0	<1.0	<1.0	<1.0	9.9

[1]CONCENTRATIONS BASED ON RESPONSE FACTOR OF MTBE

[2]CALCULATED USING THE SUM OF THE AREAS OF ALL INTEGRATED CHROMATOGRAM PEAKS AND THE INSTRUMENT RESPONSE FACTOR FOR TOLUENE

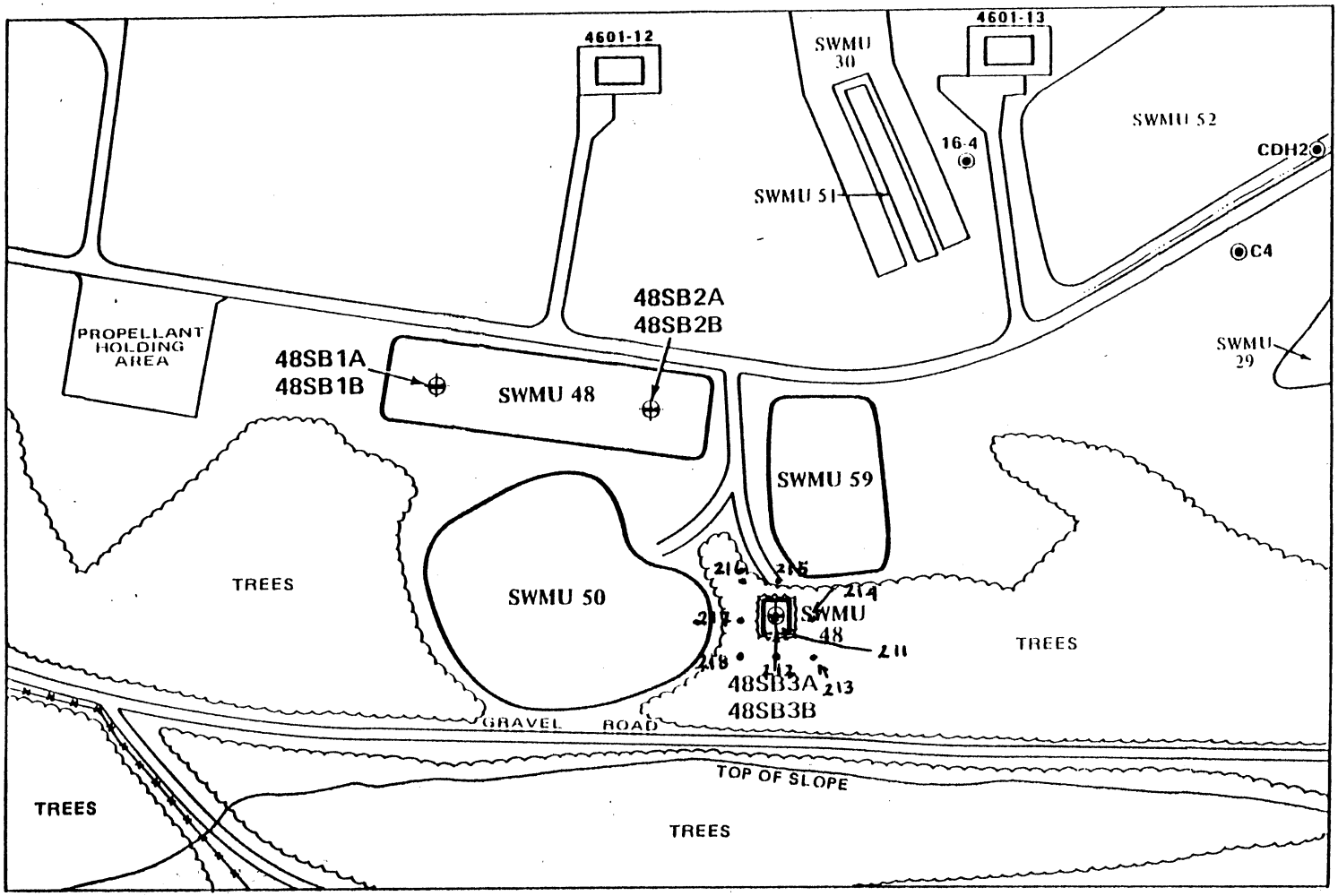


FIGURE 4-16
RECOMMENDED INVESTIGATION
SWMU 48 – OILY WASTEWATER DISPOSAL AREA
RADFORD ARMY AMMUNITION PLANT, VIRGINIA

Dames & Moore

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW1 Date 8-29-07
Field Personnel CJ, BS
Sample Organization Shaw Environmental
Identify MP

Depth to 110 (top) / 140 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2)
PID Reading (ppm)

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
740	107.05	—									
750	108.57	244.1	300	—	7.71	.511	251	4.24	13.66	137	
755		244.1	300		7.57	.509	240	1.81	13.54	133	
800		244.1	300		7.49	.505	240	1.65	14.00	122	
805	109.42	244.1	300		7.45	.499	234	1.48	14.95	105	
810		244.1	300		7.46	.502	227	1.47	14.97	100	
815					7.46	.503	227	1.48	14.99	91	
820		Sample	Taken								

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW2 Date 8.29.07
Field Personnel RD
Sample Organization Shaw Environmental
Identify MP TOC

Depth to 113.7 (top) / 133.7 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2) RF2
PID Reading (ppm) 0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
	124.47										
0805	128.47	265	300		6.93	0.441	-5.0	9.33	14.96	97	silty
0810	129.0	265	300		6.98	0.421	-5.0	7.44	19.47	84	silty - cloudy
0815	129.0	265	300		7.05	0.436	-5.0	8.02	18.74	77	cloudy/silty
0820	129.0	265	300		7.07	0.437	-5.0	8.01	18.59	72	cloudy/silty
0825	129.0	265	300		7.08	0.436	-5.0	7.97	18.35	75	cloudy/silty

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW3 Date 8.29.07
Field Personnel PS
Sample Organization Shaw Environmental
Identify MP TOC

Depth to 100 / 120 of screen (below MP)
top bottom
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2) RF2
PID Reading (ppm) 0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
	97.60										
0955	98.90	226.0	300		7.15	0.658	347	10.37	15.07	153	
1000	98.90	226.0	300		7.02	0.655	202	8.65	14.13	149	
1005	98.90	226	300		6.90	0.649	208	7.22	14.89	122	clear
1010	98.90	226	300		6.89	0.650	226	7.52	15.41	116	clear
1015	98.90	226	300		6.88	0.650	206	7.34	15.83	114	clear
1020	98.90	226	300		6.88	0.650	207	7.30	15.91	114	clear

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW4 Date 8.29.07
Field Personnel BS
Sample Organization Shaw Environmental
Identify MP TOC

Depth to 74 (top) / 94 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2) RFR
PID Reading (ppm) 0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
	~~79.35~~										
1335	80.07	202.7	300		7.46	0.683	494	8.72	16.82	79	clear
1340	80.07	202.7	300		7.35	0.685	326	6.86	17.31	68	clear
1345	80.07	202.7	300		7.29	0.683	194	6.29	18.14	67	clear
1350	80.07	202.7	300		7.26	0.680	146	6.07	18.68	70	clear
1355	80.07	202.7	300		7.26	0.678	145	5.96	18.85	71	clear
1400	80.07	202.7	300		7.26	0.675	140	5.87	19.00	71	clear

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW05 Date 8-30-07
Field Personnel CJ BS
Sample Organization Shaw Environmental
Identify MP

Depth to 91 (top) / 121 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2)
PID Reading (ppm)

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
0930	84.15	—									
1010	88.0	222.6	500		7.14	.795	999	1.62	14.79	187	
1015					7.01	.793	999	0.88	14.80	126	
1020	92.0	224.6	500		7.01	.805	999	0.34	15.10	37	
* Samples taken due to dropping water level											
Final WL = 109.73 after sampling.											

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW06 Date 8.30.07
Field Personnel JR/CS
Sample Organization Shaw Environmental
Identify MP TOC

Depth to 58 (top) / 78 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2)
PID Reading (ppm) 0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
	66.65										
1110	69.20	188.5	300		7.75	0.381	-5.0	6.13	18.30	131	silty
1115	69.30	187.3	300		7.70	0.352	-5.0	4.05	16.56	126	silty/cloudy
1120	69.20	187.3	300		7.61	0.351	-5.0	3.51	16.91	124	silty/cloudy
1125	69.20	187.3	300		7.41	0.349	-5.0	3.25	18.14	120	silty/cloudy
1130	69.25	187.3	300		7.32	0.402	-5.0	2.99	20.11	118	silty
1135	69.25	187.3	300		7.26	0.419	-5.0	2.99	20.23	118	silty
1140	69.25	187.3	300		7.21	0.442	-5.0	3.03	20.12	119	silty

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 48MW07 Date 8.30.07
Field Personnel BS
Sample Organization Shaw Environmental
Identify MP TOC

Depth to 62 (top) / 82 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2) RF2
PID Reading (ppm) 0

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
	48.24										
0945	48.62	161.5	300		8.02	0.184	-5.0	11.01	15.43	125	cloudy
0950	48.62	161.5	300		7.93	0.181	-5.0	10.62	15.52	126	cloudy
0955	48.62	161.5	300		7.77	0.179	-5.0	10.10	15.90	132	cloudy
1000	48.62	161.5	300		7.66	0.178	-5.0	9.90	16.24	138	cloudy → clearing
1005	48.62	156.6	300		7.58	0.179	745	9.52	16.75	142	clear
1010	48.62	156.6	300		7.59	0.179	692	9.61	17.14	143	clear
1015	48.62	156.6	300		7.60	0.179	642	9.54	17.32	143	clear

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 49MW01 Date 8-29-07
Field Personnel CS BS
Sample Organization Shaw Environmental
Identify MP

Depth to 91 (top) / 121 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) Bailor
Purging Device (e.g., Redi Flo2)
PID Reading (ppm)

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
1340		—	—	—	7.73	.510	131	3.20	13.54	93	

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 50MW01 Date 8-30-07
Field Personnel CS BS
Sample Organization Shaw Environmental
Identify MP

Depth to 91 / 121 of screen (below MP)
top bottom
Pump Intake at (ft. below MP) Bailer
Purging Device (e.g., Redi Flo2)
PID Reading (ppm)

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
0800	18.26	—	—	—	6.37	1.40	-5.0	11.99	17.03	205	

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 50mw02 Date 8-30-07
Field Personnel
Sample Organization Shaw Environmental
Identify MP

Depth to 89 (top) / 119 (bottom) of screen (below MP)
Pump Intake at (ft. below MP) Bailer
Purging Device (e.g., Redi Flo2)
PID Reading (ppm)

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
	115.91										
0900					7.04	6.921	547	12.43	17.80	212	

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

Well Purging-Field Water Quality Measurements Form

Location (Site / Facility Name) RFAAP
Well Number 59MW01 Date 8-29-07
Field Personnel CJ / BS
Sample Organization Shaw Environmental
Identify MP

Depth to 68 (top) / 82 (bottom) of screen (below MP)
Pump Intake at (ft. below MP)
Purging Device (e.g., Redi Flo2)
PID Reading (ppm)

Clock Time 24 HR	Water Depth ft. below MP	Pump Setting[1]	Purge Rate mL/min	Cum. Volume Purged liters	pH	Spec. Cond. mS/cm	Turbidity NTU	DO mg/L	Temp. deg. C	ORP/Eh[2] mv	Comments
0540	45.9										
0555	49.95	167	350		6.10	.342	999	2.64	13.57	119	
0600	[illegible]	167	350		6.50	.345	999	2.20	14.62	97	
0605	50.00	167	350		6.93	.347	999	1.88	14.87	82	
0610		167	350		7.16	.345	999	1.71	14.95	71	
0615	50.35	167	350		7.33	.345	685	1.54	15.05	59	
0620		167	350		7.43	.347	410	1.36	15.11	48	
0625	50.40	167	350		7.47	.347	345	1.29	15.09	41	
0630		167	350		7.50	.347	300	1.23	15.19	36	
0635		167	350		7.52	.346	268	1.20	15.21	33	
0640		167	350		7.53	.347	265	1.16	15.27	32	
0645		167	350		7.55	.347	243	1.11	15.30	28	
0650		Sample Taken									

[1] Pump dial setting (e.g., hertz, cycles/min., etc.)
[2] Oxidation reduction potential (stand in for Eh)

RADFORD ARMY AMMUNITION PLANT, VIRGINIA

SWMU 48 (RAAP – 018)
Supplemental RCRA Facility Investigation (RFI) Data Report

Prepared for:

USACE Baltimore District
10 S. Howard St.
Baltimore, MD 21201

Prepared by:

Shaw Environmental, Inc.
2113 Emmorton Park Rd.
Edgewood, MD 21040

Draft Document

August 2010

TABLE OF CONTENTS

Section		*Page*
1.0	**INTRODUCTION**	**1-1**
2.0	**BACKGROUND**	**2-1**
2.1	Site Description	2-1
2.2	Site History	2-1
2.3	Summary of Previous Investigations	2-4
3.0	**COMPLETED ACTIVITIES**	**3-1**
3.1	Test Pitting	3-1
3.2	Soil Sampling	3-2
3.3	IDM Disposal	3-8
4.0	**REFERENCES**	**4-1**

LIST OF TABLES

Table 1	Work Elements Referenced in the Master Work Plan and Addendum 019	1-1
Table 2	Previous Investigations Samples and Analyses	2-4
Table 3	Analytes Detected in Fill Samples at SWMU 48	2-7
Table 4	Summary of Analytes Detected in Fill Samples at SWMU 48	2-9
Table 5	Analytes Detected in Soil Below Fill Material at SWMU 48	2-11
Table 6	Summary of Analytes Detected in Soil Below Fill Material at SWMU 48	2-14
Table 7	Proposed Test Pit Samples and Analyses	2-11
Table 8	Analytes Detected in in Test Pits at SWMU 48	3-4
Table 9	Summary of Analytes Detected in in Test Pits at SWMU 48	3-5
Table 10	TCLP Results from Test Pit Samples at SWMU 48	3-5

LIST OF FIGURES

Figure 1	SWMU 48 Site Location Map	2-2
Figure 2	SWMU 48 Proposed Test Pit Locations	2-3
Figure 3	SWMU 48 Sample Locations	2-3

LIST OF APPENDICES

Appendix A Actvity Hazard Analysis

LIST OF ACRONYMS AND ABBREVIATIONS

AHA.....Activity Hazard Analysis
CFR.....Code of Federal Regulations
CMS.....Corrective Measures Study
DNB.....Dinitrobenzene
DNT.....Dinitrotoluene
Ft.....feet
ft bgs.....feet below ground surface
ft msl.....feet above mean sea level
HSA.....Horseshoe Area
i-SL.....Industrial Screening Level
IDM.....Investigation-Derived Material
IMWP.....Interim Measures Work Plan
MHSP.....Master Health and Safety Plan
MMA.....Main Manufacturing Area
MQAP.....Master Quality Assurance Plan
MWP.....Master Work Plan
PPE.....Personal Protective Equipment
QA/QC.....Quality Assurance/Quality Control
r-SL.....Residential Screening Level
RCRA.....Resource Conservation and Recovery Act
RFA.....RCRA Facility Assessment
RFAAP.....Radford Army Ammunition Plant
RFI.....RCRA Facility Investigation
SWMU.....Solid Waste Management Unit
TAL.....Target Analyte List
TCL.....Target Compound List
TCLP RL.....Toxicity Characteristic Leachate Procedure Regulatory Limit
TNT.....Trinitrotoluene
USACE.....U.S. Army Corps of Engineers
USEPA.....U.S. Environmental Protection Agency
WPA.....Work Plan Addendum
VI.....Verification Investigation
yd^3.....cubic yard

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) was tasked by the U.S. Army Corps of Engineers (USACE), Baltimore District, to perform characterization activities at Solid Waste Management Unit (SWMU) 48 (RAAP-18) - the Oily Water Burial Area of Radford Army Ammunition Plant (RFAAP), in accordance with Contract No. W912QR-04-D-0027, Delivery Order DA0101. This document is intended to describe the completed investigation activities performed and report the results of supplemental data at the SWMU 48 site. The purpose of the data collection effort was to collect supplemental data in order to complete the Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI)/Corrective Measures Study (CMS) for the site.

The proposed work was performed in accordance with RFAAP's *Master Work Plan (MWP)* (URS, 2003), *MWP Addendum 019* (Shaw, 2007), and elements of the SWMU 51 Interim Measures Work Plan (IMWP) (Shaw, 2008). **Table 1** provides cross references between the applicable sections in the MWP, Work Plan Addendum (WPA) 019, and the SWMU 51 IMWP that were used to complete the supplemental data collection effort.

Table 1
Work Elements Referenced in the Master Work Plan and Addendum 019

Task Description	MWP Section	WPA 019 Section	MWP SOP #	SWMU 51 IMWP
Introduction	2.0	1.1	NA	NA
Installation Setting and Site Description	2.0	2.1.1	NA	NA
Summary of Previous Investigations	NA	2.3	NA	NA
Soil Sampling/Test Pitting				
Field Logbooks	NA		10.1	
Sample Logbooks	NA		10.2	
Chain-of Custody	NA		10.4	
Subsurface Soil Sampling	5.2		30.1, 30.7	2.2.3
Sample Labels	5.1		50.1	
Sample Packaging	5.1		50.2	
Investigative Derived Material	5.13		70.1	
Decontamination	5.12		80.1	

Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) procedures followed those specified in the Master Quality Assurance Plan (MQAP) (URS, 2003). Section 2.0 of the MWP establishes requirements for documentation, data collection and reporting, management and tracking of electronic and hard copy data, and presentation format. The MQAP provides assurance that data of known and documented quality is generated to allow the Army to make accurate risk management decisions.

Health and Safety

Health and Safety procedures, including monitoring and personal protection levels, followed those specified in the Master Health and Safety Plan (MHSP) (URS, 2003). Site-specific training, personal protective equipment and clothing (PPE), and applicable monitoring requirements are presented in Section 3.0 of the MWP. These procedures were developed to provide the requirements for protection of site personnel including government employees, Shaw, regulators, subcontractors, and visitors, who are expected to be involved with site activities.

In addition to the Master Health and Safety Plan (URS, 2003), *Section 8.0 – Health and Safety* from the SWMU 51 Interim Measures Work Plan (Shaw, 2008) was incorporated by reference to this document. Subsections related to excavation and heavy equipment, including an Excavation Activity Hazard Analysis (AHA), have been included in **Appendix A** of this plan. AHAs define the activities being performed and identify the sequences of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. All investigation activities will be performed in accordance with the safety provisions of 29 Code of Federal Regulations (CFR) Parts 1910 and 1926, and USACE EM 385-1-1.

2.0 BACKGROUND

2.1 Site Description

SWMU 48 is located in the southeastern portion of the RFAAP Horseshoe Area (HSA), east of the main bridge over the New River (**Figure 1**). The SWMU is situated in the northwestern corner of a group of SWMUs consisting of SWMU 48, SWMU 49, SWMU 50, and SWMU 59. SWMU 48 is located approximately 30 feet (ft) north of SWMU 50, 75 ft west of SWMU 59, and 200 ft northwest of SWMU 49.

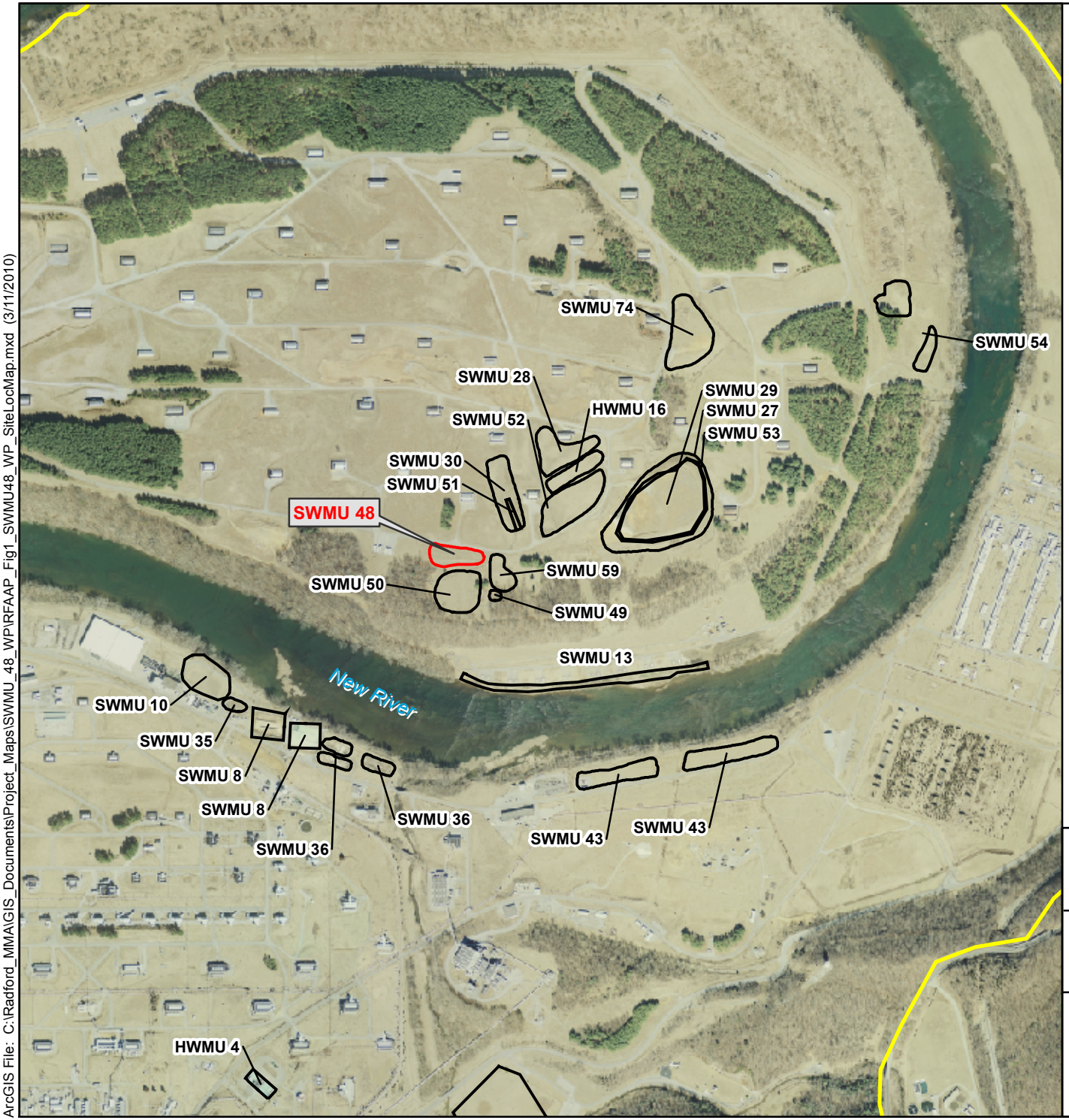
The SWMU 48 study area is approximately 380 ft long by 120 ft wide. The site is situated on a bluff approximately 120 ft above and overlooking SWMU 13 and the New River. The land surface in the combined study area gently slopes from approximately 1,830 feet above mean sea level (ft msl) on the north side of SWMUs 48 and 59, to approximately 1,814 ft msl on the south of SWMU 50. Based on topography, surface water runoff is expected to infiltrate into the soil.

The overall study area is grassy with wooded areas to the south, east, and west. The site map shown on **Figure 2** indicates ground scarring and disturbed soil; however, the site has re-vegetated in the years since they were active. A subsided area that coincides with the southern trench in SWMU 48 provides evidence of its location.

An east-west asphalt road, located at the northern edge of the study area, parallels SWMU 48 and provides access to the combined study area via a gravel and bottom ash covered dirt road that trends north-south between SWMUs 48 and 59. The dirt and gravel road connects to an east-west trending dirt road south of SWMU 50. There are no structures in the combined study area; and, according to RFAAP utility maps, there are no manholes, catch basins, or storm drains located in the immediate vicinity of the area.

2.2 Site History

Aerial photographs taken in 1971 and 1986 indicate that SWMU 48 consists of two sets of unlined trenches, identified as the northern and southern trenches (**Figure 2**). Prior to off-post waste oil reclamation, approximately 200,000 gallons of oily wastewater removed from oil/water separators throughout RFAAP was reportedly disposed of in SWMU 48 (Dames and Moore, 1992). However, the results of environmental sampling to date indicate that the oily wastewater was likely disposed of in the area associated with SWMU 49. Conversely, sampling indicates that the red water ash associated with SWMU 49 was disposed in the SWMU 48 disposal trenches. Interpretations of aerial photographs indicate that activity first occurred at SWMU 48 in 1970 (USEPA, 1992). The northern trench is visible in the 1971 aerial photograph as light colored east to west trending scars of disturbed soil that parallel the asphalt road. Revegetation had occurred by the time of the 1981 aerial photograph. The filled and revegetated southern trench is prominent in the 1986 aerial photograph, positioned at a slight angle below the northern trench. This trench is marked by the growth of grass visibly different from the surrounding vegetation (e.g., greener and thicker) and by extensive ground subsidence. There is no documentation for disposal activities, but observations during soil boring and test pit activities during the 1998 RFI indicate a layer of fine black material (ash) occurring at approximately 6-9 ft below ground surface (bgs). Explosives compounds were detected in samples of this material.



ArcGIS File: C:\Radford_MMA\GIS_Documents\Project_Maps\SWMU_48_WP\RFAAP_Fig1_SWMU48_WP_SiteLocMap.mxd (3/11/2010)

LEGEND

- SWMU 48 Boundary
- Other SWMU Boundary
- Installation Boundary

Notes:
1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.

N

Scale:
0 500 1,000 2,000 Feet

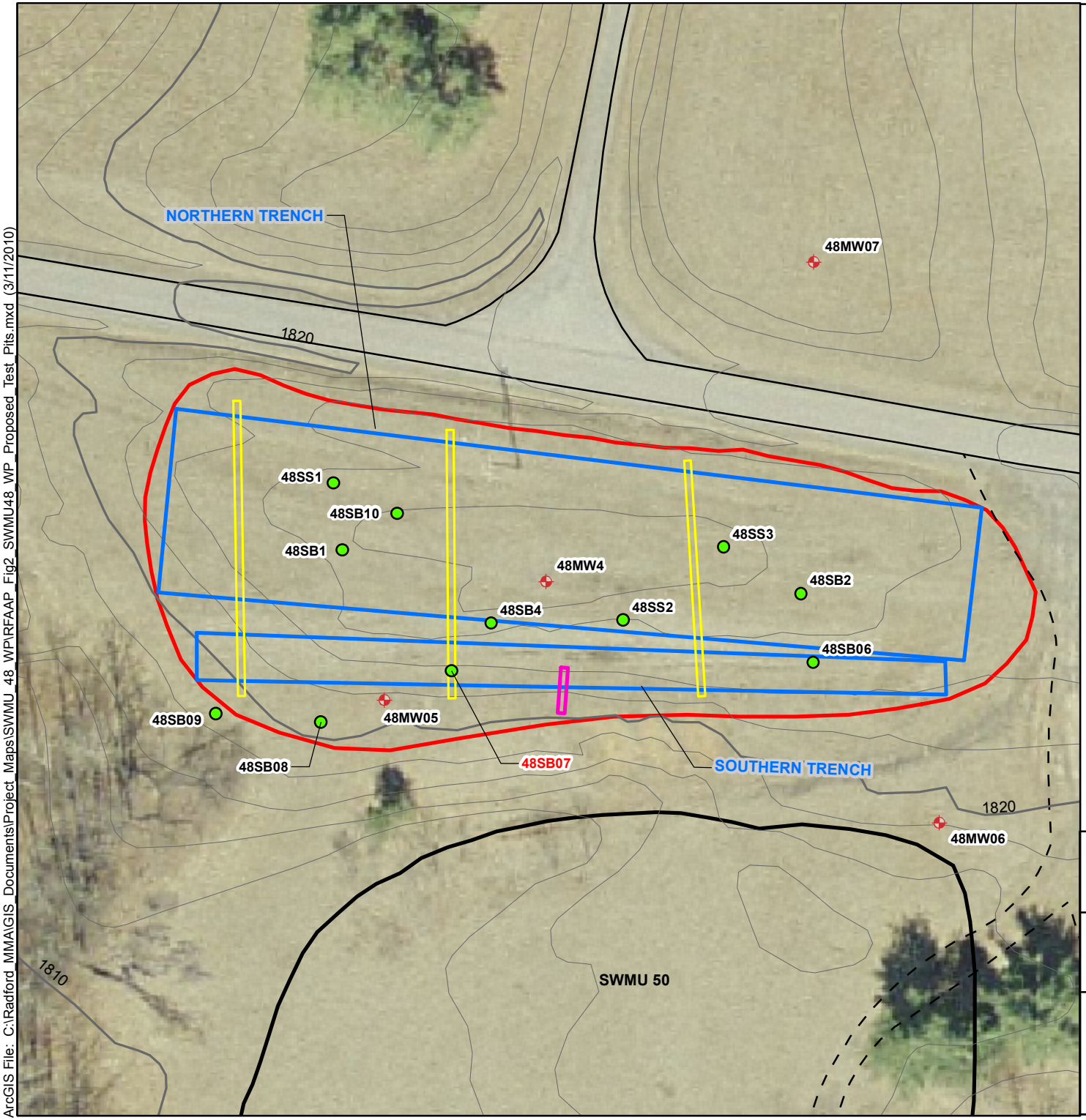
U.S. Army Corps of Engineers

Shaw® Shaw Environmental, Inc.

FIGURE 1

SWMU 48 Site Location Map

Radford Army Ammunition Plant,
Radford, VA



ArcGIS File: C:\Radford_MMA\GIS_Documents\Project_Maps\SWMU_48_WP\RFAAP_Fig2_SWMU48_WP_Proposed_Test_Pits.mxd (3/11/2010)

LEGEND

- Monitoring Well Location
- Soil Sample Location
- Dirt Road
- Paved Road
- 2 ft Contour Line
- 10 ft Contour Line
- Proposed Test Pit Boundary
- Trench Boundary
- 1998 RFI Trench Boundary
- SWMU 48 Boundary
- Other SWMU Boundary

Notes:
1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.

N

Scale:

0 30 60 120 Feet

U.S. Army Corps of Engineers

Shaw® Shaw Environmental, Inc.

FIGURE 2

SWMU 48 Proposed Test Pit Locations

Radford Army Ammunition Plant,
Radford, VA

2.3 Summary of Previous Investigations

Six previous investigations have been conducted at SWMU 48. In 1987, the U.S. Environmental Protection Agency (USEPA) conducted an RCRA Facility Assessment (RFA) to evaluate potential hazardous waste or hazardous constituent releases and implement corrective actions, as necessary. In 1992, Dames and Moore performed a Verification Investigation (VI), which included surface and subsurface soil sampling to characterize the nature and extent of contamination. In 1996, Parsons Engineering Science conducted an RFI to further delineate the extent of contamination identified during the 1992 VI sampling. ICF Kaiser Engineers also performed an RFI in 1998 to further refine the understanding of the nature and extent of contamination identified during the previous investigations. Additional sampling was conducted by IT Corporation/Shaw in 2002 and 2006 to collect sufficient data to complete human health and ecological risk assessments.

Sample locations from these investigations are illustrated on **Figure 2**. A summary of the previous investigation samples collected is presented in **Table 2**. Detected results from soil samples collected in the fill material (0-6 ft bgs) overlying the ash layer discovered in the southern trench at SWMU 48 are presented in **Table 3** and summarized in **Table 4**. Detected results from soil samples collected below the fill material (> 6 ft bgs) at SWMU 48 are presented in **Table 5** and summarized in **Table 6**.

Table 2
Previous Investigations Samples and Analyses

Media	Sample ID	Depth (ft bgs)	Analyses
1992 Verification Investigation, Dames & Moore			
Subsurface Soil	48SB1	7.5-9.5	TAL metals, VOCs, SVOCs, TCLP metals
	48SB1	13-15	TAL metals, VOCs, SVOCs, TCLP metals
	48SB2	10-12	TAL metals, VOCs, SVOCs, TCLP metals
	48SB2	20-22	TAL metals, VOCs, SVOCs, TCLP metals
1996 RCRA Facility Investigation, Parsons Engineering Science, Inc.			
Surface Soil	48SS1	0-1	TAL metals, VOCs, SVOCs, explosives, TPH
	48SS2	0-1	TAL metals, VOCs, SVOCs, explosives, TPH
	48SS3	0-1	TAL metals, VOCs, SVOCs, explosives, TPH
Subsurface Soil	48SB4A11	10-11	VOCs, SVOCs, explosives, TPH
	48SB4B21	20-21	VOCs, SVOCs, explosives, TPH, TOC
1998 RCRA Facility Investigation, ICF Kaiser Engineers, Inc.			
Surface Soil	48SB6C	1-3	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB6C2	1-3	VOCs (methanol preservation)
Subsurface Soil	48SB6A	6-7	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB6A2	6-7	VOCs (methanol preservation)
	48SB6B	14-16	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB6B2	14-16	VOCs (methanol preservation)
	48SB7A	8-9	TAL metals, VOCs, SVOCs, PAHs, explosives
	48SB7A2	8-9	VOCs (methanol preservation)
	48SB7B	10-11	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP1	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP2	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP3	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives
	48TP4	6-6.5	TAL metals, VOCs, SVOCs, PAHs, explosives

Table 2
Previous Investigations Samples and Analyses (Continued)

Media	Sample ID	Depth (ft bgs)	Analyses
2002 Site Characterization, IT Corporation			
Surface Soil	48SB08A	0-0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans, TOC, grain size, pH
	48SB09A	0-0.5	Explosives, dioxins/furans
	48SB10A	0-0.5	TCL VOCs, SVOCs, pesticides/PCBs, herbicides, PAHs, explosives, TAL metals, dioxins/furans
Subsurface Soil	48SB08B	4-6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans
	48SB08C	8-10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans, TOC, grain size, pH
	48SB09B	4-6	Explosives, dioxins/furans
	48SB09C	8-10	Explosives, dioxins/furans
	48SB10B	4-6	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans
	48SB10C	8-10	TCL VOCs, SVOCs, PCBs, PAHs, explosives, TAL metals, dioxins/furans

Fill Material

As shown in **Tables 3 and 4**, concentrations of constituents detected in the fill material overlying the ash layer at SWMU 48 were below residential screening levels (r-SLs) with the exception of Aroclor-1254, iron, mercury, and 2,4- and 2,6-Dinitrotoluene (DNT). Aroclor-1254 was detected above the r-SL, but below the industrial screening level (i-SL), in one sample (48SB10A) collected from 0-0.5 ft bgs. Iron was detected above the r-SL and i-SL in one sample (48SB10B) collected from 4-6 ft bgs. The concentration of mercury was above the r-SL only in surface soil sample 48SS1. Concentrations of 2,4-DNT were detected above the "DNT mixture" r-SL and i-SL and the 2,6-DNT concentration was above the DNT mixture" r-SL both in sample 48SB6C from 1-3 ft bgs.

Although 2,4- and 2,6-DNT concentrations are present in one sample above r- and i-SLs for DNT mixture, a comparison of Shaw's recent sample results from waste characterization sampling at SWMU 54 to 2,4- and 2,6-DNT concentrations in SWMU 48 fill samples indicates that the fill material contains theoretical explosive concentrations below the Toxicity Characteristic Leachate Procedure Regulatory Limit (TCLP RL). In addition, concentrations of Aroclor-1254 and mercury were isolated in single samples at concentrations below the i-SL and iron was only detected above the i-SL in one sample. Based on these results, fill material from 0-6 ft bgs is suitable for re-use during test pitting activities proposed at the site.

Soil Below the Fill Material

As shown in **Tables 4 and 5**, three metals (aluminum, iron, and mercury) and four explosives [1,3-Dinitrobenzene (DNB), 2,4,6-Trinitrotoluene (TNT), 2,4- and 2,6-DNT] were detected at concentrations above r-SLs in soil samples collected below the fill material. Two of the explosives (2,4,6-TNT and 2,4-DNT) were present at concentrations above i-SLs below the fill material. Concentrations of explosives above SLs were limited to three samples collected in the southern trench. Subsurface soil samples 48SB07A (8-9 ft bgs) and 48TP1 (6-6.5 ft bgs) were both collected from soil containing ash. Sample 48SB7B (10-11 ft bgs) was collected directly

below sample 48SB7A and indicates a marked decrease in the concentration of 2,4,6-TNT. Based on sample results from the previous investigations samples collected below the fill material at SWMU 48, it appears as though the ash layer is a discontinuous layer that has been identified at depths from 6-9 ft bgs. Although explosive concentrations were present in samples collected directly from the ash layer, sample results from samples collected directly below the samples containing ash indicate that the explosives are not mobile in soil.

Table 3
Analytes Detected in Fill Samples at SWMU 48

Analyte	Sample ID			48SS1					48SS2					48SS3					48SB6C					48SB6C2					48SB08A				
	Sample Date			12/16/94					12/16/94					12/16/94					3/26/98					4/8/98					6/24/02				
	Sample Depth			0-0.5					0-0.5					0-0.5					1-3					1-3					0-0.5				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)																																	
1,2,4-Trichlorobenzene	99000	22000	na	NT					NT					NT					0.06			*0.005*		1.2	U		*1.2*		NT				
Acetone	63000000	6100000	na	3300	U			*3300*	3300	U			*3300*	3300	U			*3300*	0.14		B	*0.005*		1.4	B	B	*0.005*		26		B	*2.2*	*4.9*
Ethylbenzene	27000	5400	na	190	U			*190*	190	U			*190*	190	U			*190*	0.49		K	*0.005*		1.2	U		*1.2*		4.9	U		*0.33*	*4.9*
Methylene chloride	53000	11000	na	4400	U			*4400*	4400	U			*4400*	4400	U			*4400*	0.048		B	*0.005*		1.2	U		*1.2*		4.9	U		*0.31*	*4.9*
o-Xylene	1900000	380000	na	NT					NT					NT					0.77		K	*0.005*		1.2	U		*1.2*		4.9	U		*1*	*4.9*
Toluene	4500000	500000	na	100	U			*100*	100	U			*100*	100	U			*100*	0.047	U		*0.047*		1.2	U		*1.2*		0.84	J	B	*0.32*	*4.9*
PAHs (ug/kg)																																	
2-Methylnaphthalene	410000	31000	na	NT					NT					NT					NT					NT					2.5		B	*0.63*	*1.9*
Anthracene	17000000	1700000	na	NT					NT					NT					0.002	J	J	*0.0032*		NT					1.9	U		*0.2*	*1.9*
Benz(a)anthracene	2100	150	na	NT					NT					NT					0.0051			*0.0032*		NT					4.4			*0.25*	*1.9*
Benzo(a)pyrene	210	15	na	NT					NT					NT					0.0056			*0.0032*		NT					3.6			*0.21*	*1.9*
Benzo(b)fluoranthene	2100	150	na	NT					NT					NT					0.0064	U		*0.0064*		NT					7.9			*0.35*	*1.9*
Benzo(g,h,i)perylene	1700000	170000	na	NT					NT					NT					0.0064	U		*0.0064*		NT					2.4			*0.66*	*1.9*
Benzo(k)fluoranthene	21000	1500	na	NT					NT					NT					0.0054			*0.0032*		NT					2			*0.33*	*1.9*
Chrysene	210000	15000	na	NT					NT					NT					0.0032	U		*0.0032*		NT					4.7			*0.3*	*1.9*
Dibenz(a,h)anthracene	210	15	na	NT					NT					NT					0.0064	U		*0.0064*		NT					1.9	U		*0.64*	*1.9*
Fluoranthene	2200000	230000	na	NT					NT					NT					0.0082			*0.0064*		NT					9.8			*0.32*	*1.9*
Fluorene	2200000	230000	na	NT					NT					NT					0.0064	U		*0.0064*		NT					1.9	U		*0.5*	*1.9*
Indeno(1,2,3-cd)pyrene	2100	150	na	NT					NT					NT					0.007			*0.0032*		NT					2.9			*0.6*	*1.9*
Naphthalene	18000	3600	na	NT					NT					NT					0.032	U	UL	*0.032*		NT					1.8	JB	B	*0.72*	*1.9*
Phenanthrene	1700000	170000	na	NT					NT					NT					0.0081			*0.0032*		NT					7.6			*0.29*	*1.9*
Pyrene	1700000	170000	na	NT					NT					NT					0.0046		J	*0.0032*		NT					9.5			*0.42*	*1.9*
SVOCs (ug/kg)																																	
bis(2-Ethylhexyl)phthalate	120000	35000	na	1500					1300					480	U			*480*	0.35	J	J	*0.62*		NT					190	U		*12*	*190*
Chrysene	210000	15000	na	86					32	U			*32*	32	U			*32*	NT					NT					190	U		*4.3*	*190*
Di-n-butylphthalate	6200000	610000	na	1300	U			*1300*	10000					1300	U			*1300*	33			*6.2*		NT					190	U		*54*	*190*
Fluoranthene	2200000	230000	na	32	U			*32*	32	U			*32*	32	U			*32*	NT					NT					11	J	J	*6.1*	*190*
N-nitrosodiphenylamine	350000	99000	na	290	U			*290*	290	U			*290*	290	U			*290*	0.56	J	J	*0.62*		NT					190	U		*8.8*	*190*
Phenanthrene	1700000	170000	na	270					32	U			*32*	32	U			*32*	NT					NT					10	J	J	*5.8*	*190*
Pyrene	1700000	170000	na	83	U			*83*	83	U			*83*	83	U			*83*	NT					NT					7.9	J	J	*5.7*	*190*
Pesticides (ug/kg)																																	
4,4'-DDD	7200	2000	na	NT					NT					NT					NT					NT					0.389	J	J	*0.155*	*0.733*
4,4'-DDE	5100	1400	na	NT					NT					NT					NT					NT					0.462	BJ	B	*0.154*	*0.733*
4,4'-DDT	7000	1700	na	NT					NT					NT					NT					NT					0.733	U		*0.259*	*0.733*
Endosulfan II	na	na	na	NT					NT					NT					NT					NT					0.733	U		*0.262*	*0.733*
Endrin aldehyde	na	na	na	NT					NT					NT					NT					NT					0.733	U		*0.37*	*0.733*
Methoxychlor	310000	31000	na	NT					NT					NT					NT					NT					0.567	J	J	*0.559*	*0.733*
PCBs (mg/kg)																																	
PCB-1254	0.74	0.022	na	NT					NT					NT					NT					NT					0.0366	U	UJ	*0.0108*	*0.0366*
Explosives (mg/kg)																																	
2,4-Dinitrotoluene	2.5	0.71	na	NT					NT					NT					3.8		L	*0.25*		NT					0.2	U		*0.0163*	*0.2*
2,6-Dinitrotoluene	2.5	0.71	na	NT					NT					NT					1.1		J	*0.25*		NT					0.2	U		*0.0246*	*0.2*
Nitroglycerin	6.2	0.61	na	NT					NT					NT					1.3	U	UL	*1.3*		NT					0.12	J	J	*0.11*	*0.33*
Herbicides (ug/kg)																																	
Metals (mg/kg)																																	
Aluminum	99000	7700	40041	NT					NT					NT					11800			*1.1*		NT					12600			*6.1*	*22*
Antimony	41	3.1	na	19.6	U				19.6	U				19.6	U				0.94	U		*0.94*		NT					0.549	U	UL	*0.19*	*0.549*
Arsenic	1.6	0.39	15.8	3.42					7.97					2.5	U				5			*1.1*		NT					1.46		L	*0.38*	*0.549*
Barium	19000	1500	209	**572**					82.3					108					47		L	*0.19*		NT					102			*0.37*	*2.2*
Beryllium	200	16	1.02	**1.62**					0.739					0.872					0.56	B	B	*0.19*		NT					0.73			*0.0379*	*0.549*
Calcium	na	na	na	NT					NT					NT					120000			*4.3*		NT					415		J	*3.1*	*11*
Chromium	150000	12000	65.3	5.34					47.8					24.3					**65.4**			*0.19*		NT					27.5			*0.41*	*1.1*
Cobalt	30	2.3	72.3	NT					NT					NT					4.2	B	L	*0.19*		NT					10.3		J	*0.89*	*5.49*
Copper	4100	310	53.5	NT					NT					NT					**149**		**K**	*0.19*		NT					5.39			*0.68*	*2.2*
Iron	72000	5500	50962	NT					NT					NT					11700			*3.4*		NT					15500		J	*3.7*	*5.49*
Lead	800	400	26.8	4.4					**160**					18					**286**			*0.38*		NT					18.7			*0.033*	*0.33*
Magnesium	na	na	na	NT					NT					NT					4730			*5.8*		NT					587		J	*2.6*	*11*
Manganese	2300	180	2543	NT					NT					NT					123			*0.19*		NT					998		J	*0.061*	*1.1*
Mercury	3.4	0.56	0.13	**1.11**					**0.441**					0.05	U				0.18	U		*0.18*		NT					0.03	B	J	*0.0218*	*0.0549*
Nickel	2000	160	62.8	8.93					25.4					6.13					39.2		K	*0.19*		NT					7.16		J	*1*	*4.4*
Potassium	na	na	na	NT					NT					NT					805	B	K	*8.3*		NT					673			*37*	*330*
Selenium	510	39	na	0.449	U				1.07					0.449	U				0.75	U		*0.75*		NT					1.1	U	UL	*0.36*	*1.1*
Silver	510	39	na	0.0124	U				0.0285					0.0245					0.38	U		*0.38*		NT					1.1	U		*0.54*	*1.1*
Sodium	na	na	na	NT					NT					NT					339	B	K	*5.6*		NT					22.1		B	*4.1*	*22*
Thallium	na	na	2.11	34.3	U				34.3	U				34.3	U				1.1	U		*1.1*		NT					0.14	B	J	*0.033*	*0.33*
Vanadium	7.2	0.55	108	NT					NT					NT					16.2		K	*0.19*		NT					32.6		J	*0.64*	*5.49*
Zinc	31000	2300	202	NT					NT					NT					73.6		K	*0.38*		NT					23.8		J	*0.39*	*2.2*

Table 3
Analytes Detected in Fill Samples at SWMU 48

Analyte	Sample ID			48SB08B					48SB09A					48SB09B					48SB10A					48SB10B				
	Sample Date			6/24/02					6/24/02					6/24/02					6/24/02					6/24/02				
	Sample Depth			4-6					0-0.5					4-6					0-0.5					4-6				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)																												
1,2,4-Trichlorobenzene	99000	22000	na	NT					NT					NT					NT					NT				
Acetone	63000000	6100000	na	5.6	U	UJ	*2.5*	*5.6*	NT					NT					4.8	U	UJ	*2.1*	*4.8*	5.4	U	UJ	*2.4*	*5.4*
Ethylbenzene	27000	5400	na	5.6	U		*0.37*	*5.6*	NT					NT					4.8	U		*0.32*	*4.8*	5.4	U		*0.36*	*5.4*
Methylene chloride	53000	11000	na	5.6	U		*0.35*	*5.6*	NT					NT					4.8	U		*0.3*	*4.8*	5.4	U		*0.34*	*5.4*
o-Xylene	1900000	380000	na	5.6	U		*1.2*	*5.6*	NT					NT					4.8	U		*1*	*4.8*	5.4	U		*1.1*	*5.4*
Toluene	4500000	500000	na	5.6	U		*0.36*	*5.6*	NT					NT					4.8	U		*0.31*	*4.8*	5.4	U		*0.35*	*5.4*
PAHs (ug/kg)																												
2-Methylnaphthalene	410000	31000	na	1.2	J	B	*0.71*	*2.1*	NT					NT					9.6			*0.61*	*1.8*	2	U		*0.69*	*2*
Anthracene	17000000	1700000	na	2.1	U		*0.23*	*2.1*	NT					NT					0.71	J	J	*0.2*	*1.8*	2	U		*0.22*	*2*
Benz(a)anthracene	2100	150	na	2.1	U		*0.28*	*2.1*	NT					NT					2.9			*0.24*	*1.8*	2	U		*0.27*	*2*
Benzo(a)pyrene	210	15	na	2.1	U		*0.24*	*2.1*	NT					NT					2.4			*0.2*	*1.8*	2	U		*0.23*	*2*
Benzo(b)fluoranthene	2100	150	na	2.1	U		*0.4*	*2.1*	NT					NT					4.7			*0.34*	*1.8*	2	U		*0.39*	*2*
Benzo(g,h,i)perylene	1700000	170000	na	2.1	U		*0.74*	*2.1*	NT					NT					1.4	J	J	*0.63*	*1.8*	2	U		*0.72*	*2*
Benzo(k)fluoranthene	21000	1500	na	2.1	U		*0.37*	*2.1*	NT					NT					1.5	J	J	*0.31*	*1.8*	2	U		*0.36*	*2*
Chrysene	210000	15000	na	2.1	U		*0.34*	*2.1*	NT					NT					4.6			*0.29*	*1.8*	2	U		*0.33*	*2*
Dibenz(a,h)anthracene	210	15	na	2.1	U		*0.72*	*2.1*	NT					NT					0.74	J	J	*0.61*	*1.8*	2	U		*0.69*	*2*
Fluoranthene	2200000	230000	na	2.1	U		*0.36*	*2.1*	NT					NT					6.3			*0.31*	*1.8*	2	U		*0.35*	*2*
Fluorene	2200000	230000	na	2.1	U		*0.56*	*2.1*	NT					NT					1.1	J	J	*0.48*	*1.8*	2	U		*0.54*	*2*
Indeno(1,2,3-cd)pyrene	2100	150	na	2.1	U		*0.68*	*2.1*	NT					NT					1.6	J	J	*0.58*	*1.8*	2	U		*0.65*	*2*
Naphthalene	18000	3600	na	1.5	JB	B	*0.82*	*2.1*	NT					NT					6.7	B		*0.7*	*1.8*	1.2	JB	B	*0.79*	*2*
Phenanthrene	1700000	170000	na	2.1	U		*0.32*	*2.1*	NT					NT					18			*0.28*	*1.8*	2	U		*0.31*	*2*
Pyrene	1700000	170000	na	2.1	U		*0.48*	*2.1*	NT					NT					8.2			*0.41*	*1.8*	2	U		*0.46*	*2*
SVOCs (ug/kg)																												
bis(2-Ethylhexyl)phthalate	120000	35000	na	210	U		*14*	*210*	NT					NT					130	J	B	*12*	*180*	200	U		*14*	*200*
Chrysene	210000	15000	na	210	U		*4.8*	*210*	NT					NT					180	U		*4.1*	*180*	200	U		*4.7*	*200*
Di-n-butylphthalate	6200000	610000	na	210	U		*61*	*210*	NT					NT					180	U		*52*	*180*	200	U		*58*	*200*
Fluoranthene	2200000	230000	na	210	U		*6.9*	*210*	NT					NT					7.9	J	J	*5.9*	*180*	200	U		*6.6*	*200*
N-nitrosodiphenylamine	350000	99000	na	210	U		*10*	*210*	NT					NT					180	U		*8.5*	*180*	200	U		*9.6*	*200*
Phenanthrene	1700000	170000	na	210	U		*6.5*	*210*	NT					NT					13	J	J	*5.6*	*180*	200	U		*6.3*	*200*
Pyrene	1700000	170000	na	210	U		*6.4*	*210*	NT					NT					8.1	J	J	*5.5*	*180*	200	U		*6.2*	*200*
Pesticides (ug/kg)																												
4,4'-DDD	7200	2000	na	NT					NT					NT					0.347	J	J	*0.15*	*0.708*	NT				
4,4'-DDE	5100	1400	na	NT					NT					NT					0.525	BJ	B	*0.149*	*0.708*	NT				
4,4'-DDT	7000	1700	na	NT					NT					NT					2.31			*0.251*	*0.708*	NT				
Endosulfan II	na	na	na	NT					NT					NT					0.418	J	J	*0.253*	*0.708*	NT				
Endrin aldehyde	na	na	na	NT					NT					NT					0.55	J	J	*0.358*	*0.708*	NT				
Methoxychlor	310000	31000	na	NT					NT					NT					0.708	U		*0.54*	*0.708*	NT				
PCBs (mg/kg)																												
PCB-1254	0.74	0.022	na	0.0415	U	UJ	*0.0122*	*0.0415*	NT					NT					0.0769		J	*0.0104*	*0.0354*	0.04	U	UJ	*0.0118*	*0.04*
Explosives (mg/kg)																												
2,4-Dinitrotoluene	2.5	0.71	na	0.2	U		*0.0163*	*0.2*	0.2	U		*0.0163*	*0.2*	0.2	U		*0.0163*	*0.2*	0.2	U		*0.0163*	*0.2*	0.2	U		*0.0163*	*0.2*
2,6-Dinitrotoluene	2.5	0.71	na	0.2	U		*0.0246*	*0.2*	0.2	U		*0.0246*	*0.2*	0.2	U		*0.0246*	*0.2*	0.2	U		*0.0246*	*0.2*	0.2	U		*0.0246*	*0.2*
Nitroglycerin	6.2	0.61	na	0.374	U		*0.124*	*0.374*	0.324	U		*0.108*	*0.324*	0.382	U		*0.127*	*0.382*	0.15	J	J	*0.106*	*0.318*	0.36	U		*0.12*	*0.36*
Herbicides (ug/kg)																												
Metals (mg/kg)																												
Aluminum	99000	7700	40041	32900			*6.9*	*24.9*	NT					NT					10900			*5.9*	*21.2*	24200			*6.6*	*24*
Antimony	41	3.1	na	0.36	B	B	*0.21*	*0.623*	NT					NT					0.531	U	UL	*0.18*	*0.531*	0.6	U	UL	*0.2*	*0.6*
Arsenic	1.6	0.39	15.8	0.6	B	L	*0.44*	*0.623*	NT					NT					2.62		L	*0.37*	*0.531*	0.6	U	UL	*0.42*	*0.6*
Barium	19000	1500	209	56.3			*0.42*	*2.49*	NT					NT					73.3			*0.36*	*2.12*	164			*0.4*	*2.4*
Beryllium	200	16	1.02	0.765			*0.043*	*0.623*	NT					NT					0.44	B	J	*0.0366*	*0.531*	0.745			*0.0414*	*0.6*
Calcium	na	na	na	141		J	*3.5*	*12.5*	NT					NT					15900		J	*3*	*10.6*	26.8		B	*3.4*	*12*
Chromium	150000	12000	65.3	36.1			*0.47*	*1.25*	NT					NT					30.7			*0.4*	*1.06*	17.6			*0.45*	*1.2*
Cobalt	30	2.3	72.3	6.1	B	J	*1*	*6.23*	NT					NT					5.98		J	*0.86*	*5.31*	58.2		J	*0.97*	*6*
Copper	4100	310	53.5	15.9			*0.77*	*2.49*	NT					NT					6.59			*0.66*	*2.12*	13.7			*0.74*	*2.4*
Iron	72000	5500	50962	41600		J	*4.2*	*6.23*	NT					NT					12100		J	*3.6*	*5.31*	**81800**		**J**	*4*	*6*
Lead	800	400	26.8	13.6			*0.038*	*0.374*	NT					NT					17			*0.032*	*0.318*	19.9			*0.036*	*0.36*
Magnesium	na	na	na	1100		J	*2.9*	*12.5*	NT					NT					1640		J	*2.5*	*10.6*	1040		J	*2.8*	*12*
Manganese	2300	180	2543	129		J	*0.07*	*1.25*	NT					NT					248		J	*0.059*	*1.06*	2070		J	*0.067*	*1.2*
Mercury	3.4	0.56	0.13	0.0674			*0.0247*	*0.0623*	NT					NT					0.037	B	J	*0.021*	*0.0531*	0.047	B	J	*0.0238*	*0.06*
Nickel	2000	160	62.8	12.3		J	*1.1*	*4.98*	NT					NT					5.54		J	*0.97*	*4.25*	11.3		J	*1.1*	*4.8*
Potassium	na	na	na	1340			*42*	*374*	NT					NT					642			*36*	*318*	1280			*40*	*360*
Selenium	510	39	na	1.25	U	UL	*0.41*	*1.25*	NT					NT					1.06	U	UL	*0.35*	*1.06*	1.2	U	UL	*0.39*	*1.2*
Silver	510	39	na	0.71	B	B	*0.61*	*1.25*	NT					NT					1.06	U		*0.52*	*1.06*	1.2	B	B	*0.59*	*1.2*
Sodium	na	na	na	21	B	B	*4.7*	*24.9*	NT					NT					19	B	B	*4*	*21.2*	19	B	B	*4.5*	*24*
Thallium	na	na	2.11	0.17	B	J	*0.038*	*0.374*	NT					NT					0.14	B	J	*0.032*	*0.318*	0.27	B	J	*0.036*	*0.36*
Vanadium	7.2	0.55	108	73.3		J	*0.72*	*6.23*	NT					NT					30.8		J	*0.61*	*5.31*	55.9		J	*0.69*	*6*
Zinc	31000	2300	202	42.9		J	*0.45*	*2.49*	NT					NT					24.4		J	*0.38*	*2.12*	42.2		J	*0.43*	*2.4*

Table 4
Summary of Analytes Detected in Fill Samples at SWMU 48
Page 1 of 2

Analyte	i-SL	r-SL	Background	# of i-SL Exceedances	# of r-SL Exceedances	# of Background Exceedances	# of Detections	# of Samples	Minimum Concentration	Maximum Concentration	Location of Maximum
VOCs (ug/kg)											
1,2,4-Trichlorobenzene	99000	22000	na	0	0	na	1	2	0.06	0.06	48SB6C
Acetone	63000000	6100000	na	0	0	na	3	9	0.14	26	48SB08A
Ethylbenzene	27000	5400	na	0	0	na	1	9	0.49	0.49	48SB6C
Methylene chloride	53000	11000	na	0	0	na	1	9	0.048	0.048	48SB6C
o-Xylene	1900000	380000	na	0	0	na	1	6	0.77	0.77	48SB6C
Toluene	4500000	500000	na	0	0	na	1	9	0.84	0.84	48SB08A
PAHs (ug/kg)											
2-Methylnaphthalene	410000	31000	na	0	0	na	3	4	1.2	9.6	48SB10A
Anthracene	17000000	1700000	na	0	0	na	2	5	0.002	0.71	48SB10A
Benz(a)anthracene	2100	150	na	0	0	na	3	5	0.0051	4.4	48SB08A
Benzo(a)pyrene	210	15	na	0	0	na	3	5	0.0056	3.6	48SB08A
Benzo(b)fluoranthene	2100	150	na	0	0	na	2	5	4.7	7.9	48SB08A
Benzo(g,h,i)perylene	1700000	170000	na	0	0	na	2	5	1.4	2.4	48SB08A
Benzo(k)fluoranthene	21000	1500	na	0	0	na	3	5	0.0054	2	48SB08A
Chrysene	210000	15000	na	0	0	na	2	5	4.6	4.7	48SB08A
Dibenz(a,h)anthracene	210	15	na	0	0	na	1	5	0.74	0.74	48SB10A
Fluoranthene	2200000	230000	na	0	0	na	3	5	0.0082	9.8	48SB08A
Fluorene	2200000	230000	na	0	0	na	1	5	1.1	1.1	48SB10A
Indeno(1,2,3-cd)pyrene	2100	150	na	0	0	na	3	5	0.007	2.9	48SB08A
Naphthalene	18000	3600	na	0	0	na	4	5	1.2	6.7	48SB10A
Phenanthrene	1700000	170000	na	0	0	na	3	5	0.0081	18	48SB10A
Pyrene	1700000	170000	na	0	0	na	3	5	0.0046	9.5	48SB08A
SVOCs (ug/kg)											
bis(2-Ethylhexyl)phthalate	120000	35000	na	0	0	na	4	8	0.35	1500	48SS1
Chrysene	210000	15000	na	0	0	na	1	7	86	86	48SS1
Di-n-butylphthalate	6200000	610000	na	0	0	na	2	8	33	10000	48SS2
Fluoranthene	2200000	230000	na	0	0	na	2	7	7.9	11	48SB08A
N-nitrosodiphenylamine	350000	99000	na	0	0	na	1	8	0.56	0.56	48SB6C
Phenanthrene	1700000	170000	na	0	0	na	3	7	10	270	48SS1
Pyrene	1700000	170000	na	0	0	na	2	7	7.9	8.1	48SB10A
Pesticides (ug/kg)											
4,4'-DDD	7200	2000	na	0	0	na	2	2	0.347	0.389	48SB08A
4,4'-DDE	5100	1400	na	0	0	na	2	2	0.462	0.525	48SB10A
4,4'-DDT	7000	1700	na	0	0	na	1	2	2.31	2.31	48SB10A
Endosulfan II	na	na	na	na	na	na	1	2	0.418	0.418	48SB10A
Endrin aldehyde	na	na	na	na	na	na	1	2	0.55	0.55	48SB10A
Methoxychlor	310000	31000	na	0	0	na	1	2	0.567	0.567	48SB08A
PCBs (mg/kg)											
PCB-1254	0.74	0.022	na	0	1	na	1	4	0.0769	0.0769	48SB10A
Explosives (mg/kg)											
2,4-Dinitrotoluene	2.5	0.71	na	1	1	na	1	7	3.8	3.8	48SB6C
2,6-Dinitrotoluene	2.5	0.71	na	0	1	na	1	7	1.1	1.1	48SB6C
Nitroglycerin	6.2	0.61	na	0	0	na	2	7	0.12	0.15	48SB10A
Herbicides (ug/kg)											
Metals (mg/kg)											
Aluminum	99000	7700	40041	0	0	0	5	5	10900	32900	48SB08B
Antimony	41	3.1	na	0	0	na	1	8	0.36	0.36	48SB08B
Arsenic	1.6	0.39	15.8	0	0	0	6	8	0.6	7.97	48SS2
Barium	19000	1500	209	0	0	1	8	8	47	572	48SS1
Beryllium	200	16	1.02	0	0	1	8	8	0.44	1.62	48SS1

Table 4
Summary of Analytes Detected in Fill Samples at SWMU 48
Page 2 of 2

Analyte	i-SL	r-SL	Background	# of i-SL Exceedances	# of r-SL Exceedances	# of Background Exceedances	# of Detections	# of Samples	Minimum Concentration	Maximum Concentration	Location of Maximum
Calcium	na	na	na	na	na	na	5	5	26.8	120000	48SB6C
Chromium	150000	12000	65.3	0	0	1	8	8	5.34	65.4	48SB6C
Cobalt	30	2.3	72.3	0	0	0	5	5	4.2	58.2	48SB10B
Copper	4100	310	53.5	0	0	1	5	5	5.39	149	48SB6C
Iron	72000	5500	50962	1	1	1	5	5	11700	81800	48SB10B
Lead	800	400	26.8	0	0	2	8	8	4.4	286	48SB6C
Magnesium	na	na	na	na	na	na	5	5	587	4730	48SB6C
Manganese	2300	180	2543	0	0	0	5	5	123	2070	48SB10B
Mercury	3.4	0.56	0.13	0	1	2	6	8	0.03	1.11	48SS1
Nickel	2000	160	62.8	0	0	0	8	8	5.54	39.2	48SB6C
Potassium	na	na	na	na	na	na	5	5	642	1340	48SB08B
Selenium	510	39	na	0	0	na	1	8	1.07	1.07	48SS2
Silver	510	39	na	0	0	na	4	8	0.0245	1.2	48SB10B
Sodium	na	na	na	na	na	na	5	5	19	339	48SB6C
Thallium	na	na	2.11	na	na	0	4	8	0.14	0.27	48SB10B
Vanadium	7.2	0.55	108	0	0	0	5	5	16.2	73.3	48SB08B
Zinc	31000	2300	202	0	0	0	5	5	23.8	73.6	48SB6C

Table 5
Analytes Detected in Soil Below Fill Material at SWMU 48

Analyte	Sample ID			48SB1 (RVFS*1)					48SB1 (RVFS*2)					48SB2 (RVFS*3)					48SB2 (RVFS*4)					48SB4A11					48SB4B21					48SB6A				
	Sample Date			8/19/91					8/19/91					8/16/91					8/16/91					12/17/94					12/17/94					3/26/98				
	Sample Depth			7.5-9.5					13-15					10-12					20-22					10-11					20-21					6-7				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)																																						
Acetone	63000000	6100000	na	17	U			*17*	17	U			*17*	17	U			*17*	17	U			*17*	3300	U			*3300*	3300	U			*3300*	NT				
Benzene	5600	1100	na	1.5	U			*1.5*	1.5	U			*1.5*	1.5	U			*1.5*	1.5	U			*1.5*	100	U			*100*	100	U			*100*	0.017		J	*0.005*	
Dichlorodifluoromethane	78000	18000	na	NT					NT					NT					NT					NT					NT					0.008	U	R	*0.008*	
m- & p-Xylene	na	na	na	NT					NT					NT					NT					NT					NT					0.008	U	R	*0.008*	
Methylene chloride	53000	11000	na	12	U			*12*	12	U			*12*	12	U			*12*	12	U			*12*	4400	U			*4400*	4400	U			*4400*	0.049		B	*0.005*	
o-Xylene	1900000	380000	na	NT					NT					NT					NT					NT					NT					0.008	U	R	*0.008*	
Toluene	4500000	500000	na	0.78	U			*0.78*	0.78	U			*0.78*	1					0.78	U			*0.78*	100	U			*100*	100	U			*100*	0.023		J	*0.005*	
Trichlorofluoromethane	340000	79000	na	5.9	U			*5.9*	5.9	U			*5.9*	5.9	U			*5.9*	5.9	U			*5.9*	230	U			*230*	230	U			*230*	0.008	U	R	*0.008*	
Vinyl chloride	1700	60	na	6.2	U			*6.2*	6.2	U			*6.2*	6.2	U			*6.2*	6.2	U			*6.2*	1800	U			*1800*	1800	U			*1800*	0.008	U	R	*0.008*	
PAHs (ug/kg)																																						
2-Methylnaphthalene	410000	31000	na	NT					NT					NT					NT					NT					NT					NT				
Chrysene	210000	15000	na	NT					NT					NT					NT					NT					NT					0.0029	U	UL	*0.0029*	
Fluoranthene	2200000	230000	na	NT					NT					NT					NT					NT					NT					0.048		L	*0.0058*	
Naphthalene	18000	3600	na	NT					NT					NT					NT					NT					NT					0.029	U	UL	*0.029*	
Phenanthrene	1700000	170000	na	NT					NT					NT					NT					NT					NT					0.0029	U	UL	*0.0029*	
Pyrene	1700000	170000	na	NT					NT					NT					NT					NT					NT					0.025		J	*0.0029*	
SVOCs (ug/kg)																																						
2,4-Dinitrotoluene	120000	12000	na	700	U			*700*	140	U			*140*	3200					140	U			*140*	2500	U			*2500*	2500	U			*2500*	NT				
2,6-Dinitrotoluene	62000	6100	na	400	U			*400*	85	U			*85*	1200					85	U			*85*	2000	U			*2000*	2000	U			*2000*	NT				
bis(2-Ethylhexyl)phthalate	120000	35000	na	3000	U			*3000*	620	U			*620*	1000					620	U			*620*	2800					3600					0.13	J	J	*0.52*	
Di-n-butylphthalate	6200000	610000	na	300	U			*300*	61	U			*61*	2900					190					1300	U			*1300*	6000					0.36	J	J	*0.52*	
Naphthalene	18000	3600	na	200	U			*200*	37	U			*37*	270					37	U			*37*	740	U			*740*	740	U			*740*	NT				
N-nitrosodiphenylamine	350000	99000	na	10000	U			*10000*	190	U			*190*	190	U			*190*	190	U			*190*	1400					1700					0.65			*0.52*	
Phenanthrene	1700000	170000	na	200					33	U			*33*	130					33	U			*33*	32	U			*32*	32	U			*32*	NT				
Pyrene	1700000	170000	na	300					33	U			*33*	33	U			*33*	33	U			*33*	83	U			*83*	83	U			*83*	NT				
Pesticides (ug/kg)		None detected																																				
PCBs (mg/kg)		None detected																																				
Explosives (mg/kg)																																						
1,3,5-Trinitrobenzene	2700	220	na	NT					NT					NT					NT					NT					NT					0.25	U	UL	*0.25*	
1,3-Dinitrobenzene	6.2	0.61	na	NT					NT					NT					NT					NT					NT					0.25	U	UL	*0.25*	
2,4,6-Trinitrotoluene	7.9	1.9	na	NT					NT					NT					NT					2	U			*2*	2	U			*2*	0.25	U	UL	*0.25*	
2,4-Dinitrotoluene	2.5	0.71	na	NT					NT					NT					NT					NT					NT					0.25	U	UL	*0.25*	
2,6-Dinitrotoluene	2.5	0.71	na	NT					NT					NT					NT					NT					NT					0.25	U		*0.25*	
4-amino-2,6-Dinitrotoluene	190	15	na	NT					NT					NT					NT					NT					NT					0.25	U	UL	*0.25*	
HMX	4900	380	na	NT					NT					NT					NT					2	U			*2*	2	U			*2*	0.25	U	UL	*0.25*	
Nitrobenzene	28	3.1	na	NT					NT					NT					NT					NT					NT					0.25	U	UL	*0.25*	
RDX	24	5.5	na	NT					NT					NT					NT					1.28	U			*1.28*	1.28	U			*1.28*	0.25	U	UL	*0.25*	
Herbicides (ug/kg)		Samples were not tested for this group.																																				
Metals (mg/kg)																																						
Aluminum	99000	7700	40041	2940					12200					15700					14600					NT					NT					15700			*0.95*	
Antimony	41	3.1	na	7.14	U				7.14	U				7.14	U				7.14	U				NT					NT					1.6	B	J	*0.79*	
Arsenic	1.6	0.39	15.8	8.19					3.1					4.7					2.75					NT					NT					2.8			*0.95*	
Barium	19000	1500	209	42.5					36.7					52.4					70.8					NT					NT					83.4		L	*0.16*	
Beryllium	200	16	1.02	0.767					**1.73**					**2.15**					**4.98**					NT					NT					0.16	U		*0.16*	
Calcium	na	na	na	240000					662					9740					198					NT					NT					35800			*3.6*	
Chromium	150000	12000	65.3	7.78					27.3					29.5					31.9					NT					NT					35.5			*0.16*	
Cobalt	30	2.3	72.3	3.01					6.34					11.3					17.9					NT					NT					7.6	B	L	*0.16*	
Copper	4100	310	53.5	10.8					6.87					**135**					14.6					NT					NT					33.3		K	*0.16*	
Iron	72000	5500	50962	8550					21200					25800					41600					NT					NT					18100			*2.9*	
Lead	800	400	26.8	**36.9**					10.5	U				**154**					10.5	U				NT					NT					**59.6**			*0.32*	
Magnesium	na	na	na	130000					784					3390					763					NT					NT					4660			*4.9*	
Manganese	2300	180	2543	222					195					278					547					NT					NT					148			*0.16*	
Mercury	3.4	0.56	0.13	**2.6**					0.05	U				**0.23**					0.05	U				NT					NT					0.16	U		*0.16*	
Nickel	2000	160	62.8	4.91					6.57					25.6					24.5					NT					NT					18.8		K	*0.16*	
Potassium	na	na	na	327					551					758					934					NT					NT					2200		K	*7*	
Silver	510	39	na	1.03					0.589	U				0.855					0.589	U				NT					NT					0.16	U		*0.32*	
Sodium	na	na	na	551					372					391					2880					NT					NT					537	B	K	*4.8*	
Thallium	na	na	2.11	6.62	U				6.62	U				6.62	U				6.62	U				NT					NT					0.79	U	UL	*0.95*	
Vanadium	7.2	0.55	108	8.97					30					34.3					32.8					NT					NT					33		K	*0.16*	
Zinc	31000	2300	202	38.2					23					71.3					29.8					NT					NT					54.5		K	*0.32*	

Table 5
Analytes Detected in Soil Below Fill Material at SWMU 48
Page 2 of 3

Analyte	Sample ID			48SB6A2					48SB6B					48SB6B2					48SB7A					48SB7A2					48SB7B					48SB08C				
	Sample Date			4/8/98					3/26/98					4/8/98					3/30/98					4/9/98					3/30/98					6/24/02				
	Sample Depth			6-7					14-16					14-16					8-9					8-9					10-11					8-10				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)																																						
Acetone	63000000	6100000	na	1.3	B	B	*0.005*		NT					1	B	B	*0.005*		0.008		B	*0.005*		1.1	B	B	*0.005*		0.008		B	*0.005*		5.4	U	UJ	*2.4*	*5.4*
Benzene	5600	1100	na	0.99	U		*0.99*		0.007	U		*0.007*		0.85	U		*0.85*		0.008	U		*0.008*		0.94	U		*0.94*		0.006	U		*0.006*		5.4	U		*0.3*	*5.4*
Dichlorodifluoromethane	78000	18000	na	0.99	U		*0.99*		0.007	U		*0.007*		0.85	U		*0.85*		0.008	U		*0.008*		0.94	U		*0.94*		0.006	U		*0.006*		NT				
m- & p-Xylene	na	na	na	1.1			*0.005*		0.007	U		*0.007*		0.85	U		*0.85*		0.008	U		*0.008*		0.94	U		*0.94*		0.006	U		*0.006*		11	U		*1.1*	*11*
Methylene chloride	53000	11000	na	0.99	U		*0.99*		0.002	J	B	*0.005*		0.85	U		*0.85*		0.003	J	B	*0.005*		0.94	U		*0.94*		0.006		B	*0.005*		5.4	U		*0.34*	*5.4*
o-Xylene	1900000	380000	na	0.64	J	J	*0.005*		0.007	U		*0.007*		0.85	U		*0.85*		0.008	U		*0.008*		0.94	U		*0.94*		0.006	U		*0.006*		5.4	U		*1.1*	*5.4*
Toluene	4500000	500000	na	0.99	U		*0.99*		0.007	U		*0.007*		0.85	U		*0.85*		0.008	U		*0.008*		0.94	U		*0.94*		0.006	U		*0.006*		5.4	U		*0.35*	*5.4*
Trichlorofluoromethane	340000	79000	na	0.99	U		*0.99*		0.007	U		*0.007*		0.85	U		*0.85*		0.002	J	J	*0.005*		0.7	J	J	*0.005*		0.006	U		*0.006*		NT				
Vinyl chloride	1700	60	na	0.99	U		*0.99*		0.007	U		*0.007*		0.85	U		*0.85*		0.008	U		*0.008*		0.94	U		*0.94*		0.006	U		*0.006*		5.4	U		*0.41*	*5.4*
PAHs (ug/kg)																																						
2-Methylnaphthalene	410000	31000	na	NT					NT					NT					NT					NT					NT					0.89	J	B	*0.69*	*2.1*
Chrysene	210000	15000	na	NT					0.002	U	UL	*0.002*		NT					0.021	U		*0.021*		NT					0.0019	U		*0.0019*		2.1	U		*0.33*	*2.1*
Fluoranthene	2200000	230000	na	NT					0.0039	U	UL	*0.0039*		NT					0.042	U		*0.042*		NT					0.0038	U		*0.0038*		2.1	U		*0.35*	*2.1*
Naphthalene	18000	3600	na	NT					0.02	U	UL	*0.02*		NT					0.21	U	UL	*0.21*		NT					0.019	U	UL	*0.019*		1.5	JB	B	*0.79*	*2.1*
Phenanthrene	1700000	170000	na	NT					0.002	U	UL	*0.002*		NT					0.021	U		*0.021*		NT					0.0019	U		*0.0019*		2.1	U		*0.31*	*2.1*
Pyrene	1700000	170000	na	NT					0.002	U	UL	*0.002*		NT					0.021	U		*0.021*		NT					0.0019	U		*0.0019*		2.1	U		*0.46*	*2.1*
SVOCs (ug/kg)																																						
2,4-Dinitrotoluene	120000	12000	na	NT					NT					NT					NT					NT					NT					210	U		*6.9*	*210*
2,6-Dinitrotoluene	62000	6100	na	NT					NT					NT					NT					NT					NT					210	U		*5.1*	*210*
bis(2-Ethylhexyl)phthalate	120000	35000	na	NT					0.45	U		*0.45*		NT					0.49	U		*0.49*		NT					0.38	U		*0.38*		210	U		*14*	*210*
Di-n-butylphthalate	6200000	610000	na	NT					0.45	U		*0.45*		NT					0.49	U	UJ	*0.49*		NT					0.081	J	J	*0.38*		210	U		*59*	*210*
Naphthalene	18000	3600	na	NT					NT					NT					NT					NT					NT					210	U		*7.5*	*210*
N-nitrosodiphenylamine	350000	99000	na	NT					0.45	U		*0.45*		NT					0.49	U	UJ	*0.49*		NT					0.38	U		*0.38*		210	U		*9.7*	*210*
Phenanthrene	1700000	170000	na	NT					NT					NT					NT					NT					NT					210	U		*6.4*	*210*
Pyrene	1700000	170000	na	NT					NT					NT					NT					NT					NT					210	U		*6.2*	*210*
Pesticides (ug/kg)		None detected																																				
PCBs (mg/kg)		None detected																																				
Explosives (mg/kg)																																						
1,3,5-Trinitrobenzene	2700	220	na	NT					0.24	U	UL	*0.24*		NT					102		L	*25*		NT					0.53		L	*0.25*		0.1	U		*0.0246*	*0.1*
1,3-Dinitrobenzene	6.2	0.61	na	NT					0.24	U	UL	*0.24*		NT					3.6		L	*0.25*		NT					0.25	U	UL	*0.25*		0.1	U		*0.0216*	*0.1*
2,4,6-Trinitrotoluene	7.9	1.9	na	NT					0.24	U	UL	*0.24*		NT					935		L	*25*		NT					35.68		L	*1*		0.2	U		*0.0187*	*0.2*
2,4-Dinitrotoluene	2.5	0.71	na	NT					0.24	U	UL	*0.24*		NT					0.25	U	UL	*0.25*		NT					0.25	U	UL	*0.25*		0.2	U		*0.0163*	*0.2*
2,6-Dinitrotoluene	2.5	0.71	na	NT					0.24	U		*0.24*		NT					0.25	U	UL	*0.25*		NT					0.25	U	UL	*0.25*		0.2	U		*0.0246*	*0.2*
4-amino-2,6-Dinitrotoluene	190	15	na	NT					0.24	U		*0.24*		NT					0.25	U	UL	*0.25*		NT					0.25	U	UL	*0.25*		0.2	U		*0.0444*	*0.2*
HMX	4900	380	na	NT					0.24	U	UL	*0.24*		NT					0.25	U	UL	*0.25*		NT					0.25	U	UL	*0.25*		0.2	U		*0.0602*	*0.2*
Nitrobenzene	28	3.1	na	NT					0.24	U	UL	*0.24*		NT					0.25	U	UL	*0.25*		NT					0.25	U	UL	*0.25*		0.2	U		*0.0583*	*0.2*
RDX	24	5.5	na	NT					0.24	U	UL	*0.24*		NT					0.25	U	UL	*0.25*		NT					0.25	U	UL	*0.25*		0.2	U		*0.035*	*0.2*
Herbicides (ug/kg)		Samples were not tested fo																																				
Metals (mg/kg)																																						
Aluminum	99000	7700	40041	NT					34200			*0.81*		NT					24600			*0.88*		NT					16500			*0.69*		22500			*6.7*	*24.2*
Antimony	41	3.1	na	NT					1.1	B	J	*0.67*		NT					0.9	B	J	*0.73*		NT					0.57	U		*0.57*		0.605	U	UL	*0.2*	*0.605*
Arsenic	1.6	0.39	15.8	NT					5.4			*0.81*		NT					8			*0.88*		NT					3.5			*0.69*		0.846		L	*0.42*	*0.605*
Barium	19000	1500	209	NT					72.9		L	*0.13*		NT					111		L	*0.15*		NT					49.8		L	*0.11*		29.4			*0.4*	*2.42*
Beryllium	200	16	1.02	NT					0.93		K	*0.13*		NT					0.69	B	B	*0.15*		NT					0.76		B	*0.11*		0.701			*0.0418*	*0.605*
Calcium	na	na	na	NT					860			*3.1*		NT					2640			*3.4*		NT					984			*2.6*		81.7		J	*3.4*	*12.1*
Chromium	150000	12000	65.3	NT					42.2			*0.13*		NT					33.3			*0.15*		NT					37.4			*0.11*		27.2			*0.45*	*1.21*
Cobalt	30	2.3	72.3	NT					11.5		L	*0.13*		NT					12.5		L	*0.15*		NT					15		L	*0.11*		4.6	B	J	*0.98*	*6.05*
Copper	4100	310	53.5	NT					15.1		K	*0.13*		NT					36.9		K	*0.15*		NT					9.6		B	*0.11*		8.03			*0.75*	*2.42*
Iron	72000	5500	50962	NT					39700			*2.4*		NT					45600			*2.6*		NT					25300			*2.1*		27500		J	*4.1*	*6.05*
Lead	800	400	26.8	NT					8			*0.27*		NT					25.6			*0.29*		NT					9			*0.23*		4.89			*0.037*	*0.363*
Magnesium	na	na	na	NT					1440			*4.2*		NT					1810			*4.5*		NT					950			*3.6*		832		J	*2.9*	*12.1*
Manganese	2300	180	2543	NT					342			*0.13*		NT					176			*0.15*		NT					613			*0.11*		122		J	*0.068*	*1.21*
Mercury	3.4	0.56	0.13	NT					0.14	U		*0.14*		NT					0.15	U		*0.15*		NT					0.12	U		*0.12*		0.033	B	J	*0.024*	*0.0605*
Nickel	2000	160	62.8	NT					17.6		K	*0.13*		NT					24.4		K	*0.15*		NT					10.6		K	*0.11*		7.85		J	*1.1*	*4.84*
Potassium	na	na	na	NT					1430		K	*5.9*		NT					2220		K	*6.5*		NT					909		K	*5.1*		1490			*40*	*363*
Silver	510	39	na	NT					0.13	U		*0.27*		NT					0.39	B	J	*0.29*		NT					0.23	U		*0.23*		1.21	U		*0.6*	*1.21*
Sodium	na	na	na	NT					180	B	K	*4*		NT					211	B	B	*4.4*		NT					100	B	B	*3.4*		14	B	B	*4.5*	*24.2*
Thallium	na	na	2.11	NT					0.67	U	UL	*0.81*		NT					0.88	U		*0.88*		NT					0.69	U		*0.69*		0.097	B	J	*0.036*	*0.363*
Vanadium	7.2	0.55	108	NT					41.2		K	*0.13*		NT					73.2		K	*0.15*		NT					23.1		K	*0.11*		23.8		J	*0.7*	*6.05*
Zinc	31000	2300	202	NT					46.6		K	*0.27*		NT					67.1		K	*0.29*		NT					29		K	*0.23*		29		J	*0.43*	*2.42*

Table 5
Analytes Detected in Soil Below Fill Material at SWMU 48

Analyte	Sample ID			48SB09C					48SB10C					48TP1					48TP2					48TP3					48TP4				
	Sample Date			6/24/02					6/24/02					3/24/98					3/24/98					3/24/98					3/24/98				
	Sample Depth			8-10					8-10					6-6.5					6-6.5					6-6.5					6-6.5				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)																																	
Acetone	63000000	6100000	na	NT					5.6	U	UJ	*2.5*	*5.6*	NT					NT					NT					NT				
Benzene	5600	1100	na	NT					5.6	U		*0.31*	*5.6*	0.011	U	UJ	*0.011*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
Dichlorodifluoromethane	78000	18000	na	NT					NT					0.006	J	J	*0.005*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
m- & p-Xylene	na	na	na	NT					11	U		*1.2*	*11*	0.011	U	UJ	*0.011*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
Methylene chloride	53000	11000	na	NT					5.6	U		*0.35*	*5.6*	0.007	JB	B	*0.005*		0.002	J	B	*0.005*		0.002	J	B	*0.005*		0.002	J	B	*0.005*	
o-Xylene	1900000	380000	na	NT					5.6	U		*1.2*	*5.6*	0.011	U	UJ	*0.011*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
Toluene	4500000	500000	na	NT					5.6	U		*0.36*	*5.6*	0.011	U	UJ	*0.011*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
Trichlorofluoromethane	340000	79000	na	NT					NT					0.007	J	J	*0.005*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
Vinyl chloride	1700	60	na	NT					5.6	U		*0.42*	*5.6*	0.011	J	J	*0.011*		0.006	U		*0.006*		0.007	U	UJ	*0.007*		0.006	U		*0.006*	
PAHs (ug/kg)																																	
2-Methylnaphthalene	410000	31000	na	NT					0.95	J	B	*0.71*	*2.1*	NT					NT					NT					NT				
Chrysene	210000	15000	na	NT					2.1	U		*0.34*	*2.1*	0.017		J	*0.003*		0.0021	U		*0.0021*		0.0022	U		*0.0022*		0.0021	U		*0.0021*	
Fluoranthene	2200000	230000	na	NT					2.1	U		*0.36*	*2.1*	0.006	U		*0.006*		0.0042	U		*0.0042*		0.0044	U		*0.0044*		0.0042	U		*0.0042*	
Naphthalene	18000	3600	na	NT					1.6	JB	B	*0.82*	*2.1*	0.03	U		*0.03*		0.021	U		*0.021*		0.022	U		*0.022*		0.021	U		*0.021*	
Phenanthrene	1700000	170000	na	NT					2.1	U		*0.32*	*2.1*	0.094		J	*0.003*		0.0021	U		*0.0021*		0.0022	U		*0.0022*		0.0021	U		*0.0021*	
Pyrene	1700000	170000	na	NT					2.1	U		*0.48*	*2.1*	0.003	U		*0.003*		0.0021	U		*0.0021*		0.0022	U		*0.0022*		0.0021	U		*0.0021*	
SVOCs (ug/kg)																																	
2,4-Dinitrotoluene	120000	12000	na	NT					210	U		*7.1*	*210*	NT					NT					NT					NT				
2,6-Dinitrotoluene	62000	6100	na	NT					210	U		*5.2*	*210*	NT					NT					NT					NT				
bis(2-Ethylhexyl)phthalate	120000	35000	na	NT					210	U		*14*	*210*	0.72	U		*0.72*		0.43	U		*0.43*		0.44	U		*0.44*		0.43	U		*0.43*	
Di-n-butylphthalate	6200000	610000	na	NT					210	U		*61*	*210*	0.72	U		*0.72*		0.43	U		*0.43*		0.44	U		*0.44*		0.43	U		*0.43*	
Naphthalene	18000	3600	na	NT					210	U		*7.7*	*210*	NT					NT					NT					NT				
N-nitrosodiphenylamine	350000	99000	na	NT					210	U		*10*	*210*	0.72	U		*0.72*		0.43	U		*0.43*		0.44	U		*0.44*		0.43	U		*0.43*	
Phenanthrene	1700000	170000	na	NT					210	U		*6.5*	*210*	NT					NT					NT					NT				
Pyrene	1700000	170000	na	NT					210	U		*6.4*	*210*	NT					NT					NT					NT				
Pesticides (ug/kg)	None detected																																
PCBs (mg/kg)	None detected																																
Explosives (mg/kg)																																	
1,3,5-Trinitrobenzene	2700	220	na	0.1	U		*0.0246*	*0.1*	0.1	U		*0.0246*	*0.1*	1.4		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
1,3-Dinitrobenzene	6.2	0.61	na	0.1	U		*0.0216*	*0.1*	0.1	U		*0.0216*	*0.1*	2.7		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
2,4,6-Trinitrotoluene	7.9	1.9	na	0.2	U		*0.0187*	*0.2*	0.2	U		*0.0187*	*0.2*	0.25	U				0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
2,4-Dinitrotoluene	2.5	0.71	na	0.2	U		*0.0163*	*0.2*	0.2	U		*0.0163*	*0.2*	6.7		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
2,6-Dinitrotoluene	2.5	0.71	na	0.2	U		*0.0246*	*0.2*	0.2	U		*0.0246*	*0.2*	1.3			*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
4-amino-2,6-Dinitrotoluene	190	15	na	0.2	U		*0.0444*	*0.2*	0.2	U		*0.0444*	*0.2*	5.5		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
HMX	4900	380	na	0.2	U		*0.0602*	*0.2*	0.2	U		*0.0602*	*0.2*	5.2		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
Nitrobenzene	28	3.1	na	0.2	U		*0.0583*	*0.2*	0.2	U		*0.0583*	*0.2*	1		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
RDX	24	5.5	na	0.2	U		*0.035*	*0.2*	0.2	U		*0.035*	*0.2*	0.85		J	*0.25*		0.25	U		*0.25*		0.25	U		*0.25*		0.25	U		*0.25*	
Herbicides (ug/kg)	Samples were not tested fo																																
Metals (mg/kg)																																	
Aluminum	99000	7700	40041	NT					24100			*6.9*	*24.9*	9230			*1.3*		**47400**			*0.75*		**50700**			*0.79*		**47900**			*0.78*	
Antimony	41	3.1	na	NT					0.623	U	UL	*0.21*	*0.623*	0.66	U		*1.1*		1.3	B	J	*0.62*		1.5	B	J	*0.66*		1.5	B	J	*0.65*	
Arsenic	1.6	0.39	15.8	NT					0.623	U	UL	*0.44*	*0.623*	8.1			*1.3*		4.3			*0.75*		4.8			*0.79*		4.8			*0.78*	
Barium	19000	1500	209	NT					63.4			*0.42*	*2.49*	34.6	B	L	*0.22*		71.8		L	*0.12*		70.6		L	*0.13*		80.4		L	*0.13*	
Beryllium	200	16	1.02	NT					1			*0.043*	*0.623*	**1.5**		**K**	*0.22*		0.48	B	K	*0.12*		0.51	B	K	*0.13*		0.55	B	K	*0.13*	
Calcium	na	na	na	NT					16.8		B	*3.5*	*12.5*	4650			*5*		697			*2.9*		266	B	J	*3*		246	B	J	*3*	
Chromium	150000	12000	65.3	NT					27.6			*0.47*	*1.25*	23.2			*0.22*		28.4			*0.12*		33			*0.13*		31.2			*0.13*	
Cobalt	30	2.3	72.3	NT					18.6		J	*1*	*6.23*	13.8		L	*0.22*		6.7		L	*0.12*		7.5		L	*0.13*		6.2	B	L	*0.13*	
Copper	4100	310	53.5	NT					15.7			*0.77*	*2.49*	15.4		K	*0.22*		18.6		K	*0.12*		19.7		K	*0.13*		20.1		K	*0.13*	
Iron	72000	5500	50962	NT					**61400**		**J**	*4.2*	*6.23*	16700			*3.9*		**51100**			*2.2*		**55000**			*2.4*		**54800**			*2.3*	
Lead	800	400	26.8	NT					10.5			*0.038*	*0.374*	17.8			*0.44*		17			*0.25*		14.7			*0.26*		15.8			*0.26*	
Magnesium	na	na	na	NT					1480		J	*2.9*	*12.5*	442	B	J	*6.8*		2310			*3.9*		1980			*4.1*		2160			*4*	
Manganese	2300	180	2543	NT					508		J	*0.07*	*1.25*	314			*0.22*		188			*0.12*		218			*0.13*		163			*0.13*	
Mercury	3.4	0.56	0.13	NT					0.0623	U		*0.0247*	*0.0623*	0.22	U		*0.22*		0.13	U		*0.13*		0.13	U		*0.13*		0.13	U		*0.13*	
Nickel	2000	160	62.8	NT					13		J	*1.1*	*4.98*	8.6	B	K	*0.22*		20.9		K	*0.12*		21.2		K	*0.13*		22		K	*0.13*	
Potassium	na	na	na	NT					1720			*42*	*374*	176	B	K	*9.6*		2910		K	*5.5*		2670		K	*5.8*		2920		K	*5.7*	
Silver	510	39	na	NT					0.87	B	B	*0.61*	*1.25*	0.22	U		*0.44*		0.12	U		*0.25*		0.13	U		*0.26*		0.13	U		*0.26*	
Sodium	na	na	na	NT					16	B	B	*4.7*	*24.9*	5740		K	*6.6*		323	B	K	*3.7*		288	B	K	*4*		224	B	K	*3.9*	
Thallium	na	na	2.11	NT					0.21	B	J	*0.038*	*0.374*	1.1	U	UL	*1.3*		1.9		L	*0.75*		0.66	U	UL	*0.79*		0.65	U	UL	*0.78*	
Vanadium	7.2	0.55	108	NT					63.7		J	*0.72*	*6.23*	12.1		K	*0.22*		94.6		K	*0.12*		100		K	*0.13*		96.4		K	*0.13*	
Zinc	31000	2300	202	NT					53.9		J	*0.45*	*2.49*	58.7		K	*0.44*		65.6		K	*0.25*		70.2		K	*0.26*		67.8		K	*0.26*	

Table 6
Summary of Analytes Detected in Soil Below Fill Material at SWMU 48

Analyte	i-SL	r-SL	Background	# of i-SL Exceedances	# of r-SL Exceedances	# of Background Exceedances	# of Detections	# of Samples	Minimum Concentration	Maximum Concentration	Location of Maximum
VOCs (ug/kg)											
Acetone	63000000	6100000	na	0	0	na	5	13	0.008	1.3	48SB6A2
Benzene	5600	1100	na	0	0	na	1	19	0.017	0.017	48SB6A
Dichlorodifluoromethane	78000	18000	na	0	0	na	1	11	0.006	0.006	48TP1
m- & p-Xylene	na	na	na	na	na	na	1	13	1.1	1.1	48SB6A2
Methylene chloride	53000	11000	na	0	0	na	8	19	0.002	0.049	48SB6A
o-Xylene	1900000	380000	na	0	0	na	1	13	0.64	0.64	48SB6A2
Toluene	4500000	500000	na	0	0	na	2	19	0.023	1	48SB2 (RVFS*3)
Trichlorofluoromethane	340000	79000	na	0	0	na	3	17	0.002	0.7	48SB7A2
Vinyl chloride	1700	60	na	0	0	na	1	19	0.011	0.011	48TP1
PAHs (ug/kg)											
2-Methylnaphthalene	410000	31000	na	0	0	na	2	2	0.89	0.95	48SB10C
Chrysene	210000	15000	na	0	0	na	1	10	0.017	0.017	48TP1
Fluoranthene	2200000	230000	na	0	0	na	1	10	0.048	0.048	48SB6A
Naphthalene	18000	3600	na	0	0	na	2	10	1.5	1.6	48SB10C
Phenanthrene	1700000	170000	na	0	0	na	1	10	0.094	0.094	48TP1
Pyrene	1700000	170000	na	0	0	na	1	10	0.025	0.025	48SB6A
SVOCs (ug/kg)											
2,4-Dinitrotoluene	120000	12000	na	0	0	na	1	8	3200	3200	48SB2 (RVFS*3)
2,6-Dinitrotoluene	62000	6100	na	0	0	na	1	8	1200	1200	48SB2 (RVFS*3)
bis(2-Ethylhexyl)phthalate	120000	35000	na	0	0	na	4	16	0.13	3600	48SB4B21
Di-n-butylphthalate	6200000	610000	na	0	0	na	5	16	0.081	6000	48SB4B21
Naphthalene	18000	3600	na	0	0	na	1	8	270	270	48SB2 (RVFS*3)
N-nitrosodiphenylamine	350000	99000	na	0	0	na	3	16	0.65	1700	48SB4B21
Phenanthrene	1700000	170000	na	0	0	na	2	8	130	200	48SB1 (RVFS*1)
Pyrene	1700000	170000	na	0	0	na	1	8	300	300	48SB1 (RVFS*1)
Pesticides (ug/kg)		***None detected***									
PCBs (mg/kg)		***None detected***									
Explosives (mg/kg)											
1,3,5-Trinitrobenzene	2700	220	na	0	0	na	3	11	0.53	102	48SB7A
1,3-Dinitrobenzene	6.2	0.61	na	0	2	na	2	11	2.7	3.6	48SB7A
2,4,6-Trinitrotoluene	7.9	1.9	na	2	2	na	2	13	35.68	935	48SB7A
2,4-Dinitrotoluene	2.5	0.71	na	1	1	na	1	11	6.7	6.7	48TP1
2,6-Dinitrotoluene	2.5	0.71	na	0	1	na	1	11	1.3	1.3	48TP1
4-amino-2,6-Dinitrotoluene	190	15	na	0	0	na	1	11	5.5	5.5	48TP1
HMX	4900	380	na	0	0	na	1	13	5.2	5.2	48TP1
Nitrobenzene	28	3.1	na	0	0	na	1	11	1	1	48TP1
RDX	24	5.5	na	0	0	na	1	13	0.85	0.85	48TP1
Herbicides (ug/kg)		***Samples were not tested for this group.***									
Metals (mg/kg)											
Aluminum	99000	7700	40041	0	3	3	14	14	2940	50700	48TP3
Antimony	41	3.1	na	0	0	na	6	14	0.9	1.6	48SB6A
Arsenic	1.6	0.39	15.8	0	0	0	13	14	0.846	8.19	48SB1 (RVFS*1)
Barium	19000	1500	209	0	0	0	14	14	29.4	111	48SB7A
Beryllium	200	16	1.02	0	0	4	13	14	0.48	4.98	48SB2 (RVFS*4)
Calcium	na	na	na	na	na	na	14	14	16.8	240000	48SB1 (RVFS*1)
Chromium	150000	12000	65.3	0	0	0	14	14	7.78	42.2	48SB6B
Cobalt	30	2.3	72.3	0	0	0	14	14	3.01	18.6	48SB10C
Copper	4100	310	53.5	0	0	1	14	14	6.87	135	48SB2 (RVFS*3)
Iron	72000	5500	50962	0	4	4	14	14	8550	61400	48SB10C
Lead	800	400	26.8	0	0	3	12	14	4.89	154	48SB2 (RVFS*3)
Magnesium	na	na	na	na	na	na	14	14	442	130000	48SB1 (RVFS*1)
Manganese	2300	180	2543	0	0	0	14	14	122	613	48SB7B
Mercury	3.4	0.56	0.13	0	1	2	3	14	0.033	2.6	48SB1 (RVFS*1)
Nickel	2000	160	62.8	0	0	0	14	14	4.91	25.6	48SB2 (RVFS*3)
Potassium	na	na	na	na	na	na	14	14	176	2920	48TP4
Silver	510	39	na	0	0	na	4	14	0.39	1.03	48SB1 (RVFS*1)
Sodium	na	na	na	na	na	na	14	14	14	5740	48TP1
Thallium	na	na	2.11	na	na	0	3	14	0.097	1.9	48TP2
Vanadium	7.2	0.55	108	0	0	0	14	14	8.97	100	48TP3
Zinc	31000	2300	202	0	0	0	14	14	23	71.3	48SB2 (RVFS*3)

3.0 COMPLETED ACTIVITIES

The activities conducted at SWMU 48 are intended to provide supplemental data in order to complete the RFI/CMS for the site. High concentrations of 2,4,6-TNT were detected in soil samples collected within and immediately below an ash layer that was discovered during test pit and soil boring advancement during the 1998 RFI at SWMU 48.

The objective of the supplemental data collection was to attempt to visibly locate the ash layer within the SWMU 48 trenches via test pitting and characterize the concentrations of explosives in soil above, within, and below the ash layer. A summary of the proposed sampling is presented in **Table 7**.

Table 7
Proposed Sampling and Analysis

Media	Number of Samples*	Analysis	Objective
Subsurface Soil	18	TAL metals, explosives	Characterize the concentrations of metals and explosives associated with the ash layer, if present.
Subsurface Soil Composite	3	TCLP SVOCs, TCLP metals, explosives, corrosivity as pH, reactivity, and ignitability	Determine if excavated soil contains explosive or waste characteristic concentrations above TCLP RLs.

*Sample numbers do not include QA/QC samples
- Blind field duplicate samples were collected at a frequency of 10% of the total number of env. samples
- MS/MSD samples and rinse blanks were collected at a frequency of 5% of the total number of env. samples

3.1 Test Pitting

Three test pits were proposed for advancement perpendicularly across the northern and southern trenches at SWMU 48 (**Figure 2**). The test pits were to be advanced downward and through the ash layer, if present. The initial excavation at test pit 48TP1 encountered the ash layer. As a result, the test pit excavation plan was altered to focus on determining the extent and boundaries of the ash layer. Actual test pit locations are depicted on **Figure** 3. Several test pits, approximately 5 to 10 feet in length, within the southern and northern trenches were advanced and logged until the ash layer visually terminated within or was no longer present in the outlying test pits. As shown on **Figure 2**, the initially excavated test pit, 48TP1, was advanced to intersect 1998 RFI subsurface soil sample 48SB07A, where 2,4,6-TNT was detected at a concentration of 935 mg/kg.

Test pit advancement was performed using a 20-ton excavator (trackhoe). Fill soil above the ash layer (0-6 ft bgs) was staged on the outside of the test pits for re-use as backfill following the completion of test pit advancement. Soil below 6 ft in depth and any soil containing ash was excavated and directly loaded into drums that were transported to the RFAAP 90-day accumulation storage area. Less than 1 cubic yard investigation derived material (IDM) was generated.

The sides of all excavations in which employees were exposed to danger from moving ground were guarded by benching the ground. The benching was in accordance with EM 385-1-1 and Shaw procedure HS307, Excavation and Trenching. Excavations less than 5 ft in depth and which a "competent person" examines and determines there to be no potential for cave-in did not require protective systems. EM 385-1-1 defines a "competent person" as "one who can identify

existing and predictable hazards in the working environment or working conditions that are dangerous to personnel and who has the authority to take prompt corrective measures to eliminate them." Shaw Health and Safety provides Excavation Competent Person Training, and Shaw will ensure that the Site Superintendent for the project has completed this training. Excavation work will comply with EM 385-1-1 and 29CFR1926 Subpart P – *Excavations* and will follow the health and safety requirements specified the AHA adopted from the SWMU 51 IMWP (**Appendix A**). Excavations greater than 4 ft may constitute a confined space, as such, no Personnel was allowed to enter the excavation. Soil sampling was performed from the bucket of the excavator and is described in more detail in the following section.

3.2 Visual Inspection

Test Pits were visually inspected and logged by a staff geologist, as soil was unearthed. Test Pits typically consisted of light brown, Silty SAND (SM) fill overlying a reddish brown native Lean CLAY (CL). A dark gray to black layer of very moist black ash was encountered in several test pits including; 48TP1 through 48TP5, 48TP8, 48TP10, and 48TP13, typically around 0.5 to 3.5 ft bgs. The thickness of the ash layer generally ranged from approximately 0.3 to 2.0 feet thick. Lenses of plastics, roofing materials, and asphalt debris were encountered in Test Pits 48TP6, 48TP9, 48TP11, and 48TP12. An unknown green clayey substance was encountered at approximately 6.5 ft bgs in Test Pit 48TP6. This substance was found in approximately 12 inch by 12 inch blocks, contained by weathered cardboard and wrapped in plastic. Based on further excavations, this material was confined to 48TP6.

3.3 Soil Sampling

As shown in **Table 7**, eighteen soil grab samples and three composite samples were collected from the test pits advanced at SWMU 48 to further characterize metals and explosives concentrations associated with the ash layer. Sample locations are presented on **Figure 3**. Three soil samples were collected from each test pit, with the exception of 48TP2, 48TP4 48TP5, and 48TP13, within the southern trench. These test pits were used to visually define the boundaries of the ash layer. Test pits were typically sampled on an "every other" test pit basis. Additionally, test pits 48TP10, 48TP14, and 48TP12 in the northern trench were also not sampled, as there was no ash layer encountered, and fill material was sparse. A soil sample was typically collected from above, within, and below the ash layer, if present. As indicated in *Section 3.1*, personnel were not allowed to enter a test pit greater than 4 ft in depth for sampling. Soil sampling was performed from the bucket of the excavator in all test pits.

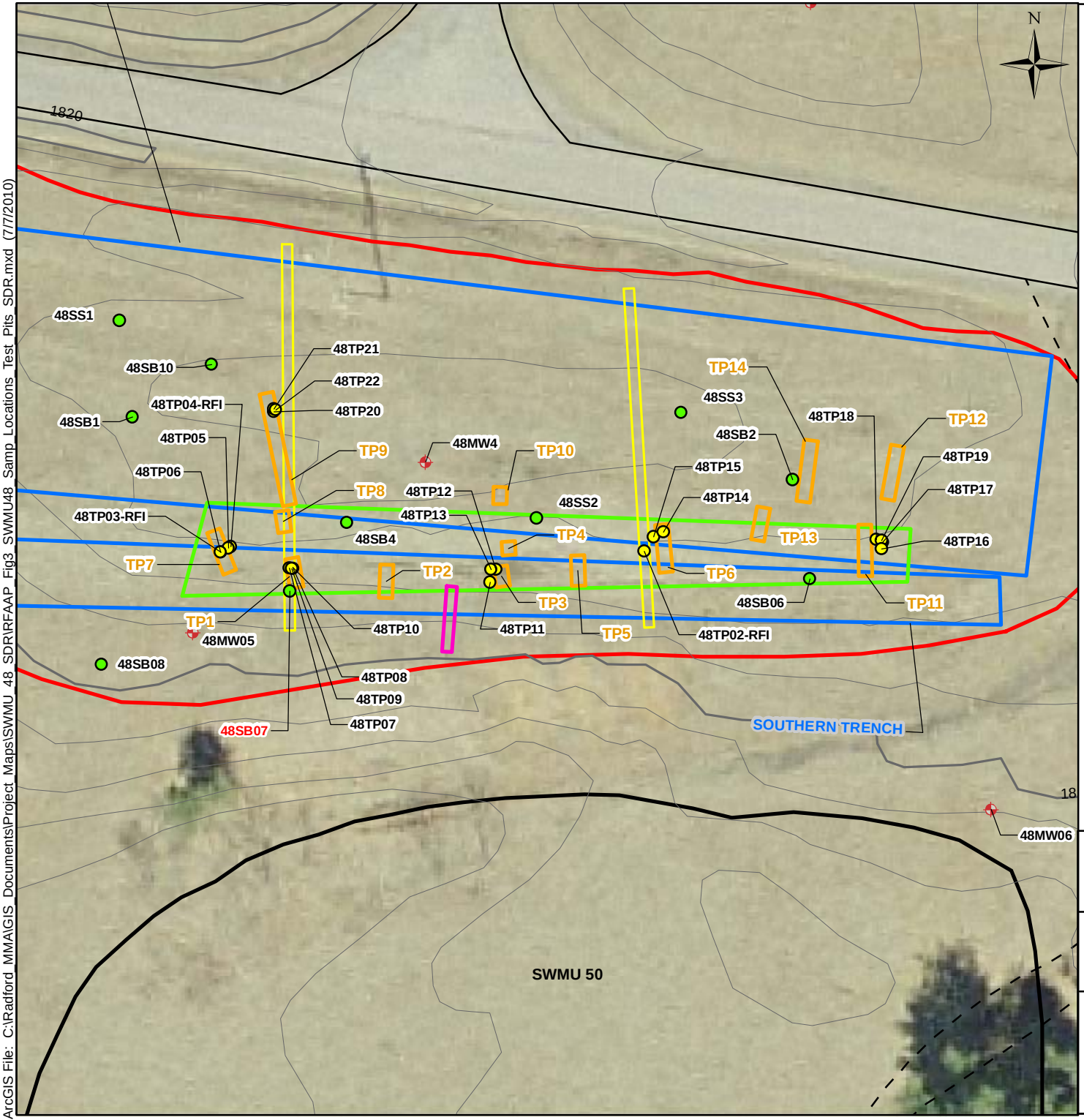
As indicated in **Table 7**, soil samples were collected to further characterize metals and explosives concentrations associated with the ash were analyzed at an offsite laboratory for Target Analyte List (TAL) metals and explosives. Three composite soil samples were also collected; one sample from test pits 48TP7, 48TP8, and 48TP11. Each composite sample consisted of three aliquots of soil; above, below, and within the encountered ash layer, that were subsequently homogenized. The composite samples were collected and tested to determine if excavated soil contains explosive or waste characteristic concentrations above TCLP RLs. Results from the sampling event are tabulated in **Tables 8 and 9**. The TCLP results are presented in **Table 10**.

TAL Metals. Twenty-three metals were detected in the soil samples. Arsenic exceeded the industrial screening level in one sample. Antimony and cadmium exceeded the residential

screening level in single samples. Lead exceeded its industrial screening level in one sample and its residential screening level in three samples. The single industrial level exceedances was from a sample of the green material that appears to be a grout mix likely used in the conductive flooring that is present in many of the explosive loading and handling buildings at Radford. Copper also exceeded its industrial screening level in this sample. Mercury exceeded the industrial screening level in three samples and the residential screening level in six samples.

Explosives. Nine explosives were detected in the subsurface soil samples. All results were below residential screening levels, with the exception of a single detection of nitroglycerin that exceeded the residential criteria.

TCLP. No TCLP SVOCs were detected. Lead, barium and mercury were detected in the TCLP metals analysis at concentrations below the TCLP Regulatory Limits (RLs), indicating that this soil would be disposed of as non-hazardous waste.



LEGEND

- Test Pit Delineation Soil Sample Location
- Monitoring Well Location
- Soil Sample Location
- Test Pit
- Dirt Road
- Paved Road
- 1998 RFI Trench Boundary
- Proposed Test Pit Boundary
- Southern Trench (GPS)
- Trench Boundary
- 10 ft Contour Line
- 2 ft Contour Line
- SWMU 48 Boundary
- Other SWMU Boundary

Notes:
1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.

Scale:
0 20 40 80 Feet

U.S. Army Corps of Engineers

Shaw® Shaw Environmental, Inc.

FIGURE 3
SWMU 48 Test Pits and Sample Locations
Radford Army Ammunition Plant, Radford, VA

ArcGIS File: C:\Radford_MMA\GIS_Documents\Project_Maps\SWMU_48_SDR\RFAAP_Fig3_SWMU48_Samp_Locations_Test_Pits_SDR.mxd (7/7/2010)

Table 8
Analytes Detected in Trenching Investigation Soil Samples
SWMU 48, Radford Army Ammunition Plant, Radford VA

Analyte	Sample ID			48TP02-RFI					48TP03-RFI					48TP04-RFI					48TP05				
	Sample Date			3/18/10					3/18/10					3/18/10					3/18/10				
	Sample Depth			6-7					1-2					3-4					5-6				
	i-SL	**r-SL**	**Background**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Explosives (mg/kg)																							
1,3,5-Trinitrobenzene	2700	220	na	0.13	J PG		*0.01*	*0.25*	0.25	U		*0.01*	*0.25*	0.25	U		*0.01*	*0.25*	0.25	U		*0.009*	*0.25*
1,3-Dinitrobenzene	6.2	0.61	na	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*
2,4,6-Trinitrotoluene	7.9	1.9	na	0.25	U		*0.019*	*0.25*	0.056	J		*0.019*	*0.25*	0.18	J		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*
2,4-Dinitrotoluene	120	12	na	0.022	J		*0.005*	*0.25*	0.079	J		*0.005*	*0.25*	1.6			*0.005*	*0.25*	0.13	J		*0.005*	*0.25*
2,6-Dinitrotoluene	62	6.1	na	0.25	U		*0.007*	*0.25*	0.074	J		*0.007*	*0.25*	0.19	J		*0.007*	*0.25*	0.054	J		*0.007*	*0.25*
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		*0.01*	*0.25*	0.038	J		*0.01*	*0.25*	0.01	J PG		*0.01*	*0.25*	0.022	J		*0.009*	*0.25*
HMX	4900	380	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.025	J		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
Nitroglycerin	6.2	0.61	na	0.5	U		*0.015*	*0.5*	0.051	J PG		*0.015*	*0.5*	1.2	PG		*0.015*	*0.5*	0.17	J		*0.015*	*0.5*
Metals (mg/kg)																							
Aluminum	99000	7700	40041	96.9			*9.2*	*32.9*	18000			*8.6*	*30.8*	9910			*8.1*	*28.9*	16200			*8.7*	*30.9*
Antimony	41	3.1	na	0.99	U		*0.33*	*0.99*	1.2		NOT	*0.31*	*0.92*	3.2			*0.29*	*0.87*	1.5			*0.31*	*0.93*
Arsenic	1.6	0.39	15.8	0.82	U		*0.25*	*0.82*	4		VALIDAT	*0.23*	*0.77*	3.5			*0.22*	*0.72*	4.1			*0.23*	*0.77*
Barium	19000	1500	209	0.96			*0.16*	*0.49*	114			*0.15*	*0.46*	199			*0.14*	*0.43*	142			*0.15*	*0.46*
Beryllium	200	16	1.02	0.16	U		*0.016*	*0.16*	0.79			*0.015*	*0.15*	0.69			*0.014*	*0.14*	0.91			*0.015*	*0.15*
Cadmium	81	7	0.69	**9.2**			*0.082*	*0.25*	**1.1**			*0.077*	*0.23*	**6.3**			*0.072*	*0.22*	**1.8**			*0.077*	*0.23*
Calcium	na	na	na	737			*41.1*	*164*	221000	RLA		*193*	*770*	16900			*36.1*	*144*	174000	RLA		*193*	*773*
Chromium	150000	12000	65.3	2.7			*0.33*	*0.99*	31.2			*0.31*	*0.92*	48.5			*0.29*	*0.87*	34.5			*0.31*	*0.93*
Cobalt	30	2.3	72.3	9			*0.16*	*0.49*	4.6			*0.15*	*0.46*	6.8			*0.14*	*0.43*	6			*0.15*	*0.46*
Copper	4100	310	53.5	**81800**	**B RLA**		*247*	*822*	31.7	B		*0.23*	*0.77*	**239**	**B**		*0.22*	*0.72*	**87.5**	**B**		*0.23*	*0.77*
Iron	72000	5500	50962	118			*5.1*	*16.4*	13900			*4.8*	*15.4*	15500			*4.5*	*14.4*	15100			*4.8*	*15.5*
Lead	800	400	26.8	**114000**	**B RLA**		*98.7*	*329*	**294**	**B**	**O DAT**	*0.092*	*0.31*	**665**	**B**		*0.087*	*0.29*	**450**	**B**		*0.093*	*0.31*
Magnesium	na	na	na	382			*12.3*	*82.2*	17400			*11.6*	*77*	3320			*10.8*	*72.2*	14000			*11.6*	*77.3*
Manganese	2300	180	2543	11.3			*0.41*	*1.3*	145			*0.39*	*1.2*	162			*0.36*	*1.2*	180			*0.39*	*1.2*
Mercury	3.4	0.56	0.13	0.024	J		*0.014*	*0.066*	**1.5**	**RLA**		*0.026*	*0.12*	**25.5**	**RLA**		*0.31*	*1.4*	**5.9**	**RLA**		*0.11*	*0.49*
Nickel	2000	160	62.8	10.7			*0.16*	*0.49*	25			*0.15*	*0.46*	22.7			*0.14*	*0.43*	23.3			*0.15*	*0.46*
Potassium	na	na	na	73.3	J		*41.1*	*164*	2370			*38.5*	*154*	627			*36.1*	*144*	2340			*38.7*	*155*
Selenium	510	39	na	0.7			*0.16*	*0.49*	0.77			*0.15*	*0.46*	1.1			*0.14*	*0.43*	0.85			*0.15*	*0.46*
Silver	510	39	na	0.95			*0.049*	*0.16*	1.1			*0.046*	*0.15*	30	RLA		*0.22*	*0.72*	13.5			*0.046*	*0.15*
Sodium	na	na	na	779	J		*41.1*	*822*	210	J		*38.5*	*770*	77.4	J		*36.1*	*722*	153	J		*38.7*	*773*
Thallium	na	na	2.11	0.25	U		*0.082*	*0.25*	0.23	U		*0.077*	*0.23*	0.22	U		*0.072*	*0.22*	0.23	U		*0.077*	*0.23*
Vanadium	7.2	0.55	108	3.3	U		*0.99*	*3.3*	24.4			*0.92*	*3.1*	15.2			*0.87*	*2.9*	24.9			*0.93*	*3.1*
Zinc	31000	2300	202	32.9	U G		*9.9*	*32.9*	40.4			*0.92*	*3.1*	**499**			*0.87*	*2.9*	143			*0.93*	*3.1*

12	J	Shading and black font indicates a i-SL exceedance.
12	J	Bold outline indicates a r-SL exceedance.
12	**J**	Bold, underlined font indicates a Background exceedance.
12	*12*	Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to an HI of 0.1.
The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.
Inorganic results below background UTLs are not indicated as exceedances on the table.
SL/SSL source: ORNL Regional Screening Table. April 2009.
BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.
BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

Table 8
Analytes Detected in Trenching Investigation Soil Samples
SWMU 48, Radford Army Ammunition Plant, Radford VA

Analyte	Sample ID			48TP07					48TP08					48TP08D					48TP09				
	Sample Date			3/18/10					3/18/10					3/18/10					3/18/10				
	Sample Depth			2.35-2.5					3.5-4					3.5-4					5-6				
	i-SL	**r-SL**	**Background**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Explosives (mg/kg)																							
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		*0.01*	*0.25*	0.62			*0.009*	*0.25*	0.14	J PG		*0.01*	*0.25*	0.25	U		*0.01*	*0.25*
1,3-Dinitrobenzene	6.2	0.61	na	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*
2,4,6-Trinitrotoluene	7.9	1.9	na	0.25	U		*0.019*	*0.25*	1.6			*0.019*	*0.25*	0.42			*0.019*	*0.25*	0.25	U		*0.019*	*0.25*
2,4-Dinitrotoluene	120	12	na	0.25	U		*0.005*	*0.25*	0.75			*0.005*	*0.25*	0.32			*0.005*	*0.25*	0.25	U		*0.005*	*0.25*
2,6-Dinitrotoluene	62	6.1	na	0.11	J		*0.007*	*0.25*	0.9			*0.007*	*0.25*	0.27			*0.007*	*0.25*	0.013	J		*0.007*	*0.25*
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		*0.012*	*0.25*	1.7			*0.012*	*0.25*	2.6			*0.012*	*0.25*	0.032	J		*0.012*	*0.25*
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		*0.01*	*0.25*	0.43			*0.009*	*0.25*	0.45			*0.01*	*0.25*	0.25	U		*0.01*	*0.25*
HMX	4900	380	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
Nitroglycerin	6.2	0.61	na	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*
Metals (mg/kg)																							
Aluminum	99000	7700	40041	11300			*7.6*	*27.1*	18100			*7.1*	*25.2*	12200			*6.5*	*23.3*	31200			*7.2*	*25.7*
Antimony	41	3.1	na	1.9			*0.27*	*0.81*	1			*0.25*	*0.76*	0.36	J		*0.23*	*0.7*	0.77	U		*0.26*	*0.77*
Arsenic	1.6	0.39	15.8	6.4			*0.2*	*0.68*	**112**			*0.19*	*0.63*	7.4			*0.17*	*0.58*	2.8			*0.19*	*0.64*
Barium	19000	1500	209	144			*0.14*	*0.41*	96.1			*0.13*	*0.38*	95.8			*0.12*	*0.35*	55.4			*0.13*	*0.39*
Beryllium	200	16	1.02	0.69			*0.014*	*0.14*	0.89			*0.013*	*0.13*	0.83			*0.012*	*0.12*	0.69			*0.013*	*0.13*
Cadmium	81	7	0.69	**2.2**			*0.068*	*0.2*	**1.1**			*0.063*	*0.19*	**0.71**			*0.058*	*0.17*	0.31			*0.064*	*0.19*
Calcium	na	na	na	31300			*33.9*	*136*	18300			*31.6*	*126*	49400			*29.1*	*116*	2370			*32.1*	*128*
Chromium	150000	12000	65.3	32.7			*0.27*	*0.81*	52			*0.25*	*0.76*	23.5			*0.23*	*0.7*	26.7			*0.26*	*0.77*
Cobalt	30	2.3	72.3	4.9			*0.14*	*0.41*	8.5			*0.13*	*0.38*	7.1			*0.12*	*0.35*	4.6			*0.13*	*0.39*
Copper	4100	310	53.5	**98**	**B**		*0.2*	*0.68*	27.5	B		*0.19*	*0.63*	23.4	B		*0.17*	*0.58*	17.1	B		*0.19*	*0.64*
Iron	72000	5500	50962	15600			*4.2*	*13.6*	24600			*3.9*	*12.6*	17100			*3.6*	*11.6*	40400			*4*	*12.8*
Lead	800	400	26.8	**349**	**B**		*0.081*	*0.27*	**105**	**B**		*0.076*	*0.25*	**106**	**B**		*0.07*	*0.23*	26.3	B		*0.077*	*0.26*
Magnesium	na	na	na	5840			*10.2*	*67.8*	5470			*9.5*	*63.1*	14600			*8.7*	*58.2*	1530			*9.6*	*64.2*
Manganese	2300	180	2543	171			*0.34*	*1.1*	456			*0.32*	*1*	356			*0.29*	*0.93*	130			*0.32*	*1*
Mercury	3.4	0.56	0.13	**12.5**	**RLA**		*0.29*	*1.4*	**2.1**	**RLA**		*0.032*	*0.15*	**0.71**			*0.01*	*0.047*	**0.31**			*0.011*	*0.051*
Nickel	2000	160	62.8	16.9			*0.14*	*0.41*	13.4			*0.13*	*0.38*	15.6			*0.12*	*0.35*	15.3			*0.13*	*0.39*
Potassium	na	na	na	962			*33.9*	*136*	973			*31.6*	*126*	1130			*29.1*	*116*	1530			*32.1*	*128*
Selenium	510	39	na	1.2			*0.14*	*0.41*	1.1			*0.13*	*0.38*	0.73			*0.12*	*0.35*	0.72			*0.13*	*0.39*
Silver	510	39	na	16.1	RLA		*0.2*	*0.68*	3.1			*0.038*	*0.13*	1.8			*0.035*	*0.12*	0.49			*0.039*	*0.13*
Sodium	na	na	na	94.4	J		*33.9*	*678*	46.8	J		*31.6*	*631*	80.2	J		*29.1*	*582*	642	U		*32.1*	*642*
Thallium	na	na	2.11	0.12	J		*0.068*	*0.2*	1.3			*0.063*	*0.19*	0.11	J		*0.058*	*0.17*	0.21			*0.064*	*0.19*
Vanadium	7.2	0.55	108	24.4			*0.81*	*2.7*	37.2			*0.76*	*2.5*	33.5			*0.7*	*2.3*	77.6			*0.77*	*2.6*
Zinc	31000	2300	202	**209**			*0.81*	*2.7*	158			*0.76*	*2.5*	170			*0.7*	*2.3*	45.1			*0.77*	*2.6*

Table 8
Analytes Detected in Trenching Investigation Soil Samples
SWMU 48, Radford Army Ammunition Plant, Radford VA

Analyte	Sample ID / Sample Date / Sample Depth			48TP11 3/18/10 1-2					48TP12 3/18/10 1-2					48TP13 3/18/10 3-4					48TP14 3/18/10 2-3				
	i-SL	**r-SL**	**Background**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Explosives (mg/kg)																							
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	1.3	U		*0.05*	*1.3*
1,3-Dinitrobenzene	6.2	0.61	na	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	1.3	U		*0.021*	*1.3*
2,4,6-Trinitrotoluene	7.9	1.9	na	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*	1.3	U		*0.097*	*1.3*
2,4-Dinitrotoluene	120	12	na	0.25	U		*0.005*	*0.25*	0.25	U		*0.005*	*0.25*	0.25	U		*0.005*	*0.25*	6.9	V		*0.027*	*1.3*
2,6-Dinitrotoluene	62	6.1	na	0.25	U		*0.007*	*0.25*	0.3	PG		*0.007*	*0.25*	0.25	U		*0.007*	*0.25*	2.7			*0.037*	*1.3*
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	1.3	U		*0.063*	*1.3*
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		*0.009*	*0.25*	0.13	J		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	1.3	U		*0.05*	*1.3*
HMX	4900	380	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	1.3	U		*0.061*	*1.3*
Nitroglycerin	6.2	0.61	na	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	2.5	U		*0.075*	*2.5*
Metals (mg/kg)																							
Aluminum	99000	7700	40041	35000			*7.3*	*26.1*	8620			*7.3*	*25.9*	29900			*6.5*	*23.1*	11000			*10.1*	*36*
Antimony	41	3.1	na	0.78	U		*0.26*	*0.78*	0.78	U		*0.26*	*0.78*	0.69	U		*0.23*	*0.69*	0.81	J		*0.36*	*1.1*
Arsenic	1.6	0.39	15.8	4			*0.2*	*0.65*	3.7			*0.19*	*0.65*	3			*0.17*	*0.58*	3.4			*0.27*	*0.9*
Barium	19000	1500	209	67.3			*0.13*	*0.39*	41.1			*0.13*	*0.39*	62.5			*0.12*	*0.35*	78.7			*0.18*	*0.54*
Beryllium	200	16	1.02	0.71			*0.013*	*0.13*	0.43			*0.013*	*0.13*	0.68			*0.012*	*0.12*	0.74			*0.018*	*0.18*
Cadmium	81	7	0.69	0.37			*0.065*	*0.2*	0.19			*0.065*	*0.19*	0.3			*0.058*	*0.17*	0.57			*0.09*	*0.27*
Calcium	na	na	na	169			*32.6*	*130*	3570			*32.4*	*130*	165			*28.9*	*116*	78300			*45.1*	*180*
Chromium	150000	12000	65.3	26.7			*0.26*	*0.78*	22.9			*0.26*	*0.78*	21.5			*0.23*	*0.69*	**68.3**			*0.36*	*1.1*
Cobalt	30	2.3	72.3	14.8			*0.13*	*0.39*	6			*0.13*	*0.39*	21			*0.12*	*0.35*	5.4			*0.18*	*0.54*
Copper	4100	310	53.5	15.6	B		*0.2*	*0.65*	5.1			*0.19*	*0.65*	14	B		*0.17*	*0.58*	**83.5**	**B**		*0.27*	*0.9*
Iron	72000	5500	50962	46100			*4*	*13*	17400			*4*	*13*	38900			*3.6*	*11.6*	14300			*5.6*	*18*
Lead	800	400	26.8	15.5	B		*0.078*	*0.26*	17.6	B		*0.078*	*0.26*	18.2	B		*0.069*	*0.23*	**257**	**B**		*0.11*	*0.36*
Magnesium	na	na	na	1350			*9.8*	*65.1*	807			*9.7*	*64.8*	1360			*8.7*	*57.8*	3980			*13.5*	*90.1*
Manganese	2300	180	2543	429			*0.33*	*1*	327			*0.32*	*1*	944			*0.29*	*0.92*	237			*0.45*	*1.4*
Mercury	3.4	0.56	0.13	**0.15**			*0.011*	*0.052*	0.078			*0.011*	*0.052*	**0.16**			*0.009*	*0.046*	**0.21**			*0.015*	*0.072*
Nickel	2000	160	62.8	16.7			*0.13*	*0.39*	5.3			*0.13*	*0.39*	15.4			*0.12*	*0.35*	55.4			*0.18*	*0.54*
Potassium	na	na	na	1310			*32.6*	*130*	532			*32.4*	*130*	1290			*28.9*	*116*	675			*45.1*	*180*
Selenium	510	39	na	0.51			*0.13*	*0.39*	0.64			*0.13*	*0.39*	0.49			*0.12*	*0.35*	0.74			*0.18*	*0.54*
Silver	510	39	na	0.097	J		*0.039*	*0.13*	0.049	J		*0.039*	*0.13*	0.093	J		*0.035*	*0.12*	0.27			*0.054*	*0.18*
Sodium	na	na	na	163	J		*32.6*	*651*	203	J		*32.4*	*648*	109	J		*28.9*	*578*	99.6	J		*45.1*	*901*
Thallium	na	na	2.11	0.32			*0.065*	*0.2*	0.12	J		*0.065*	*0.19*	0.26			*0.058*	*0.17*	0.27	U		*0.09*	*0.27*
Vanadium	7.2	0.55	108	82.3			*0.78*	*2.6*	34.7			*0.78*	*2.6*	74.4			*0.69*	*2.3*	19.2			*1.1*	*3.6*
Zinc	31000	2300	202	45.9			*0.78*	*2.6*	20.1			*0.78*	*2.6*	40.9			*0.69*	*2.3*	66.7			*1.1*	*3.6*

Table 8
Analytes Detected in Trenching Investigation Soil Samples
SWMU 48, Radford Army Ammunition Plant, Radford VA

Analyte	Sample ID / Sample Date / Sample Depth			48TP14D 3/18/10 2-3					48TP15 3/18/10 8-9					48TP16 3/18/10 1-2					48TP17 3/18/10 4-5				
	i-SL	**r-SL**	**Background**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Explosives (mg/kg)																							
1,3,5-Trinitrobenzene	2700	220	na	1.2	U		*0.049*	*1.2*	0.25	U		*0.01*	*0.25*	0.25	U		*0.01*	*0.25*	0.25	U		*0.009*	*0.25*
1,3-Dinitrobenzene	6.2	0.61	na	1.2	U		*0.02*	*1.2*	0.073	J PG		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*
2,4,6-Trinitrotoluene	7.9	1.9	na	1.2	U		*0.094*	*1.2*	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*
2,4-Dinitrotoluene	120	12	na	5.3	V		*0.026*	*1.2*	0.25	U		*0.005*	*0.25*	0.25	U		*0.005*	*0.25*	0.078	J		*0.005*	*0.25*
2,6-Dinitrotoluene	62	6.1	na	2.8			*0.036*	*1.2*	0.25	U		*0.007*	*0.25*	0.25	U		*0.007*	*0.25*	0.04	J		*0.007*	*0.25*
2-amino-4,6-Dinitrotoluene	200	15	na	1.2	U		*0.061*	*1.2*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
4-amino-2,6-Dinitrotoluene	190	15	na	1.2	U		*0.049*	*1.2*	0.25	U		*0.01*	*0.25*	0.25	U		*0.01*	*0.25*	0.25	U		*0.009*	*0.25*
HMX	4900	380	na	1.2	U		*0.059*	*1.2*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
Nitroglycerin	6.2	0.61	na	2.4	U		*0.073*	*2.4*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*
Metals (mg/kg)																							
Aluminum	99000	7700	40041	13000			*9.5*	*33.9*	7590			*11.8*	*42.2*	16000			*6.6*	*23.5*	13300			*6.6*	*23.6*
Antimony	41	3.1	na	0.92	J		*0.34*	*1*	1.3	U		*0.42*	*1.3*	0.71	U		*0.24*	*0.71*	0.71	U		*0.24*	*0.71*
Arsenic	1.6	0.39	15.8	3.7			*0.25*	*0.85*	14			*0.32*	*1.1*	2.8			*0.18*	*0.59*	2.8			*0.18*	*0.59*
Barium	19000	1500	209	57			*0.17*	*0.51*	76.8			*0.21*	*0.63*	70.2			*0.12*	*0.35*	110			*0.12*	*0.35*
Beryllium	200	16	1.02	0.64			*0.017*	*0.17*	0.48			*0.021*	*0.21*	0.51			*0.012*	*0.12*	0.61			*0.012*	*0.12*
Cadmium	81	7	0.69	0.59			*0.085*	*0.25*	0.56			*0.11*	*0.32*	0.18			*0.059*	*0.18*	0.16	J		*0.059*	*0.18*
Calcium	na	na	na	95300			*42.4*	*169*	14400			*52.8*	*211*	502			*29.4*	*118*	590			*29.5*	*118*
Chromium	150000	12000	65.3	**75.7**			*0.34*	*1*	19.4			*0.42*	*1.3*	23.7			*0.24*	*0.71*	18.9			*0.24*	*0.71*
Cobalt	30	2.3	72.3	4.7			*0.17*	*0.51*	6.6			*0.21*	*0.63*	5.7			*0.12*	*0.35*	6.4			*0.12*	*0.35*
Copper	4100	310	53.5	**100**	**B**		*0.25*	*0.85*	18			*0.32*	*1.1*	7.6			*0.18*	*0.59*	8.8			*0.18*	*0.59*
Iron	72000	5500	50962	19300			*5.3*	*16.9*	18500			*6.5*	*21.1*	18400			*3.6*	*11.8*	14800			*3.7*	*11.8*
Lead	800	400	26.8	**305**	**B**		*0.1*	*0.34*	**51.3**	**B**		*0.13*	*0.42*	16.7	B		*0.071*	*0.24*	22.8	B		*0.071*	*0.24*
Magnesium	na	na	na	3860			*12.7*	*84.7*	2220			*15.8*	*106*	636			*8.8*	*58.9*	560			*8.8*	*59*
Manganese	2300	180	2543	202			*0.42*	*1.4*	510			*0.53*	*1.7*	504			*0.29*	*0.94*	1250	RLA		*2.9*	*9.4*
Mercury	3.4	0.56	0.13	**0.24**			*0.015*	*0.068*	**0.43**			*0.018*	*0.084*	0.086			*0.01*	*0.047*	0.071			*0.01*	*0.047*
Nickel	2000	160	62.8	59.6			*0.17*	*0.51*	13.2			*0.21*	*0.63*	9.9			*0.12*	*0.35*	8.4			*0.12*	*0.35*
Potassium	na	na	na	1120			*42.4*	*169*	431			*52.8*	*211*	834			*29.4*	*118*	751			*29.5*	*118*
Selenium	510	39	na	0.73			*0.17*	*0.51*	1.2			*0.21*	*0.63*	0.66			*0.12*	*0.35*	0.89			*0.12*	*0.35*
Silver	510	39	na	0.19			*0.051*	*0.17*	0.073	J		*0.063*	*0.21*	0.043	J		*0.035*	*0.12*	0.037	J		*0.035*	*0.12*
Sodium	na	na	na	85.9	J		*42.4*	*847*	332	J		*52.8*	*1060*	589	U		*29.4*	*589*	590	U		*29.5*	*590*
Thallium	na	na	2.11	0.25	U		*0.085*	*0.25*	0.55			*0.11*	*0.32*	0.15	J		*0.059*	*0.18*	0.13	J		*0.059*	*0.18*
Vanadium	7.2	0.55	108	15.9			*1*	*3.4*	33.9			*1.3*	*4.2*	47.8			*0.71*	*2.4*	28.8			*0.71*	*2.4*
Zinc	31000	2300	202	60.6			*1*	*3.4*	21.7			*1.3*	*4.2*	33.1			*0.71*	*2.4*	26.8			*0.71*	*2.4*

Table 8
Analytes Detected in Trenching Investigation Soil Samples
SWMU 48, Radford Army Ammunition Plant, Radford VA

Analyte	Sample ID			48TP18					48TP20					48TP21					48TP22				
	Sample Date			3/18/10					3/18/10					3/18/10					3/18/10				
	Sample Depth			6-7					1-2					3-4					5-6				
	i-SL	**r-SL**	**Background**	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Explosives (mg/kg)																							
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*
1,3-Dinitrobenzene	6.2	0.61	na	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*	0.25	U		*0.004*	*0.25*
2,4,6-Trinitrotoluene	7.9	1.9	na	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*	0.25	U		*0.019*	*0.25*
2,4-Dinitrotoluene	120	12	na	0.15	J		*0.005*	*0.25*	0.25	U		*0.005*	*0.25*	0.25	U		*0.005*	*0.25*	0.25	U		*0.005*	*0.25*
2,6-Dinitrotoluene	62	6.1	na	0.16	J PG		*0.007*	*0.25*	0.25	U		*0.007*	*0.25*	0.25	U		*0.007*	*0.25*	0.25	U		*0.007*	*0.25*
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*	0.25	U		*0.009*	*0.25*
HMX	4900	380	na	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*	0.25	U		*0.012*	*0.25*
Nitroglycerin	6.2	0.61	na	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*	0.5	U		*0.015*	*0.5*
Metals (mg/kg)																							
Aluminum	99000	7700	40041	26600			*7*	*25*	27500			*6.9*	*24.8*	36500			*7.4*	*26.4*	28000			*7.1*	*25.3*
Antimony	41	3.1	na	0.75	U		*0.25*	*0.75*	0.74	U		*0.25*	*0.74*	0.79	U		*0.26*	*0.79*	0.76	U		*0.25*	*0.76*
Arsenic	1.6	0.39	15.8	1.8			*0.19*	*0.62*	4.1			*0.19*	*0.62*	4.1			*0.2*	*0.66*	2.3			*0.19*	*0.63*
Barium	19000	1500	209	47.1			*0.12*	*0.37*	63.9			*0.12*	*0.37*	53.8			*0.13*	*0.4*	46.2			*0.13*	*0.38*
Beryllium	200	16	1.02	0.54			*0.012*	*0.12*	0.41			*0.012*	*0.12*	0.5			*0.013*	*0.13*	0.55			*0.013*	*0.13*
Cadmium	81	7	0.69	0.21			*0.062*	*0.19*	0.3			*0.062*	*0.19*	0.26			*0.066*	*0.2*	0.24			*0.063*	*0.19*
Calcium	na	na	na	1480			*31.2*	*125*	361			*31*	*124*	307			*33*	*132*	124	J		*31.6*	*126*
Chromium	150000	12000	65.3	17.9			*0.25*	*0.75*	28.6			*0.25*	*0.74*	35			*0.26*	*0.79*	20.4			*0.25*	*0.76*
Cobalt	30	2.3	72.3	4.4			*0.12*	*0.37*	18.9			*0.12*	*0.37*	4.5			*0.13*	*0.4*	9.6			*0.13*	*0.38*
Copper	4100	310	53.5	12.9			*0.19*	*0.62*	11.4			*0.19*	*0.62*	13.8	B		*0.2*	*0.66*	15.3	B		*0.19*	*0.63*
Iron	72000	5500	50962	32000			*3.9*	*12.5*	32800			*3.8*	*12.4*	44700			*4.1*	*13.2*	35300			*3.9*	*12.6*
Lead	800	400	26.8	14.1	B		*0.075*	*0.25*	**34.5**	**B**		*0.074*	*0.25*	14.7	B		*0.079*	*0.26*	20	B		*0.076*	*0.25*
Magnesium	na	na	na	1210			*9.4*	*62.5*	909			*9.3*	*62*	928			*9.9*	*66.1*	1190			*9.5*	*63.2*
Manganese	2300	180	2543	167			*0.31*	*1*	689			*0.31*	*0.99*	124			*0.33*	*1.1*	280			*0.32*	*1*
Mercury	3.4	0.56	0.13	0.052			*0.011*	*0.05*	**0.36**			*0.011*	*0.05*	**0.24**			*0.011*	*0.053*	0.096			*0.011*	*0.051*
Nickel	2000	160	62.8	11.6			*0.12*	*0.37*	10.3			*0.12*	*0.37*	13.3			*0.13*	*0.4*	12.6			*0.13*	*0.38*
Potassium	na	na	na	1440			*31.2*	*125*	766			*31*	*124*	1070			*33*	*132*	1300			*31.6*	*126*
Selenium	510	39	na	0.47			*0.12*	*0.37*	0.7			*0.12*	*0.37*	0.79			*0.13*	*0.4*	0.52			*0.13*	*0.38*
Silver	510	39	na	0.068	J		*0.037*	*0.12*	0.09	J		*0.037*	*0.12*	0.07	J		*0.04*	*0.13*	0.063	J		*0.038*	*0.13*
Sodium	na	na	na	625	U		*31.2*	*625*	620	U		*31*	*620*	37.5	J		*33*	*661*	632	U		*31.6*	*632*
Thallium	na	na	2.11	0.14	J		*0.062*	*0.19*	0.57			*0.062*	*0.19*	0.3			*0.066*	*0.2*	0.2			*0.063*	*0.19*
Vanadium	7.2	0.55	108	62			*0.75*	*2.5*	65.9			*0.74*	*2.5*	85.9			*0.79*	*2.6*	67			*0.76*	*2.5*
Zinc	31000	2300	202	33			*0.75*	*2.5*	38.8			*0.74*	*2.5*	41.4			*0.79*	*2.6*	35.8			*0.76*	*2.5*

Table 9
Summary of Detected Analytes - Trenching Investigation Soil Samples
SWMU 48, Radford Army Ammunition Plant, Radford VA

	i-SL	r-SL	Background	# of i-SL Exceedances	# of r-SL Exceedances	# of Background Exceedances	# of Detections	# of Samples	Minimum Concentration	Maximum Concentration	Location of Maximum
Explosives (mg/kg)											
1,3,5-Trinitrobenzene	2700	220	na	0	0	na	3	20	0.13	0.62	48TP08
1,3-Dinitrobenzene	6.2	0.61	na	0	0	na	1	20	0.073	0.073	48TP15
2,4,6-Trinitrotoluene	7.9	1.9	na	0	0	na	4	20	0.056	1.6	48TP08
2,4-Dinitrotoluene	120	12	na	0	0	na	10	20	0.022	6.9	48TP14
2,6-Dinitrotoluene	62	6.1	na	0	0	na	12	20	0.013	2.8	48TP14D
2-amino-4,6-Dinitrotoluene	200	15	na	0	0	na	3	20	0.032	2.6	48TP08D
4-amino-2,6-Dinitrotoluene	190	15	na	0	0	na	6	20	0.01	0.45	48TP08D
HMX	4900	380	na	0	0	na	1	20	0.025	0.025	48TP04-RFI
Nitroglycerin	6.2	0.61	na	0	1	na	3	20	0.051	1.2	48TP04-RFI
Metals (mg/kg)											
Aluminum	99000	7700	40041	0	0	0	20	20	96.9	36500	48TP21
Antimony	41	3.1	na	0	1	na	8	20	0.36	3.2	48TP04-RFI
Arsenic	1.6	0.39	15.8	1	1	1	19	20	1.8	112	48TP08
Barium	19000	1500	209	0	0	0	20	20	0.96	199	48TP04-RFI
Beryllium	200	16	1.02	0	0	0	19	20	0.41	0.91	48TP05
Cadmium	81	7	0.69	0	1	7	20	20	0.16	9.2	48TP02-RFI
Calcium	na	na	na	na	na	na	20	20	124	221000	48TP03-RFI
Chromium	150000	12000	65.3	0	0	2	20	20	2.7	75.7	48TP14D
Cobalt	30	2.3	72.3	0	0	0	20	20	4.4	21	48TP13
Copper	4100	310	53.5	1	1	6	20	20	5.1	81800	48TP02-RFI
Iron	72000	5500	50962	0	0	0	20	20	118	46100	48TP11
Lead	800	400	26.8	1	3	11	20	20	14.1	114000	48TP02-RFI
Magnesium	na	na	na	na	na	na	20	20	382	17400	48TP03-RFI
Manganese	2300	180	2543	0	0	0	20	20	11.3	1250	48TP17
Mercury	3.4	0.56	0.13	3	6	14	20	20	0.024	25.5	48TP04-RFI
Nickel	2000	160	62.8	0	0	0	20	20	5.3	59.6	48TP14D
Potassium	na	na	na	na	na	na	20	20	73.3	2370	48TP03-RFI
Selenium	510	39	na	0	0	na	20	20	0.47	1.2	48TP07
Silver	510	39	na	0	0	na	20	20	0.037	30	48TP04-RFI
Sodium	na	na	na	na	na	na	14	20	37.5	779	48TP02-RFI
Thallium	na	na	2.11	na	na	0	14	20	0.11	1.3	48TP08
Vanadium	7.2	0.55	108	0	0	0	19	20	15.2	85.9	48TP21
Zinc	31000	2300	202	0	0	2	19	20	20.1	499	48TP04-RFI

Table 10
SWMU 48 TCLP Results

Analyte	TCLP RL	Sample ID		
		48TP06	48TP10	48TP19
TCLP SVOCs (ug/L)				
TCLP 2,4-Dinitrotoluene	130	< 0.05	< 0.05	< 0.05
TCLP Hexachlorobenzene	130	< 0.05	< 0.05	< 0.05
TCLP Hexachlorobutadiene	500	< 0.05	< 0.05	< 0.05
TCLP Hexachloroethane	3000	< 0.05	< 0.05	< 0.05
TCLP 2-Methylphenol	200000	< 0.05	< 0.05	< 0.05
TCLP Nitrobenzene	2000	< 0.05	< 0.05	< 0.05
TCLP Pentachlorophenol	100000	< 0.25	< 0.25	< 0.25
TCLP Pyridine	5000	< 0.1	< 0.1	< 0.1
TCLP 2,4,5-Trichlorophenol	400000	< 0.05	< 0.05	< 0.05
TCLP 2,4,6-Trichlorophenol	2000	< 0.05	< 0.05	< 0.05
TCLP 3-Methylphenol & 4-Methylphenol	200000	< 0.05	< 0.05	< 0.05
TCLP 1,4-Dichlorobenzene	7500000	< 0.05	< 0.05	< 0.05
TCLP Metals (mg/L)				
TCLP Arsenic	5	< 1.0	< 1.0	< 1.0
TCLP Lead	5	< 0.5	**0.018**	< 0.5
TCLP Barium	100	**0.35**	**0.70**	**1.1**
TCLP Mercury	0.2	**0.0020**	**0.0015**	**0.0020**
TCLP Selenium	1	< 0.20	< 0.20	< 0.20
TCLP Silver	5	< 0.10	< 0.10	< 0.10
TCLP Chromium	5	< 0.10	< 0.10	< 0.10
TCLP Cadmium	1	< 0.050	< 0.050	< 0.050
Misc				
pH (pH units)	<2 or >12	**12.4**	**10.3**	**8.7**
Cyanide, Total (mg/kg)	na	**0.70**	**0.69**	**0.63**

Notes: Detections are shown in bold.
Highlighted cells indicate a value greater than the TCLP Regulatory Limit (RL)

3.4 IDM Disposal

During excavation of the test pits, shallow soil (less than 6 ft) was placed to the side of the excavation in an enclosure constructed from silt fencing. Soil below 6 ft in depth, and any soil containing ash, was excavated and directly loaded into drums that were transported to the RFAAP 90-day accumulation storage area. The green, clayey substance found in paper drums wrapped in plastic bags was also drummed. A composite sample was collected from the drummed material and sent to an offsite laboratory for TCLP analysis. Based on those results, the material was disposed of as hazardous waste due to the leachable lead levels from the green material. Drums were clearly labeled with the project information, drum contents, and date of generation prior to storage at the 90 day accumulation area. As discussed in *Section 3.1*, less than 1 yd^3 of IDM was generated. The drums were disposed of at EQ's Belleville, Michigan Disposal Facility.

3.5 Conclusions

Shaw conducted test pits and additional sampling at SWMU 48 to re-characterize the trenches and ash layer based on regulatory concerns about the extent of the ash layer and an elevated TNT result (970 mg/kg) from the 1998 investigation. The results of the test pitting demonstrated that the ash layer is present for much of the length of the trench. However, the elevated TNT level found in 1998 was an anomalous result that could not be replicated. Twenty additional samples were analyzed for explosives, and the highest concentration of TNT was 1.6 mg/kg (**Table 9**). Based on these results, a removal action based on the explosives concentrations in the ash layer does not appear warranted.

4.0 REFERENCES

Dames and Moore, 1992. *Final Draft VI Report for the Radford Army Ammunition Plant, Virginia*. Prepared for the U.S. Army Toxic and Hazardous Materials Agency.

Shaw Environmental, Inc (Shaw), 2007. *Radford Army Ammunition Plant. Master Work Plan Addendum 019.* Final. July.

Shaw Environmental and Infrastructure, (Shaw), 2008. *SWMU 51 Interim Measures Work Plan. Radford Army Ammunition Plant, Radford VA.* Final document. October 2008. Contract No. W912QR-04-D-0027, Delivery Order DA0101.

URS, 2003. *Radford Army Ammunition Plant, Radford, Virginia Final Master Work Plan, Quality Assurance Plan, and Health and Safety Plan.* Final document. August 2003. Delivery Order No. 0008, Contract No. DACA31–00–D–0011.

U.S. Environmental Protection Agency (USEPA), 1992. *Installation Assessment: Radford Army Ammunition Plant, Radford, Virginia.* U.S. Environmental Protection Agency, Office of Research and Development. TS-PIC-92372. June 1992.

Appendix A
Activity Hazard Analysis

Table 8-1. Activity Hazard Analysis – Soil Removal
b. Soil Removal

Activity: Soil Removal **Analyzed by/date: ____**
Reviewed by/date: ____ (/ /) **Approved by/date: ____ (/ /)**

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
• Excavate soil and direct load into dump trucks • Collect waste characterization samples ***Stop work and notify your supervisor if you are not sure how to perform your task!***	**Physical Hazards**	
	General heavy equipment hazards	Safety training, personal awareness, and safety devices Maintain a safe equipment distance exclusion zone Use hand signals See *Section 8.3.2.1* for general heavy equipment controls
	Power and hand tools hazard	See *Section 8.3.2.2* for power and hand tool controls
	Electrical shock	Locate and shut down all utilities in work zone, obtain dig permit, watch out for overhead power lines, use GFCI on all temporary electrical devices
	Noise	Use hearing protection if noise exceeds 85 dBA, see *Section 8.3.2.8*
	Cold or heat stress	Wear appropriate clothing and follow recommended work schedules and monitoring controls as stated in *Sections 8.3.2.6 or 8.3.2.7*
	Manual lifting	Use proper lifting techniques as discussed in See *Section 8.3.2.10*
	Slip, trip, and fall hazards	Safety training and personal and situational awareness, see *Section 8.3.2.11*.
	Electrical storm	Shut down operations, follow the 30/30 rule, see *Section 8.3.2.12*
	Chemical Hazards	
	Exposure to contaminants in soil, primarily explosives.	Minimize dust generation, wash hands and face, see *Section 8.3.3* for chemical hazard controls Modified Level D PPE will be required, see Section 8.6
	Cross Contamination	Avoid spillage from excavator bucket, utilize plastic sheeting where spillage may occur
	Biological Hazards	
	Ticks	Tape pant legs to boots, avoid tall grass and bushes if possible, check for ticks frequently, see *Section 8.3.4.1*
	Stinging insects	Watch out for and avoid stinging insects, see *Section 8.3.4.2*
	Spiders	Watch out for and avoid black widow and brown recluse spiders, see *Section 8.3.4.3*
	Poisonous Plants ***Stop work and notify your supervisor if you are not sure how to perform your task!***	Watch out for and avoid poisonous plants, avoid contact with plant oils that may be present on clothes or equipment, wash hands to prevent spreading oils, see *Section 8.3.4.6* ***Stop work and notify your supervisor if you are not sure how to perform your task!***
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Excavator, shovels	Daily inspection and maintenance of equipment	All site workers must have OSHA Training in accordance with 29 CFR 1910.120 All site workers must attend the Daily Safety Meetings Hazard Communication for all site workers Appropriate heavy equipment and/or power tools training

* See SWMU 51 IMWP (Shaw, 2008)

Physical Hazards

This section discusses specific physical hazards that may be encountered at RFAAP during the removal actions. If additional hazards other than the ones listed in this section are encountered, this SSHP will be revised to address these hazards.

Heavy Equipment

Tests shall be made at the beginning of each day during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition and that all required safety devices are in place. Whenever any machinery or equipment is found to be unsafe or a deficiency which affects the safe operation of equipment is observed, the equipment shall be immediately taken out of service and shall not be used until all of the unsafe conditions are corrected. Machinery and mechanized equipment shall be operated by designated qualified personnel. Equipment safety requirements must be in accordance with 29 CFR 1926 and EM 385-1-1, Section 16 and the guidelines listed below:

- Operation of heavy equipment will be limited to properly trained personnel.
- Operator's certifications, qualification letters, and necessary SOPs will be maintained on site.
- Operator shall use the safety devices provided with the equipment (i.e., seatbelts, backup warning indicators, and horns).
- Visually inspect equipment daily, prior to operation, and report any deficiencies. Document observations.
- Good housekeeping practices will be maintained in the cab area of heavy equipment.
- Additional riders shall not be allowed on equipment, unless it is specifically designed for that purpose.

As presented in **Appendix E**, Shaw Procedure HS810, Commercial Motor Vehicle Operation and Maintenance, will be implemented.

Power and Hand Tools

By their very nature, power tools have great capability for inflicting serious injury upon site personnel if they are not used and maintained properly. Use of improper or defective tools can contribute significantly to the occurrence of accidents on site. To control the hazards associated with power and hand tool operation, the requirements outlined in EM 385-1-1 and the safe work practices listed below shall be observed when using these tools:

- Operation/use will be conducted by authorized and experienced personnel.
- Tools will be inspected prior to use, and defective equipment will be removed from service until repaired.
- Tools will be selected and used in the manner for which they were designed and in accordance with manufacturer's recommendations.
- Be sure of footing and grip before using any tool.
- Power tools designed to accommodate guards will have such guards properly in place prior to use.
- Do not use tools that have split handles, mushroom heads, and worn parts.
- Safety glasses or a face shield will be used if use of tools presents an eye or face hazard.
- Do not use makeshift tools or other improper tools.
- Use non-sparking tools in the presence of explosive vapors, gases, or residue.
- Loose-fitting clothing or long hair will not be permitted around moving parts.
- Hands, feet, etc. will be kept away from moving parts.

- Maintenance and adjustments to equipment will not be made while equipment is in operation. Power will be disconnected prior to maintenance.
- An adequate operating area will be provided, allowing sufficient clearance and access for operation.
- Proper PPE in accordance with equipment operating manual will be used (i.e., chainsaw chaps, leather gloves, hard hats, hearing protection, shin guards, face shield, safety glasses, etc.).

Excavations and Trenching

Excavation activities will be conducted in accordance with EM 385-1-1, Section 25 and Subpart P of 29 CFR 1926. As presented in **Appendix E**, Shaw Procedure HS307, Excavation and Trenching, will be implemented during excavation and trenching operations. The guidelines below are intended to reflect minimum requirements to be followed on this site:

- Prior to initiation of any excavation or trenching activity, the location of underground installations will be determined in accordance with Shaw Procedure HS308.
- The excavation(s) will be inspected and documented daily by the SSHO or by the Competent Excavation and Trenching person prior to commencement of work activities.
- Evidence of cave-ins, slides, sloughing, or surface cracks will be cause for work to cease until necessary precautions are taken to safeguard workers.
- Excavations 5 ft or deeper where employees must enter and cannot be sloped will require a registered civil engineer to design a protective system.
- Protective systems shall be selected from OSHA 29 CFR 1926 Subpart P and/or designed by a registered professional civil engineer.
- Spoils and other materials will be placed 2 ft or more from the edge of the excavation.
- Materials used for sheeting, shoring, or bracing will be in good condition.
- Timbers will be sound, free of large or loose knots, and of appropriate dimensions for the excavation.
- Safe access will be provided into the excavation(s) by means of a gradually sloped personnel access/egress ramp or ladders.
- Excavations 4 ft or more in depth will have a means of egress at a frequency such that lateral travel to the egress point does not exceed 25 ft.

Manual Lifting

Investigation and IM activities may require personnel to move large, heavy objects by hand. The human body is subject to severe damage in the forms of back injury and hernia if caution is not observed when handling, lifting, or moving these large, heavy objects.

The following fundamentals should be followed while manual lifting objects:

- The size, shape, and weight of the object to be lifted must be considered. Site personnel will not lift more than they can handle comfortably. No individual employee is permitted to lift any object that weighs over 60 pounds. Multiple employees or the use of mechanical lifting devices are required for objects over the 60-pound limit.
- A firm grip on the object is essential; therefore, the hands and objects shall be free of oil, grease, and water.
- The hands and fingers shall be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.
- The item shall be inspected for metal slivers, jagged edges, burrs, and pinch points, and gloves shall be used to protect the hands.

- The feet will be placed far enough apart for good balance and stability.
- Personnel will ensure that solid footing is available prior to lifting the object.
- To lift the object, the legs are straightened from their bending position.
- Never carry a load that you cannot see around.
- When placing an object down, the stance and position are identical to that for lifting.
- If needed, back support devices will be provided to aid in preventing back injury.

The following steps will be followed during manual lifting:

- Ensure the route on which you will carry the object is clear and free from trip hazards.
- Get a good footing.
- Place feet about one shoulder-width apart.
- Bend at knees to grasp weight.
- Keep the back straight.
- Get a firm hold.
- Lift gradually by straightening the legs.
- If weight is uncomfortable to lift, get help.

Slips, Trips, Falls

Field operations may place personnel in situations where they may be exposed to slip, trip, and fall hazards. Slipping hazards will exist when the ground is wet, or on steep slopes. Tripping hazards will exist on rough, uneven terrain, or if the work area is cluttered with tools, equipment, debris, soil piles, etc. Falling hazards will exist as a result of slip or trip hazards, or in elevated work areas with inadequate railing.

The following precautions should be followed by all site personnel:

- Field personnel shall become familiar with the general terrain of the site and potential physical hazards (i.e., rocky conditions, uneven terrain) that would be associated with accidental slips, trips, and falls.
- Be cautious after periods of heavy rainfall, which may cause earth movement and slides.
- Be attentive where you walk since pits, holes, or similar hazards may be partially covered or visually obstructed.
- Be cautious around soil or terrain which recently may have been disturbed, relocated, or otherwise made less stable.
- Avoid the top edges of drop-off areas whether they have been disturbed or not.
- Use the three-point rule when getting on and off heavy equipment.

Chemical Hazards

This section discusses chemical hazards that may be encountered at RFAAP during the IM at SWMU 51. Chemical hazards can be encountered either from chemicals brought on site by the contractor for use during activities, chemicals stored at the site, or chemicals that have been released to the environment and are present in various media such as air, soil, or water.

Site-Related Chemicals

1,3 DNB, 2,4 DNT, 2,6 DNT, NG, 2- and 4-NT, 2,4,6-TNT, dioxins/furans, aluminum, and lead were identified equal to or above the calculated RGs of 100, 60.5, 14, 10000, 310, 43, .0125, 40041, and 400 mg/kg, respectively, during the RFI investigation at SWMU 51 (Shaw, 2008) as presented on **Figure 2-2**.

Exposure Pathways

Chemicals may pose a hazard to humans when inhaled, ingested, or through dermal absorption. Inhalation can occur when chemicals are present as vapors, aerosols, or attached to airborne dust particles. Ingestion usually occurs incidentally, as chemicals present in the air enter the mouth or nose, or from hand to mouth activities such as eating, drinking, and smoking. Dermal absorption occurs when chemicals contact unprotected skin.

Exposure Assessment

The toxic hazards to site personnel associated with chemicals can be assessed through comparison of actual exposures with several established occupational exposure limits using quantitative collection and analysis through real-time and/or time-integrated personal air sampling.

Permissible Exposure Limits (PELs) are established by OSHA. TLVs are established by ACGIH. Immediately Dangerous to Life or Health (IDLH) values are established by NIOSH. **Table 8-6** presents occupational exposure limits (if available) for potential chemicals, including OSHA PELs, ACGIH TLVs, and NIOSH IDLH values. The table also indicates if there are potential significant contributions to the overall exposure for the chemical of concern through dermal contact, and identifies the acute symptoms resulting from exposure.

The occupational exposure limits are described as follows:

PELs may be expressed as an 8-hour Time-Weighted Average (TWA), a Short-Term Exposure Limit (STEL), or a ceiling limit. Ceiling limits may not be exceeded at any time. PELs are enforceable by law. STELs are allowable exposure limits for durations ranging from 5 to 15 minutes, without causing the 8-hour TWA to be exceeded.

The ACGIH TLV is defined as the TWA concentrations for a substance to which nearly all workers (8 hours/day, 40 hours/week) may be repeatedly exposed, day after day, without experiencing adverse health effects. For some substances, the overall exposure to a substance is enhanced by skin, mucous membrane, or eye contact. These substances are identified by “yes” in the skin notation column.

The IDLH values represent the maximum concentrations from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing symptoms or any irreversible health effects.

Table Error! No text of specified style in document.**-1**
Occupational Health Exposure Guidelines for Potential Contaminants

Contaminant	Acute Symptoms of Exposure	PEL (TWA unless otherwise noted)	TLV-TWA	Skin Notation (Yes/No)	IDLH
1,3-DNB	Anoxia, cyanosis; visual disturbance, central scotomas; bad taste, burning mouth, dry throat, thirst; yellowing hair, eyes, skin; anemia; liver damage	1 mg/m^3	1 mg/m^3	Y	50 mg/m^3
2,4-DNT as DNT	Anoxia, cyanosis; anemia, jaundice; reproductive effects; [potential occupational carcinogen]	1.5 mg/m^3	1.5 mg/m^3	Y	50
NG	Throbbing headache; dizziness; nausea, vomiting, abdominal pain; hypotension; flush; palpitations; methemoglobinemia; delirium, central nervous system depression; angina; skin irritation	2 mg/m^3	0.1 mg/m^3 Short Term	Y	75 mg/m^3
2-NT	Anoxia, cyanosis; headache, lassitude (weakness, exhaustion), dizziness; ataxia; dyspnea (breathing difficulty); tachycardia; nausea, vomiting	30 mg/m^3 5 ppm	11 mg/m^3 2 ppm	Y	200 ppm
4-NT	Anoxia, cyanosis; headache, lassitude (weakness, exhaustion), dizziness; ataxia; dyspnea (breathing difficulty); tachycardia; nausea, vomiting	30 mg/m^3	11 mg/m^3	Y	200 ppm
2,4,6-TNT	Irritation skin, mucous membrane; liver damage, jaundice; cyanosis; sneezing; cough, sore throat; peripheral neuropathy, muscle pain; kidney damage; cataract; sensitization dermatitis; leukocytosis (increased blood leukocytes); anemia; cardiac irregularities	1.5 mg/m^3	0.5 mg/m^3	Y	500 mg/m^3

Table 8-6 (Continued)
Occupational Health Exposure Guidelines for Potential Contaminants

Contaminant	Acute Symptoms of Exposure	PEL (TWA unless otherwise noted)	TLV-TWA	Skin Notation (Yes/No)	IDLH
Dioxin/Furans	Cough, dyspnea (breathing difficulty), wheezing; decreased pulmonary function, progressive respiratory symptoms (silicosis); irritation eyes; [potential occupational carcinogen]	NE	NE	Y	NE
Aluminum	Irritation eyes, skin, respiratory system	15 mg/m^3 (total) 5 mg/m^3 (resp)	10 mg/m^3 (total) 5 mg/m^3 (resp)	Y	ND
Lead	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension	0.05 mg/m^3	0.05 mg/m^3	Y	100 mg/m^3

Appendix C
Sample Location Coordinates and Elevations

Appendix C-1 Investigation Area Sample Location Coordinates and Elevations
Appendix C-2 2013 Supplemental RFI Well Survey Data

Appendix C-1
Investigation Area Sample Location Coordinates and Elevations

Site ID	Northing[1]	Easting[1]	Elevation[2]
SWMU 48			
48SB6	319820.27	1409531.73	1823.93
48SB7	319816.70	1409377.44	1821.98
48TP1	319829.44	1409426.71	1824.66
48TP2	319821.63	1409427.33	1823.76
48TP3	319816.94	1409426.49	1824.90
48TP4	319807.66	1409423.75	1822.19
SWMU 49			
49SB1	319591.68	1409690.20	1817.95
49SS02	3600476.17	10892672.26	1831.91
49SS03	3600484.26	10892670.09	1828.38
49SS04	3600476.30	10892666.76	1816.37
49SS05	3600468.77	10892672.31	1810.82
Combined Site Area Wells			
48MW1	319673.41	1409674.12	1816.42
48MW2	319424.94	1409711.87	1816.27
48MW3	319441.50	1409907.57	1808.56
48MW4	319855.04	1409417.65	1829.10
48MW05	3600689.89	10892345.42	1826.85
48MW06	3600637.40	10892582.21	1822.85
48MW07	3600876.82	10892528.68	1833.69
49MW01	3600458.19	10892671.65	1826.42
50MW01	3600334.20	10892291.52	1809.90
50MW02	3600295.66	10892519.27	1809.63
59MW01	3600759.80	10892750.26	1831.27
SWMU 13			
13MW2	319195.00	1409898.00	1702.62

[1] Coordinates in NAD 1983, US State Plane (Virginia South), unless site ID is in **bold** font in which case they are in NAD 1927, US State Plane (Virginia South).

[2] Elevations measured in feet using NGVD 1988.

Appendix C-2
SWMU 49 New Wel Survey Data

Well ID	Northing	Easting	Elevation
49MW02 GS	3600316.902	10893107	1805.3485
49MW02 TOP	3600313.972	10893107	1806.2946
49MW03 GS	3600547.269	10892960	1809.003
49MW03 TOP	3600548.757	10892960.7	1811.8181
49MW04 GS	3600077.315	10892597.6	1700.5211
49MW04 TOP	3600078.096	10892598.9	1703.0044
49MW05 GS	3600116.052	10893259.7	1696.897
49MW05 TOP	3600120.41	10893260	1699.7367

* Coordinates in VA State Plane (NAD 83)

Appendix D
Contaminant Fate and Transport

CONTAMINANT FATE AND TRANSPORT

D.1 TRANSFORMATION AND FATE OF CONTAMINANTS

When contaminants are exposed to the environment, the potential for transformations of the chemical exists. The endpoint of the transformation process is referenced as the “fate” of the chemical. The ultimate "fate" refers to the expected final state that an element, compound, or group of compounds will achieve following release to the environment. The fate processes for organic contaminants may include sorption, volatilization, hydrolysis, and abiotic and biotic degradation, while the fate processes for inorganic contaminants may include ion exchange, chemical speciation, and oxidation/reduction. These fate processes dictate how contaminants will be transported in the environment. Contaminants can be transported with little attenuation or retardation due to these fate processes, or they can be delayed or transformed so that little migration occurs. Various fate processes, as well as the properties that may affect the fate of contaminants, are discussed below.

D.1.1 Contaminant Properties Affecting Fate

The physical and chemical properties of contaminants play a large role in determining their fate after release to the environment. The following section provides a discussion of several of these key properties.

D.1.1.1 Specific Gravity

Specific gravity is the ratio of the density of a compound to the density of water. It is a measure of the tendency of a compound to float (specific gravity <1) or sink (specific gravity >1) in water. Contaminants that are immiscible in water can exist as separate phase liquids and are referred to as Light Non-Aqueous Phase Liquids (LNAPLs) if their specific gravity is less than one, or Dense Non-Aqueous Phase Liquids (DNAPLs) if their specific gravity is greater than one.

D.1.1.2 Water Solubility

The solubility of a compound in water is the maximum or saturated concentration of the compound in pure water at a specific temperature. Compounds with high solubility in water tend to remain in the aqueous phase and not partition to soil or sediment, are less likely to volatilize from water, and are generally more likely to biodegrade. Conversely, compounds with low water solubilities tend to partition to soil or sediment, volatilize more readily from water, and are less likely to be biodegradable. The solubility of inorganic chemicals varies widely from insoluble to greater than 100,000 mg/L, depending on temperature, pH, ORP, and the concentrations of dissolved constituents such as humic and fulvic acids.

D.1.1.3 Vapor Pressure

Vapor pressure is a property of a chemical in its pure state, which indicates how readily it will volatilize to the atmosphere. Volatilization from water is dependent upon vapor pressure and Henry’s Law Constant. Vapor pressures for chemicals in their pure states range from 0.001 to 760 mm mercury (mm Hg) for liquids to less than 10^{-10} mm Hg for solids.

D.1.1.4 Henry's Law Constant

The Henry's Law Constant of a compound is essentially the air/water partition coefficient. In dimensional form, the Henry's Law Constant is the ratio of the vapor pressure to the water

solubility (in atm-m^3/mole). The Henry's Law Constant indicates how a chemical will partition between air and water at equilibrium, and can be used to calculate the rate of volatilization of a chemical from water.

D.1.1.5 Organic Carbon/Water Partition Coefficient

The organic carbon/water partition coefficient (K_{oc}) is a measure of the tendency for a chemical to be sorbed to the organic fraction of soil and sediment. Normal K_{oc} values range from 1 to 10^7 L/kg, with higher values indicating greater sorption potential by the soil and lower values indicating high leaching capabilities for the contaminants from the waste source into surface runoff and groundwater.

D.1.1.6 Octanol/Water Partition Coefficient

The octanol/water partition coefficient (K_{ow}) is a measure of the distribution of a compound at equilibrium between n-octanol and water. The octanol/water partition coefficient, K_{ow}, gives an indication of how a compound will preferentially distribute into a solvent or water, and is a measure of how hydrophobic a compound is. A chemical with a high K_{ow} is hydrophobic and may be relatively immobile in an aqueous system (e.g., contaminant sorbs to soil particles), but may be mobilized in the presence of an organic solvent.

D.1.2 Fate of Organic Contaminants

D.1.2.1 Sorption

Sorption and desorption are two major mechanisms affecting the fate of contaminants in the subsurface. Sorption includes both adsorption and absorption. Adsorption is defined as the accumulation occurring at an interface, while absorption is the partitioning between two phases (Knox et al., 1993).

Sorption is the process by which a compound is retained onto a solid particle rather than remaining dissolved in solution. The sorption of contaminants to the soil matrix is an important factor affecting their transport in terrestrial environments. The sorption of contaminants to suspended sediments and bottom sediment is an important factor affecting chemical transport in aquatic environments.

In general, sorption reactions may be classified as either sorbent or solvent-motivated. Sorbent-motivated sorption occurs when an attraction between the sorbent (subsurface material) and the solute (contaminant), and the contaminant accumulates at the surface due to the affinity of the surface for the contaminant. An example of sorbent-motivated sorption would be a highly polar or ionizable contaminant interaction with the cation exchange sites of clay minerals. This type of sorption typically occurs with inorganics and is more commonly referred to as ion exchange. Solvent-motivated sorption occurs when the contaminant is hydrophobic, such as nonpolar organics, which prefer nonpolar phases to the polar water phase. Hydrophobic contaminants will accumulate at an interface or partition into a nonpolar phase (e.g., associate with the organic content of the subsurface medium) rather than partition into the water phase. The sorption of most neutral organic constituents falls into the category of hydrophobic, or solvent-motivated sorption (Knox et al., 1993). The best indicators of the partitioning of a compound between soil and water are the organic carbon/water partition coefficient (K_{oc}), the soil/water distribution coefficient (K_d), the octanol/water partition coefficient (K_{ow}), and the retardation factor (R).

For nonionic organic chemicals and aquifer materials, sorption is largely controlled by the clay and organic carbon content of the soil. The distribution of an organic chemical between water

and a specific soil matrix is characterized by the organic carbon/water partition coefficient, K_{oc}. This coefficient, which is based on the specific organic carbon content of the soil, is typically measured empirically using a linear adsorption isotherm where the partitioning between the two phases is determined by the following equation (Olsen and Davis, 1990):

$$K_d = \frac{C_s}{C_w} \qquad \textit{Equation 1}$$

where:

K_d = Soil/water distribution coefficient (L/kg)
C_s = Mass of the solute on the solid phase per unit mass of the solid phase (mg/kg)
C_w = Mass of the solute per unit volume of solution (mg/L)

The soil/water distribution coefficient, K_d, obtained from the above equation is then normalized to correct for variations in the organic carbon content of differing soil matrices to calculate K_{oc}:

$$K_{oc} = \frac{K_d}{f_{oc}} \qquad \textit{Equation 2}$$

where:

K_{oc} = Organic carbon/water partition coefficient (L/kg)
K_d = Soil/water distribution coefficient (L/kg)
f_{oc} = Fraction of organic carbon in the soil

The normalization of the adsorption coefficient to ascertain K_{oc} correlates well with other adsorption coefficient estimation methods which use other properties of the chemical such as water solubility or octanol/water partitioning (Callahan et al., 1979).

If the empirical K_d or K_{oc} value for the chemical is not available, the most widely accepted method of estimating the organic carbon/water partition coefficient involves the octanol/water partition coefficient, K_{ow}. The octanol/water partition coefficient, K_{ow}, has been correlated to water solubility, the organic carbon/water partition coefficient, and bioconcentration factors for aquatic life and represents the extent of partitioning by a chemical between organic and aqueous phases (Lyman et al., 1990). The relationship between K_{oc} and K_{ow} is expressed as a regression equation:

$$\log K_{oc} = a \log K_{ow} + b \qquad \textit{Equation 3}$$

where a and b are constants derived from specific data sets which represent differing classes of chemicals such as pesticides, aromatic compounds, and chlorinated hydrocarbons. Chemicals with low K_{ow} (i.e., less than 10 L/kg) are considered relatively hydrophilic and tend to have high water solubilities and small K_{oc} values. Conversely, hydrophobic compounds typically have K_{ow} values greater than 10^4 L/kg (Lyman et al., 1990). In general, the more hydrophobic a contaminant is, the more likely the contaminant will be sorbed to soil.

From Equation 1, when C_s is equal to zero, K_d also equals zero. Under this condition, no adsorption or retardation of the chemical occurs. This implies that the contaminant moves at the same velocity as the groundwater and in this case, the contaminant is termed a conservative or nonreactive solute. However, the velocity of the contaminant front can be substantially different for solutes that are adsorbed within the soil matrix. The retardation factor is defined as the ratio of the groundwater flow velocity to the contaminant front velocity:

$$R = 1 + \rho_b \frac{K_d}{n_e} \qquad \textit{Equation 4}$$

where:

R	=	Retardation factor (dimensionless)
θ_b	=	Bulk density of the soil (g/mL)
K_d	=	Distribution coefficient (mL/g)
n_e	=	Effective porosity of the soil (dimensionless)

The retardation factor indicates the extent of retardation of contaminant migration in groundwater due to adsorption. A retardation factor of 1.0 indicates that the contaminant has little tendency to bind to soils and, hence, moves freely in the groundwater. By contrast, the larger the R, the greater the tendency for a contaminant to bind to the soil matrix and the slower it will move in the groundwater. The retardation factor cannot fall below 1.0.

Other factors which affect the adsorption of chemicals to the soil matrix include temperature, pH of the soil and water, particle size distribution, and surface area of solids. The value of the distribution coefficient K_d usually decreases with increasing temperature because adsorption is an exothermic process. Neutral and slightly polarized organic compounds are somewhat affected by pH. Chemicals that tend to ionize are significantly affected by pH (Lyman et al., 1990). When the pH of the groundwater is approximately 1.0 to 1.5 units above the negative log of the acid dissociation constant (pK_a), adsorption becomes significant. A comparison of the pK_a of an organic acid with the pH of the groundwater indicates the potential importance of the dissociation of the organic compound in determining the degree of partitioning. The size of affected soil particles also plays a role in a contaminant's sorption characteristics. Particles of small size, such as particles of fine silt or clay, will have a greater tendency to adsorb chemicals.

D.1.2.2 Volatilization

Volatilization is a process whereby a compound changes state from the aqueous phase to the vapor phase. Compounds that do not adsorb onto soil/sediment or dissolve in water have the greatest tendency to volatilize. The volatility of a compound can be evaluated from its K_{oc} and by assessing its Henry's Law Constant. The value of K_{oc} indicates the degree of sorption of a compound to soil/sediment. A compound with a high K_{oc} value will have a reduced volatility because the compound sorbs extensively to the soil/sediment surface. The Henry's Law Constant can be considered the partition coefficient of the contaminant between the aqueous phase and the gas phase. A Henry's Law Constant of greater than 10^{-3} atm-m^3/mol indicates a high volatility, and a Henry's Law Constant of less than 10^{-5} atm-m^3/mol indicates a low volatility. **Table D-1** provides a rough outline of relative volatility of a solute according to its Henry's Law Constant.

Table D-1
Volatility of Compounds Based on Henry's Law Constants

Volatility	Henry's Law Constant
Volatilization is very slow, at a rate controlled by slow diffusion through air	$< 10^{-5}$ atm-m^3/mol
Volatilization is not rapid but significant	10^{-5} atm-m^3/mol to 10^{-3} atm-m^3/mol
Volatilization is rapid	$> 10^{-3}$ atm-m^3/mol

The Henry's Law Constant is related to other physical properties of the compound, the most important of which are vapor pressure and water solubility. Compounds exhibiting high vapor pressures and low water solubilities tend to have high volatilization rates. In fact, in the absence of literature values, Henry's Law Constants can be estimated from the following equation (Olsen and Davis, 1990):

$$H = \frac{(V_p)(MW)(16.04)}{(WS)(T)} \qquad \textit{Equation 5}$$

where:

V_p = Vapor pressure of the chemical (mm Hg)
MW = Molecular weight of the chemical (g/mol)
WS = Solubility in water (mg/L)
T = Temperature (^oK)
H = Henry's Law Constant ([mg/L]/[mg/L])

From this equation, it is evident that the volatilization of a compound to air will depend on its vapor pressure, water solubility, and temperature. Other important factors affecting volatilization include wind speed, the depth of the aquifer, and the geology of the unsaturated zone.

D.1.2.3 Hydrolysis

Hydrolysis is the reaction of a compound with water. It usually involves the introduction of a hydroxyl (-OH) group into an organic compound, usually at a point of unbalanced charge distribution (Cherry et al., 1983). The hydrolysis reaction can displace halogens, and may be catalyzed by the presence of acids, bases, or metal ions. Therefore, the rate of hydrolysis is pH and metal-ion concentration dependent. Surface effects also may affect the rate of hydrolysis. Halogenated aliphatics are susceptible to hydrolysis, with reactions proceeding most rapidly for monohalogenated compounds, and much more slowly as the number of halogen ions increases (Fetter, 1993).

Hydrolysis applies to a limited number of chemicals. These contain hydrolyzable groups, such as esters, aliphatic halogens, amides, carbamates, and phosphate esters (Howard, 1991). Compounds that are not susceptible include: alkanes, alkenes, aldehydes, amines, and carboxy-containing compounds (Olsen and Davis, 1990).

D.1.2.4 Abiotic Degradation

Abiotic degradation is the chemical degradation of compounds without the assistance of biological activities. In the natural environment, the most common abiotic degradation processes are hydrolysis and hydroxyl radical reactions. Other abiotic degradation processes include direct photolysis, dehydrohalogenation, and oxidation.

Hydrolysis, as mentioned above, is a chemical reaction in which compounds react with water molecules in the environment, resulting in the introduction of a hydroxyl group (-OH) and the loss of a leaving group (-X), typically a halogen.

$$RX + H_2O \rightarrow ROH + HX \ (or\ H^+, X^-) \qquad Equation\ 6$$

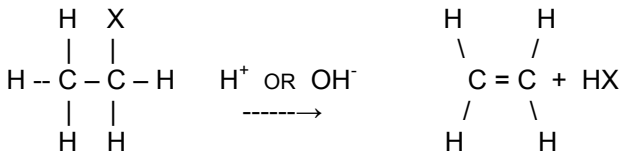
These reactions are catalyzed mainly by hydronium (H_3O^+) and/or hydroxyl ions (OH^-). Therefore, as mentioned above, hydrolysis reactions are pH dependent. Selected metals may also catalyze a hydrolysis reaction (Olsen and Davis, 1990).

Hydroxyl radical reactions are reactions with hydroxyl radicals photochemically generated from sunlight. These reactions may occur mostly in the atmosphere and to a lesser degree in surface water. Once the free radicals are formed, they will react with organic molecules to form an intermediate organic-free radical, which usually reacts further with other compounds. For most chemicals in the atmosphere, reaction with photochemically-generated hydroxyl radicals is the most common degradation process. For many chemicals, experimental reaction rate constants for reactions involving hydroxyl radicals are available in the scientific literature and are used to calculate an estimated half-life by assuming an average hydroxyl radical concentrations of $5x10^5$ molecules/cm^3 in non-smog conditions (Howard, 1991).

Occasionally, other reactions besides hydroxyl radical reactions occur in the atmosphere such as ozone oxidation and direct photolysis. Direct photolysis is a photochemical alteration of the compound as a result of the compound absorbing direct sunlight. The possibility of direct photolysis in air or water can be partially assessed by examining the UV spectrum of the chemical. If the chemical does not absorb sunlight at wavelengths greater than 290 nm, the chemical cannot directly photolyze.

Dehydrohalogenation is an elimination reaction in which an alkyl derivative will eliminate HX to form an alkene, where X is commonly a halogen, hydroxyl radical, or ester group:

Equation 7



D.1.2.5 Biotic Degradation

Biodegradation is the process in which the chemical degradation of a compound is assisted by soil microorganisms (e.g., fungi, bacteria). Reactions include oxidation, reduction, hydrolysis, and sometimes rearrangement of the molecule. Though biodegradation may occur very slowly for some compounds, the eventual mineralization of almost every organic compound in the

terrestrial and aquatic environment can be attributed to biodegradation (Alexander, 1978). A typical range of half lives for different degradation rates are summarized in **Table D-2**.

Rates of biotic degradation depend on many factors. Microorganisms require a carbon source (e.g., organic matter), an electron acceptor (e.g., oxygen, nitrate), nutrients (e.g., nitrogen, phosphorus), and various trace elements in order to maintain existing cells and produce new cells. Many environmental factors can also serve to limit the occurrence of microbial metabolism in the subsurface. These factors include pH, temperature, toxics, substrate concentration, and the presence of microbes. Most bacteria find the optimum pH range to be 6.5 to 7.5 and are not able to survive at pH values greater than 9.5 or below 4.0 (Knox et al., 1993). Microbial activity generally increases with increasing temperature. The presence of certain compounds may also be toxic to microorganisms. Heavy metals, acids, bases, or high concentrations of the substrate can serve to limit microbial activity. Finally, for biotic degradation to occur in the subsurface, microbes capable of metabolizing (or cometabolizing) the substrate must be present.

Table D-2
Rate of Biodegradation Based on Half Lives

Biodegradation Rate	Approximate Biodegradation Half-Life
Fast	1 day to 7 days
Moderately Fast	7 days to 4 weeks
Slow	4 weeks to 6 months
Resistant	6 months to 1 year

Complete biotic degradation of organic chemicals by microorganisms, utilizing enzymes to facilitate degradation, ultimately produces microbial cells, water, and carbon dioxide, which eventually lead to mineralization of the compound. Whether or not a chemical is transformed by enzymes depends on the configuration alignment of the enzyme with the organic chemical during the reaction. If an ideal configuration of the enzyme with organic chemicals occurs, the reaction will occur. Persistent chemicals have less favorable alignments, and non-reacting or recalcitrant chemicals fail to bond or produce favorable alignments.

Biotic degradation can be either aerobic or anaerobic. An aerobic reaction occurs in the presence of oxygen. Aerobic reactions occur in oxygen-rich environments such as surface soil (i.e., 0 to 6 inches bgs) and upper layers of sediment. An aerobic reaction is usually an oxidation reaction. An anaerobic reaction occurs in the absence of oxygen. Anaerobic reactions occur in such places as the saturated zone in terrestrial environments and the bottom layer of sediment in aquatic environments. Because of the lack of oxygen in these environments, an anaerobic reaction usually favors dehydrohalogenation reactions or reductive reactions.

D.1.3 Fate of Inorganic Contaminants

D.1.3.1 Ion Exchange

Metals in soil are generally immobile, particularly under neutral or alkaline conditions, and tend to sorb to soil particles. As described in *Section D.1.2.1*, sorption can be considered as either

sorbent- or solvent-motivated. Solvent-motivated sorption (partitioning) typically occurs for nonpolar, hydrophobic organic chemicals in groundwater by accumulation occurring on the organic content of the media. Ion exchange is sorbent-motivated sorption and occurs for inorganic chemicals due to an affinity of the solid surface for the compound. Typically, the sorbent surface contains a charge deficiency and requires the accumulation of ions near the solid/liquid interface to neutralize the surface charge. In subsurface media, the mineral fraction most commonly involved in ion exchange is the clay fraction (Knox et al., 1993). Ion exchange occurs when the sorbent charge deficiency can be neutralized more efficiently by ions in solution than by those ions currently adsorbed. For example, if sodium ions (monovalent) have accumulated and calcium ions (divalent) suddenly appear, the excess surface charge can be more efficiently neutralized by the calcium ions than by sodium. Thus, the sodium ions will desorb, the calcium ions will adsorb, and an exchange of ions occurs. The cation exchange capacity of a given aquifer material indicates the probable type and amount of clay minerals present, and can be used as an indication of the ability of a soil to attenuate cations found in the groundwater (Makeig, 1982).

D.1.3.2 Chemical Speciation

Most inorganic chemicals occur in more than one ionic form, or species, in soils and groundwater. These species, which form as a result of hydrolysis, oxidation/reduction, and complexation reactions, may have different valences and mobilities in groundwater due to different affinities for adsorption and different solubility controls. Simple ionic species often combine with ligands to form ionic or neutral-charge aqueous complexes. The major inorganic ligands in groundwater are generally Cl^-, HCO_3^{-2}, CO_2, and SO_4^{-2}, and in some cases, NH_3, NO_3^- and F^- (Cherry et al., 1983). Environmental conditions which affect speciation of inorganic chemicals include pH, redox potential, and inorganic ligands.

D.1.3.3 Oxidation/Reduction

Oxidation and reduction ("redox") refers to the transfer of electrons and the resultant species change of ions or compounds. Oxidation is the loss of electrons, while reduction is the gain of electrons. Redox processes are important because they can cause changes in the mobility of many inorganic compounds. The ability of a redox reaction to occur is a function of the redox potential. The redox potential is defined in terms of the negative logarithm of the free-electron activity and is referred to as pE. The redox potential can also be expressed in terms of volts (E_h). Low values of pE indicate high electron activity and favor electron-rich species (reduced). High values of pE indicate low electron activity and favor electron-poor species (oxidized).

D.2 TRANSPORT OF CONTAMINANTS

Contaminant transport refers to the mechanisms and rates of migration of contaminants away from the source area. Migration pathways often include air, water, soil, and the interfaces between the phases of the contaminant (i.e., solid, liquid, or gas). Mechanisms controlling the movement of contaminants include advection, dispersion, diffusion, volatilization, and sorption. These mechanisms are dictated by the physical and chemical nature of the environmental media and their interaction with the potential COCs. Water pathways include surface water, storm water runoff, groundwater, infiltration/percolation, and precipitation. The air pathways include uptake into the atmosphere and deposition from it either in a dry or wet form. The soil pathways include sediment and soil transported by erosion or by site activities such as construction and movement through the vadose zone as soil gas. Transport across an interface is primarily due to

partitioning. The degree of partitioning will depend on the volatility, solubility, and sorptive capacity of the phases. The primary transport mechanism across the water-air and soil-air interfaces are volatilization and sorption, while transport across the soil-water interface is controlled by sorption/desorption and dissolution (solubilization).

D.2.1 Advection

Contaminant transport by advection occurs when the contaminant is moved in and with the bulk flow of either water or the atmosphere. The primary advective transport pathway at Building 4343 is migration into surface water.

D.2.2 Diffusion

Transport by diffusion is the result of a concentration gradient in the contaminant plume or the soil gas within the vadose zone. The rate of diffusion is expressed by the diffusivity coefficient, which is affected by temperature, pressure, density, and soil porosity. Diffusion in soil is strongly dependent on the effective porosity of the soil. Residual clays have high porosity but low effective (interconnected) porosity. Transport due to diffusion in clays is usually minimal.

D.2.3 Volatilization

Volatilization occurs when a liquid changes its phase to a gas. This is primarily a mechanism for organic contaminants migrating from the soil or surface water to the air. Volatilization is a mass transfer process that is limited by a compound's solubility in water, molecular weight, vapor pressure, K_{oc} value, and by the local temperature.

D.2.4 Sorption

As discussed previously, sorption is a general term used in place of the specific terms absorption or adsorption. Adsorption describes the process whereby a contaminant is bound to the surface of a medium, whereas absorption occurs when the contaminant is bound within the medium. The distinction between the two is not always relevant, but the fact that a contaminant has been sorbed indicates that it has been bound to its new medium and will be transported with this new medium. This transport mechanism may be significant when a high concentration of suspended solids is found in water samples.

Desorption is the release (leaching) of a contaminant from the sorbent phase. Sorption/desorption is a primary mechanism of transport for water and soil pathways. In a water-soil environment, soil is the adsorbent and the contaminants are the adsorbates. Sorption/desorption of organic and inorganic compounds within soil-water systems is assessed by several physical and chemical properties of both the compound and the soil or sediment (*Section D.1.2.1*).

Appendix E
HHRA Tables
and
Statistical Comparison Results

Appendix E-1	RAGS Part D Tables - SWMU 48
Appendix E-2	RAGS Part D Tables - SWMU 49
Appendix E-3	Calculations for 2,3,7,8-TCDD Equivalents - SWMUs 48 and 49 Groundwater
Appendix E-4	Exposure Point Concentrations - ProUCL 4.0 Output - SWMU 48
Appendix E-5	Exposure Point Concentrations - ProUCL 4.0 Output - SWMU 49
Appendix E-6	Johnson & Ettinger Model - Input and Output - SWMU 48 Groundwater
Appendix E-7	Johnson & Ettinger Model - Input and Output - SWMU 49 Groundwater
Appendix E-8	Chromium Concentration Plots
Appendix E-9	Background Comparisons - ProUCL 4.0 Output - SWMU 48
Appendix E-10	Background Comparisons - ProUCL 4.0 Output - SWMU 49

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options **Units = mg/kg**

From File H:\Risk DB\Radford - Background Statistics

Full Precision OFF

Confidence Coefficient 0.95

Lead (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	2.1	256	22.04	12	39.85

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.186	1.149	18.59	2.615	0.783	0.299

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.597	0.597	0.597	0.597

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.344	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.803	0.803	0.803	0.803

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	7.671	0.777	
Kolmogorov-Smirnov (Full: no NDs)	0.245	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.929	0.929	0.929	0.929

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.147	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Aluminum (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	3620	47900	14204	12100	9433

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	2.787	2.689	5097	9.371	0.618	0.0659

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.923	0.923	0.923	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.15	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.988	0.988	0.988	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.604	0.76	
Kolmogorov-Smirnov (Full: no NDs)	0.0772	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.995	0.995	0.995	0.995

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0626	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Antimony (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	41	38	0	38	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony (mg/kg) (rfaap bkgrd ts) was not processed!

Arsenic (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	76	3	3.80%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.09	0.12	0.103	0.1	0.0153
Statistics (Detects Only)	76	1.2	35.9	4.989	3.2	5.36
Statistics (All: NDs treated as DL value)	79	0.09	35.9	4.804	3.1	5.339
Statistics (All: NDs treated as DL/2 value)	79	0.045	35.9	4.802	3.1	5.341
Statistics (Normal ROS Estimated Data)	79	-5.169	35.9	4.604	3.1	5.608
Statistics (Gamma ROS Estimated Data)	79	1E-09	35.9	4.8	3.1	5.343
Statistics (Lognormal ROS Estimated Data)	79	0.728	35.9	4.828	3.1	5.32

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.819	1.759	2.742	1.308	0.692	0.529
Statistics (NDs = DL)	1.401	1.356	3.429	1.172	0.968	0.826
Statistics (NDs = DL/2)	1.323	1.281	3.631	1.146	1.067	0.932
Statistics (Gamma ROS Estimates)	0.568	0.555	8.454	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	0.748	0.6

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.765	0.778	0.778	0.817

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.282	0.102	Data Not Normal
Lilliefors (NDs = DL)	0.279	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.279	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.263	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.916	0.932	0.935	0.972

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.409	0.766	
Kolmogorov-Smirnov (Detects Only)	0.213	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.469	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.182	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.587	0.774	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.103	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.23	0.812	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.332	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.958	0.919	0.886	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.151	0.102	Data Not Lognormal
Lilliefors (NDs = DL)	0.159	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Barium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	63	16	20.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	0.36	1.1	0.821	1	0.3
Statistics (Detects Only)	63	23.4	174	68.4	56.7	40.39
Statistics (All: NDs treated as DL value)	79	0.36	174	54.71	45.5	45.21
Statistics (All: NDs treated as DL/2 value)	79	0.18	174	54.63	45.5	45.31
Statistics (Normal ROS Estimated Data)	79	-54.83	174	50.41	45.5	51.24
Statistics (Gamma ROS Estimated Data)	79	1E-09	174	58.64	45.5	41.27
Statistics (Lognormal ROS Estimated Data)	79	10.45	174	58.03	45.5	41.56

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.354	3.236	20.39	4.069	0.555	0.136
Statistics (NDs = DL)	0.737	0.717	74.26	3.188	1.839	0.577
Statistics (NDs = DL/2)	0.642	0.626	85.13	3.047	2.109	0.692
Statistics (Gamma ROS Estimates)	1.061	1.029	55.28	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.817	0.71	0.186

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.932	0.955	0.955	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.211	0.112	Data Not Normal
Lilliefors (NDs = DL)	0.154	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.153	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.13	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.977	0.947	0.938	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.567	0.757	
Kolmogorov-Smirnov (Detects Only)	0.142	0.113	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	4.488	0.794	
Kolmogorov-Smirnov (NDs = DL)	0.207	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.552	0.804	
Kolmogorov-Smirnov (NDs = DL/2)	0.235	0.105	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.925	0.78	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.215	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.875	0.857	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.114	0.112	Data Not Lognormal
Lilliefors (NDs = DL)	0.29	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.317	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0679	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Beryllium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	40	39	49.37%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	0.022	0.03	0.0286	0.03	0.00265
Statistics (Detects Only)	40	0.61	5.4	1.449	1.1	1.086
Statistics (All: NDs treated as DL value)	79	0.022	5.4	0.748	0.61	1.049
Statistics (All: NDs treated as DL/2 value)	79	0.011	5.4	0.74	0.61	1.054
Statistics (Normal ROS Estimated Data)	79	-3.53	5.4	0.149	0.61	1.644
Statistics (Gamma ROS Estimated Data)	79	1E-09	5.4	1.439	1.3	0.88
Statistics (Lognormal ROS Estimated Data)	79	0.0819	5.4	0.892	0.61	0.959

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.116	3.006	0.465	0.202	0.533	2.643
Statistics (NDs = DL)	0.47	0.461	1.589	-1.654	1.93	-1.167
Statistics (NDs = DL/2)	0.39	0.383	1.9	-1.996	2.273	-1.138
Statistics (Gamma ROS Estimates)	1.38	1.336	1.043	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.504	0.875	-1.735

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.81	0.829	0.83	0.978

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.666	0.94	Data Not Normal
Lilliefors (Detects Only)	0.256	0.14	Data Not Normal
Lilliefors (NDs = DL)	0.247	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.248	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.117	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.915	0.976	0.973	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.172	0.754	
Kolmogorov-Smirnov (Detects Only)	0.198	0.14	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.807	0.826	
Kolmogorov-Smirnov (NDs = DL)	0.32	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	7.311	0.844	
Kolmogorov-Smirnov (NDs = DL/2)	0.323	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	5.881	0.773	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.232	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.947	0.883	0.873	0.996

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.891	0.94	Data Not Lognormal
Lilliefors (Detects Only)	0.155	0.14	Data Not Lognormal
Lilliefors (NDs = DL)	0.325	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.328	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0541	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cadmium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	13	66	83.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	66	0.02	0.05	0.0256	0.02	0.00861
Statistics (Detects Only)	13	0.57	2.5	1.152	1.1	0.585
Statistics (All: NDs treated as DL value)	79	0.02	2.5	0.211	0.02	0.479
Statistics (All: NDs treated as DL/2 value)	79	0.01	2.5	0.2	0.01	0.483
Statistics (Normal ROS Estimated Data)	79	-4.148	2.5	-1.016	-1.143	1.342
Statistics (Gamma ROS Estimated Data)	79	0.197	2.987	1.943	2.175	0.717
Statistics (Lognormal ROS Estimated Data)	79	0.0167	2.5	0.338	0.174	0.444

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	5.194	5.005	0.222	0.0424	0.448	10.55
Statistics (NDs = DL)	0.424	0.416	0.498	-3.093	1.437	-0.465
Statistics (NDs = DL/2)	0.329	0.325	0.609	-3.672	1.69	-0.46
Statistics (Gamma ROS Estimates)	5.206	5.016	0.373	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.649	1.046	-0.634

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.905	0.675	0.671	0.995

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.82	0.866	Data Not Normal
Lilliefors (Detects Only)	0.246	0.246	Data Not Normal
Lilliefors (NDs = DL)	0.467	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.477	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0689	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.955	0.948	0.957	0.92

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.512	0.736	
Kolmogorov-Smirnov (Detects Only)	0.181	0.237	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	17.17	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.422	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	18.08	0.858	
Kolmogorov-Smirnov (NDs = DL/2)	0.448	0.109	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.804	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.164	0.101	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.969	0.778	0.764	0.995

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.934	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.246	Data Appear Lognormal
Lilliefors (NDs = DL)	0.327	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.348	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0689	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Chromium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	6.3	75.8	26.86	26	12.51

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.546	4.382	5.91	3.177	0.501	0.158

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.971	0.971	0.971	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0734	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.99	0.99	0.99	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.591	0.755	
Kolmogorov-Smirnov (Full: no NDs)	0.0909	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.984	0.984	0.984	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.122	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cobalt (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	56	23	29.11%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	23	0.11	0.84	0.587	0.73	0.286
Statistics (Detects Only)	56	5.9	130	22.23	13.3	23.94
Statistics (All: NDs treated as DL value)	79	0.11	130	15.93	11.4	22.41
Statistics (All: NDs treated as DL/2 value)	79	0.055	130	15.84	11.4	22.47
Statistics (Normal ROS Estimated Data)	79	-40.83	130	8.784	11.4	29.44
Statistics (Gamma ROS Estimated Data)	79	1E-09	130	17.57	11.9	21.54
Statistics (Lognormal ROS Estimated Data)	79	1.86	130	16.76	11.4	21.87

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.78	1.721	12.49	2.795	0.701	0.251
Statistics (NDs = DL)	0.61	0.595	26.11	1.758	1.787	1.017
Statistics (NDs = DL/2)	0.523	0.511	30.31	1.556	2.08	1.337
Statistics (Gamma ROS Estimates)	0.504	0.494	34.83	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.331	0.947	0.406

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.767	0.788	0.789	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.263	0.118	Data Not Normal
Lilliefors (NDs = DL)	0.24	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.241	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.17	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.914	0.965	0.969	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.203	0.765	
Kolmogorov-Smirnov (Detects Only)	0.162	0.121	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.127	0.807	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.851	0.816	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.036	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.36	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.956	0.941	0.924	0.986

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.13	0.118	Data Not Lognormal
Lilliefors (NDs = DL)	0.213	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0915	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Copper (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	77	2	2.53%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.17	0.17	0.17	0.17	0
Statistics (Detects Only)	77	1.6	38.7	12.25	9.1	9.397
Statistics (All: NDs treated as DL value)	79	0.17	38.7	11.95	9	9.47
Statistics (All: NDs treated as DL/2 value)	79	0.085	38.7	11.94	9	9.473
Statistics (Normal ROS Estimated Data)	79	-11.93	38.7	11.67	9	9.957
Statistics (Gamma ROS Estimated Data)	79	1E-09	38.7	11.94	9	9.475
Statistics (Lognormal ROS Estimated Data)	79	0.988	38.7	11.97	9	9.441

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.754	1.696	6.985	2.194	0.828	0.378
Statistics (NDs = DL)	1.438	1.391	8.31	2.094	1.03	0.492
Statistics (NDs = DL/2)	1.381	1.337	8.649	2.076	1.101	0.53
Statistics (Gamma ROS Estimates)	0.698	0.68	17.1	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.141	0.882	0.412

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.941	0.944	0.944	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.152	0.101	Data Not Normal
Lilliefors (NDs = DL)	0.155	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.155	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.136	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.982	0.98	0.979	0.955

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.936	0.767	
Kolmogorov-Smirnov (Detects Only)	0.117	0.103	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.591	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.0861	0.102	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.619	0.773	
Kolmogorov-Smirnov (NDs = DL/2)	0.0788	0.103	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	4.964	0.798	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.209	0.105	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.988	0.951	0.927	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.082	0.101	Data Appear Lognormal
Lilliefors (NDs = DL)	0.0741	0.0997	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.0933	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0707	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Iron (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	7250	67700	26963	25200	11990

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.607	4.441	5852	10.09	0.508	0.0503

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.979	0.979	0.979	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0648	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.984	0.984	0.984	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.831	0.755	
Kolmogorov-Smirnov (Full: no NDs)	0.082	0.101	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.97	0.97	0.97	0.97

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.115	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Magnesium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	72	7	8.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.8	5	4.686	4.8	0.402
Statistics (Detects Only)	72	139	58100	6394	1270	12925
Statistics (All: NDs treated as DL value)	79	3.8	58100	5828	1080	12466
Statistics (All: NDs treated as DL/2 value)	79	1.9	58100	5827	1080	12466
Statistics (Normal ROS Estimated Data)	79	-19110	58100	4438	1080	13862
Statistics (Gamma ROS Estimated Data)	79	1E-09	58100	5827	1080	12466
Statistics (Lognormal ROS Estimated Data)	79	28.2	58100	5832	1080	12464

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.484	0.474	13216	7.443	1.571	0.211
Statistics (NDs = DL)	0.379	0.373	15366	6.92	2.257	0.326
Statistics (NDs = DL/2)	0.368	0.363	15828	6.859	2.409	0.351
Statistics (Gamma ROS Estimates)	0.198	0.199	29431	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	7.129	1.812	0.254

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.71	0.697	0.697	0.812

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.323	0.104	Data Not Normal
Lilliefors (NDs = DL)	0.321	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.29	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.943	0.948	0.949	0.956

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.255	0.821	
Kolmogorov-Smirnov (Detects Only)	0.17	0.111	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.668	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.136	0.108	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.542	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.129	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	7.068	0.912	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.298	0.111	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.962	0.948	0.992

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0868	0.104	Data Appear Lognormal
Lilliefors (NDs = DL)	0.135	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.157	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0546	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Manganese (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	16.7	2040	471.4	359	467.1

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.121	1.087	420.6	5.647	1.118	0.198

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.894	0.894	0.894	0.894

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.165	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.982	0.982	0.982	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.359	0.779	
Kolmogorov-Smirnov (Full: no NDs)	0.0515	0.103	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.985	0.985	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.093	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Mercury (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	18	61	77.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	61	0.019	0.06	0.0484	0.06	0.0158
Statistics (Detects Only)	18	0.038	1.2	0.187	0.125	0.259
Statistics (All: NDs treated as DL value)	79	0.019	1.2	0.0799	0.06	0.135
Statistics (All: NDs treated as DL/2 value)	79	0.0095	1.2	0.0612	0.03	0.139
Statistics (Normal ROS Estimated Data)	79	-1.214	1.2	-0.361	-0.372	0.403
Statistics (Gamma ROS Estimated Data)	79	0.038	1.2	0.173	0.156	0.138
Statistics (Lognormal ROS Estimated Data)	79	0.0007952	1.2	0.0541	0.0171	0.141

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.552	1.501	0.12	-2.035	0.727	-0.358
Statistics (NDs = DL)	1.645	1.591	0.0485	-2.861	0.681	-0.238
Statistics (NDs = DL/2)	0.962	0.934	0.0636	-3.396	0.902	-0.266
Statistics (Gamma ROS Estimates)	3.073	2.965	0.0563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.029	1.44	-0.357

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.64	0.523	0.527	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.442	0.897	Data Not Normal
Lilliefors (Detects Only)	0.384	0.209	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.067	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.801	0.683	0.741	0.816

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.702	0.756	
Kolmogorov-Smirnov (Detects Only)	0.274	0.207	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.715	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.33	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	8.44	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.725	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0728	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.919	0.916	0.914	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.871	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.193	0.209	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.062	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Nickel (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	61	18	22.78%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	18	0.21	1.4	1.066	1.3	0.466
Statistics (Detects Only)	61	4.6	94.2	17.95	13.2	15.68
Statistics (All: NDs treated as DL value)	79	0.21	94.2	14.1	9.4	15.49
Statistics (All: NDs treated as DL/2 value)	79	0.105	94.2	13.98	9.4	15.59
Statistics (Normal ROS Estimated Data)	79	-32.3	94.2	10.45	9.4	19.82
Statistics (Gamma ROS Estimated Data)	79	1E-09	94.2	14.69	9.8	15.1
Statistics (Lognormal ROS Estimated Data)	79	1.082	94.2	14.48	9.4	15.18

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.974	1.908	9.092	2.614	0.722	0.276
Statistics (NDs = DL)	0.89	0.865	15.85	1.989	1.367	0.687
Statistics (NDs = DL/2)	0.743	0.723	18.82	1.831	1.622	0.886
Statistics (Gamma ROS Estimates)	0.377	0.371	38.92	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.235	0.959	0.429

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.86	0.87	0.874	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.197	0.113	Data Not Normal
Lilliefors (NDs = DL)	0.185	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.156	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.969	0.99	0.992	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.996	0.763	
Kolmogorov-Smirnov (Detects Only)	0.096	0.115	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.633	0.787	
Kolmogorov-Smirnov (NDs = DL)	0.112	0.104	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	1.261	0.794	
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	11.39	0.847	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.343	0.108	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.986	0.963	0.942	0.997

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.087	0.113	Data Appear Lognormal
Lilliefors (NDs = DL)	0.14	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.198	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0586	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Potassium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	67	12	15.19%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	201	271	223.1	217	20.78
Statistics (Detects Only)	67	123	10900	1690	694	2232
Statistics (All: NDs treated as DL value)	79	123	10900	1467	618	2120
Statistics (All: NDs treated as DL/2 value)	79	100.5	10900	1450	618	2131
Statistics (Normal ROS Estimated Data)	79	-1878	10900	1235	618	2322
Statistics (Gamma ROS Estimated Data)	79	1E-09	10900	1433	618	2142
Statistics (Lognormal ROS Estimated Data)	79	104.7	10900	1456	618	2127

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.92	0.893	1837	6.798	1.115	0.164
Statistics (NDs = DL)	0.837	0.814	1752	6.586	1.143	0.174
Statistics (NDs = DL/2)	0.75	0.73	1933	6.481	1.273	0.196
Statistics (Gamma ROS Estimates)	0.163	0.165	8778	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.525	1.216	0.186

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.813	0.789	0.795	0.88

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.247	0.108	Data Not Normal
Lilliefors (NDs = DL)	0.263	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.263	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.972	0.968	0.974	0.962

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.945	0.784	
Kolmogorov-Smirnov (Detects Only)	0.153	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.288	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.171	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.192	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	14.88	0.944	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.392	0.113	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.989	0.973	0.983	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0982	0.108	Data Appear Lognormal
Lilliefors (NDs = DL)	0.106	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.0732	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0941	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Selenium (mg.kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	2	77	97.47%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	77	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	79	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	79	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Estimated Data)	79	N/A	N/A	N/A	N/A	N/A

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Silver (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	1	78	98.73%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Silver (mg/kg) (rfaap bkgrd ts) was not processed!

Sodium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	6	73	92.41%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	73	10.8	25.9	15.02	12	4.717
Statistics (Detects Only)	6	114	151	131.7	127	14.76
Statistics (All: NDs treated as DL value)	79	10.8	151	23.88	12.1	31.65
Statistics (All: NDs treated as DL/2 value)	79	5.4	151	16.94	6.05	33.39
Statistics (Normal ROS Estimated Data)	79	-8.416	151	43.69	36.98	33.18
Statistics (Gamma ROS Estimated Data)	79	114	151	131.6	131.6	3.738
Statistics (Lognormal ROS Estimated Data)	79	45.83	151	70.08	64.41	20.82

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	97.1	93.42	1.356	4.875	0.111	0.0227
Statistics (NDs = DL)	1.618	1.565	14.76	2.833	0.653	0.23
Statistics (NDs = DL/2)	0.916	0.889	18.5	2.193	0.823	0.376
Statistics (Gamma ROS Estimates)	1276	1227	0.103	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	4.216	0.249	0.059

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.957	0.639	0.59	0.936

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.901	0.788	Data Appear Normal
Lilliefors (Detects Only)	0.212	0.362	Data Appear Normal
Lilliefors (NDs = DL)	0.404	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.472	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.2	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.959	0.811	0.809	0.571

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.389	0.696	
Kolmogorov-Smirnov (Detects Only)	0.22	0.332	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	13.6	0.769	
Kolmogorov-Smirnov (NDs = DL)	0.302	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	17.64	0.786	
Kolmogorov-Smirnov (NDs = DL/2)	0.386	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	22.97	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.448	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.963	0.798	0.753	0.936

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.913	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.198	0.362	Data Appear Lognormal
Lilliefors (NDs = DL)	0.246	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.27	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.2	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Thallium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	15	64	81.01%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	64	0.13	0.45	0.189	0.15	0.0931
Statistics (Detects Only)	15	1.3	5	2.527	2.2	0.932
Statistics (All: NDs treated as DL value)	79	0.13	5	0.633	0.16	1.007
Statistics (All: NDs treated as DL/2 value)	79	0.065	5	0.556	0.08	1.039
Statistics (Normal ROS Estimated Data)	79	-4.787	5	-0.573	-0.722	1.972
Statistics (Gamma ROS Estimated Data)	79	1.3	5	2.489	2.468	0.399
Statistics (Lognormal ROS Estimated Data)	79	0.155	5	0.998	0.707	0.884

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	8.698	8.377	0.29	0.868	0.352	0.405
Statistics (NDs = DL)	0.753	0.733	0.841	-1.253	1.097	-0.876
Statistics (NDs = DL/2)	0.515	0.504	1.08	-1.814	1.358	-0.748
Statistics (Gamma ROS Estimates)	44.1	42.44	0.0564	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.291	0.738	-2.538

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.938	0.746	0.729	0.991

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.893	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.17	0.229	Data Appear Normal
Lilliefors (NDs = DL)	0.382	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.435	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0779	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.964	0.943	0.944	0.777

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.367	0.738	
Kolmogorov-Smirnov (Detects Only)	0.145	0.222	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	12.86	0.793	
Kolmogorov-Smirnov (NDs = DL)	0.361	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	14.62	0.817	
Kolmogorov-Smirnov (NDs = DL/2)	0.371	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.13	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.835	0.815	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.134	0.229	Data Appear Lognormal
Lilliefors (NDs = DL)	0.334	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.34	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0779	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Vanadium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	12.2	114	45.84	41.4	20.38

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.973	4.792	9.218	3.721	0.477	0.128

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.98	0.98	0.98	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0967	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.997	0.997	0.997	0.997

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.228	0.754	
Kolmogorov-Smirnov (Full: no NDs)	0.054	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.988	0.988	0.988	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0843	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Zinc (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	4.7	598	54.94	30.2	87.15

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.083	1.05	50.74	3.478	0.93	0.267

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.683	0.683	0.683	0.683

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.291	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.88	0.88	0.88	0.88

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	3.363	0.78	
Kolmogorov-Smirnov (Full: no NDs)	0.145	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.982	0.982	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0696	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(swmu 49 ss)
Background Data: Aluminum(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	6	28
Number of Missing Values	3	0
Number of Distinct Observations	6	28
Minimum	9220	3620
Maximum	28900	20100
Mean	16170	8300
Median	13000	6705
SD	8041	4279
SE of Mean	3283	808.6

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	159.5
WMW Test U-Stat	2.439
WMW Critical Value (0.050)	1.645
P-Value	0.00735

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(swmu 49 ss)
Background Data: Chromium(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	9	28
Number of Distinct Observations	9	27
Minimum	11.8	6.3
Maximum	30.3	53.3
Mean	17.93	21.09
Median	15.9	22.4
SD	6.171	10.5
SE of Mean	2.057	1.985

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	153.5
WMW Test U-Stat	-0.637
WMW Critical Value (0.050)	1.645
P-Value	0.262

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Iron(swmu 49 ss)
Background Data: Iron(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	6	28
Number of Missing Values	3	0
Number of Distinct Observations	5	26
Minimum	9060	7250
Maximum	32600	63000
Mean	19043	20108
Median	15950	19750
SD	8956	11869
SE of Mean	3656	2243

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	104
WMW Test U-Stat	-0.0678
WMW Critical Value (0.050)	1.645
P-Value	0.473

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(swmu 49 ss)
Background Data: Lead(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	9	28
Number of Distinct Observations	9	26
Minimum	13.4	8.9
Maximum	71.6	225
Mean	27.46	26.96
Median	20.4	15.15
SD	19.97	41.34
SE of Mean	6.655	7.813

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	211.5
WMW Test U-Stat	1.416
WMW Critical Value (0.050)	1.645
P-Value	0.0784

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(swmu 49 ss)
Background Data: Manganese(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	6	28
Number of Missing Values	3	0
Number of Distinct Observations	6	28
Minimum	130	43
Maximum	570	2040
Mean	302.3	695.9
Median	296	490
SD	157	591.5
SE of Mean	64.11	111.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	68
WMW Test U-Stat	-1.694
WMW Critical Value (0.050)	1.645
P-Value	0.0451

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value < alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(swmu 49 ss)
Background Data: Vanadium(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	6	28
Number of Missing Values	3	0
Number of Distinct Observations	6	27
Minimum	20.3	12.2
Maximum	63.9	101
Mean	38.01	33.89
Median	31.63	33.8
SD	18.22	17.78
SE of Mean	7.44	3.36

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	116.5
WMW Test U-Stat	0.497
WMW Critical Value (0.050)	1.645
P-Value	0.31

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(swmu 49 ss)
Background Data: Zinc(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Observations	6	28
Number of Missing Values	3	0
Number of Distinct Observations	6	28
Minimum	23.3	7.1
Maximum	56.5	216
Mean	43.29	41.21
Median	45.58	29.7
SD	11.24	40.24
SE of Mean	4.587	7.605

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	129
WMW Test U-Stat	1.062
WMW Critical Value (0.050)	1.645
P-Value	0.144

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(swmu 49 ss)
Background Data: Arsenic(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Data	9	28
Number of Non-Detect Data	1	0
Number of Detect Data	8	28
Minimum Non-Detect	2.5	N/A
Maximum Non-Detect	2.5	N/A
Percent Non detects	11.11%	0.00%
Minimum Detected	0.52	1.5
Maximum Detected	8.2	10.2
Mean of Detected Data	3.601	3.732
Median of Detected Data	3.505	2.75
SD of Detected Data	2.597	2.33

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	-0.285
Critical z (0.95)	1.645
P-Value	0.612

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(swmu 49 ss)
Background Data: Cobalt(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Data	6	28
Number of Missing Values	3	0
Number of Non-Detect Data	0	8
Number of Detect Data	6	20
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.75
Percent Non detects	0.00%	28.57%
Minimum Detected	3.1	5.9
Maximum Detected	5.75	45.4
Mean of Detected Data	4.25	15.95
Median of Detected Data	3.925	12.1
SD of Detected Data	1.159	10.07

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	-1.637
Critical z (0.95)	1.645
P-Value	0.949

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Mercury(swmu 49 ss)
Background Data: Mercury(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Data	7	28
Number of Missing Values	2	0
Number of Non-Detect Data	1	25
Number of Detect Data	6	3
Minimum Non-Detect	0.05	0.019
Maximum Non-Detect	0.05	0.06
Percent Non detects	14.29%	89.29%
Minimum Detected	0.048	0.07
Maximum Detected	0.497	1.2
Mean of Detected Data	0.199	0.467
Median of Detected Data	0.137	0.13
SD of Detected Data	0.174	0.636

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	3.491
Critical z (0.95)	1.645
P-Value	2.41E-04

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Selenium(swmu 49 ss)
Background Data: Selenium(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Data	9	28
Number of Non-Detect Data	4	26
Number of Detect Data	5	2
Minimum Non-Detect	0.449	0.14
Maximum Non-Detect	1.16	0.36
Percent Non detects	44.44%	92.86%
Minimum Detected	0.668	0.64
Maximum Detected	9.4	0.77
Mean of Detected Data	5.434	0.705
Median of Detected Data	5.4	0.705
SD of Detected Data	3.148	0.0919

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	3.554
Critical z (0.95)	1.645
P-Value	1.90E-04

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Surface Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd SS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Thallium(swmu 49 ss)
Background Data: Thallium(bkgrd ss)

Raw Statistics

	Site	Background
Number of Valid Data	9	28
Number of Non-Detect Data	7	24
Number of Detect Data	2	4
Minimum Non-Detect	4.8	0.13
Maximum Non-Detect	34.3	0.41
Percent Non detects	77.78%	85.71%
Minimum Detected	0.1	1.3
Maximum Detected	0.13	2.1
Mean of Detected Data	0.115	1.85
Median of Detected Data	0.115	2
SD of Detected Data	0.0212	0.37

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	-0.204
Critical z (0.95)	1.645
P-Value	0.581

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options **mg/kg**

From File H:\Risk DB\Radford - Background Statistics

Full Precision OFF

Confidence Coefficient 0.95

Aluminum (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	3620	20100	8300	6705	4279

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.541	4.078	1828	8.91	0.477	0.0535

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.935	0.935	0.935	0.935

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.871	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.208	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.982	0.982	0.982	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.741	0.749	
Kolmogorov-Smirnov (Full: no NDs)	0.171	0.166	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.98	0.98	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.948	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.142	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Antimony (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	14	14	0	14	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony (rfaap bkgrd-ss) was not processed!

Arsenic (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	1.5	10.2	3.732	2.75	2.33

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	3.494	3.143	1.068	1.167	0.532	0.456

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.898	0.898	0.898	0.898

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.803	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.203	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.969	0.969	0.969	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	1.02	0.752	
Kolmogorov-Smirnov (Full: no NDs)	0.165	0.166	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.972	0.972	0.972	0.972

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.932	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Barium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	24	4	14.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	0.36	1	0.683	0.685	0.367
Statistics (Detects Only)	24	23.4	174	75.55	61.85	43.2
Statistics (All: NDs treated as DL value)	28	0.36	174	64.85	58.65	47.97
Statistics (All: NDs treated as DL/2 value)	28	0.18	174	64.8	58.65	48.04
Statistics (Normal ROS Estimated Data)	28	-33.62	174	61.51	58.65	53.13
Statistics (Gamma ROS Estimated Data)	28	1E-09	174	66.05	58.65	46.43
Statistics (Lognormal ROS Estimated Data)	28	14.2	174	67.13	58.65	45.07

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.215	2.894	23.5	4.161	0.597	0.144
Statistics (NDs = DL)	0.867	0.798	74.79	3.495	1.762	0.504
Statistics (NDs = DL/2)	0.769	0.711	84.25	3.396	1.997	0.588
Statistics (Gamma ROS Estimates)	0.566	0.529	116.7	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.967	0.734	0.185

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.963	0.976	0.976	0.989

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.917	0.916	Data Appear Normal
Lilliefors (Detects Only)	0.192	0.181	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.941	0.924	Data Appear Normal
Lilliefors (NDs = DL)	0.153	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.941	0.924	Data Appear Normal
Lilliefors (NDs = DL/2)	0.153	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.971	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.127	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.986	0.947	0.939	0.927

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.354	0.751	
Kolmogorov-Smirnov (Detects Only)	0.127	0.179	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.516	0.78	
Kolmogorov-Smirnov (NDs = DL)	0.191	0.171	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.873	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.217	0.172	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.326	0.804	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.279	0.174	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.987	0.853	0.833	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.916	Data Appear Lognormal
Lilliefors (Detects Only)	0.104	0.181	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.725	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.28	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.691	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.309	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.955	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.11	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Beryllium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	15	13	46.43%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	0.022	0.03	0.0278	0.03	0.00339
Statistics (Detects Only)	15	0.61	1.5	0.887	0.87	0.246
Statistics (All: NDs treated as DL value)	28	0.022	1.5	0.488	0.615	0.471
Statistics (All: NDs treated as DL/2 value)	28	0.011	1.5	0.481	0.615	0.477
Statistics (Normal ROS Estimated Data)	28	-0.178	1.5	0.577	0.615	0.402
Statistics (Gamma ROS Estimated Data)	28	0.498	1.5	0.87	0.879	0.206
Statistics (Lognormal ROS Estimated Data)	28	0.276	1.5	0.674	0.615	0.297

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	15.44	13.81	0.0574	-0.153	0.26	-1.698
Statistics (NDs = DL)	0.6	0.559	0.814	-1.748	1.757	-1.005
Statistics (NDs = DL/2)	0.478	0.45	1.008	-2.07	2.107	-1.018
Statistics (Gamma ROS Estimates)	19.32	17.28	0.045	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.483	0.427	-0.884

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.952	0.917	0.916	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.908	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.151	0.229	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.826	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.823	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.3	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.984	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0906	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.978	0.872	0.849	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.307	0.736	
Kolmogorov-Smirnov (Detects Only)	0.159	0.221	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	3.179	0.8	
Kolmogorov-Smirnov (NDs = DL)	0.312	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.391	0.815	
Kolmogorov-Smirnov (NDs = DL/2)	0.314	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.229	0.745	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.102	0.165	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.868	0.86	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.953	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.15	0.229	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.731	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.306	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.715	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.308	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.981	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0909	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cadmium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	2	26	92.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	26	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Estimated Data)	28	N/A	N/A	N/A	N/A	N/A

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilks (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilks (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilks (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Calcium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	23	5	17.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	4.6	6.6	5.12	4.8	0.844
Statistics (Detects Only)	23	116	7340	1197	885	1440
Statistics (All: NDs treated as DL value)	28	4.6	7340	983.9	761.5	1380
Statistics (All: NDs treated as DL/2 value)	28	2.3	7340	983.5	761.5	1380
Statistics (Normal ROS Estimated Data)	28	-1605	7340	751.5	761.5	1625
Statistics (Gamma ROS Estimated Data)	28	1E-09	7340	984.5	761.5	1380
Statistics (Lognormal ROS Estimated Data)	28	104.3	7340	1007	761.5	1364

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.506	1.368	794.6	6.72	0.84	0.125
Statistics (NDs = DL)	0.575	0.537	1712	5.81	2.128	0.366
Statistics (NDs = DL/2)	0.523	0.491	1879	5.686	2.383	0.419
Statistics (Gamma ROS Estimates)	0.178	0.183	5519	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.391	1.047	0.164

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.724	0.745	0.746	0.855

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.553	0.914	Data Not Normal
Lilliefors (Detects Only)	0.275	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.244	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.244	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.761	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.866	0.916	0.919	0.944

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.694	0.76	
Kolmogorov-Smirnov (Detects Only)	0.152	0.185	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.232	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.192	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.47	0.808	
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.572	0.907	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.184	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.974	0.886	0.869	0.976

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.0979	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.779	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.75	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.296	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.949	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Chromium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	6.3	53.3	21.09	22.4	10.5

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.111	3.695	5.13	2.922	0.529	0.181

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.956	0.956	0.956	0.956

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.92	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.11	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.974	0.974	0.974	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.612	0.75	
Kolmogorov-Smirnov (Full: no NDs)	0.145	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.974	0.974	0.974	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.946	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.17	0.167	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cobalt (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	20	8	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.11	0.75	0.501	0.72	0.319
Statistics (Detects Only)	20	5.9	45.4	15.95	12.1	10.07
Statistics (All: NDs treated as DL value)	28	0.11	45.4	11.53	10.15	11.04
Statistics (All: NDs treated as DL/2 value)	28	0.055	45.4	11.46	10.15	11.11
Statistics (Normal ROS Estimated Data)	28	-10.02	45.4	9.494	10.15	13.45
Statistics (Gamma ROS Estimated Data)	28	3.774	45.4	13.39	10.15	9.473
Statistics (Lognormal ROS Estimated Data)	28	3.134	45.4	12.48	10.15	10.13

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.439	3.095	4.636	2.617	0.545	0.208
Statistics (NDs = DL)	0.701	0.65	16.45	1.583	1.793	1.132
Statistics (NDs = DL/2)	0.588	0.549	19.49	1.385	2.092	1.51
Statistics (Gamma ROS Estimates)	2.851	2.569	4.697	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.25	0.749	0.333

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.901	0.93	0.93	0.968

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.819	0.905	Data Not Normal
Lilliefors (Detects Only)	0.236	0.198	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.158	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.156	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.936	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.128	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.973	0.98	0.973	0.967

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.596	0.747	
Kolmogorov-Smirnov (Detects Only)	0.167	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.122	0.79	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.172	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.507	0.801	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.174	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.785	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.155	0.167	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.918	0.903	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.96	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.198	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.831	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.257	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.802	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.288	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.126	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Copper (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	26	2	7.14%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.17	0.17	0.17	0.17	0
Statistics (Detects Only)	26	2.2	13.6	6.919	5.35	3.696
Statistics (All: NDs treated as DL value)	28	0.17	13.6	6.437	5.2	3.973
Statistics (All: NDs treated as DL/2 value)	28	0.085	13.6	6.431	5.2	3.983
Statistics (Normal ROS Estimated Data)	28	-2.356	13.6	6.306	5.2	4.214
Statistics (Gamma ROS Estimated Data)	28	1E-09	13.6	6.44	5.2	3.969
Statistics (Lognormal ROS Estimated Data)	28	1.502	13.6	6.545	5.2	3.814

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.738	3.361	1.851	1.795	0.544	0.303
Statistics (NDs = DL)	1.699	1.541	3.788	1.54	1.072	0.696
Statistics (NDs = DL/2)	1.493	1.357	4.307	1.49	1.234	0.828
Statistics (Gamma ROS Estimates)	0.633	0.589	10.17	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.703	0.623	0.366

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.947	0.966	0.967	0.973

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.88	0.92	Data Not Normal
Lilliefors (Detects Only)	0.206	0.174	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.919	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.181	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.92	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.18	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.939	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.164	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.96	0.946	0.941	0.888

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.717	0.749	
Kolmogorov-Smirnov (Detects Only)	0.151	0.172	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.918	0.761	
Kolmogorov-Smirnov (NDs = DL)	0.152	0.168	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	1.191	0.763	
Kolmogorov-Smirnov (NDs = DL/2)	0.177	0.168	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.942	0.797	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.345	0.173	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.861	0.825	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.939	0.92	Data Appear Lognormal
Lilliefors (Detects Only)	0.135	0.174	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.748	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.222	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.69	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.258	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.952	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.118	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Iron (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	7250	63000	20108	19750	11869

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	3.411	3.069	5895	9.755	0.57	0.0584

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.912	0.912	0.912	0.912

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.846	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.139	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.961	0.961	0.961	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.612	0.752	
Kolmogorov-Smirnov (Full: no NDs)	0.151	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.97	0.97	0.97	0.97

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.932	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.153	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Lead (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	8.9	225	26.96	15.15	41.34

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.456	1.324	18.52	2.913	0.702	0.241

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.619	0.619	0.619	0.619

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.416	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.375	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.807	0.807	0.807	0.807

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	3.163	0.764	
Kolmogorov-Smirnov (Full: no NDs)	0.253	0.169	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.886	0.886	0.886	0.886

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.798	0.924	Data Not Lognormal
Lilliefors (Full: no NDs)	0.192	0.167	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Magnesium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	25	3	10.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	4.7	5	4.833	4.8	0.153
Statistics (Detects Only)	25	158	20400	2498	913	4334
Statistics (All: NDs treated as DL value)	28	4.7	20400	2231	741	4161
Statistics (All: NDs treated as DL/2 value)	28	2.35	20400	2230	741	4161
Statistics (Normal ROS Estimated Data)	28	-5148	20400	1678	741	4743
Statistics (Gamma ROS Estimated Data)	28	1E-09	20400	2230	741	4161
Statistics (Lognormal ROS Estimated Data)	28	56.13	20400	2236	741	4158

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.694	0.643	3600	6.951	1.272	0.183
Statistics (NDs = DL)	0.479	0.451	4657	6.375	2.075	0.325
Statistics (NDs = DL/2)	0.457	0.432	4879	6.301	2.257	0.358
Statistics (Gamma ROS Estimates)	0.198	0.201	11267	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.638	1.512	0.228

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.731	0.721	0.721	0.836

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.558	0.918	Data Not Normal
Lilliefors (Detects Only)	0.303	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.299	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.729	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.267	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.946	0.959	0.961	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.247	0.789	
Kolmogorov-Smirnov (Detects Only)	0.183	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.674	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.175	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.681	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.176	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.847	0.898	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.366	0.183	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.978	0.943	0.925	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.95	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.107	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.889	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.195	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.856	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.973	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0849	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Manganese (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	43	2040	695.9	490	591.5

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.442	1.311	482.6	6.16	0.971	0.158

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.923	0.923	0.923	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.84	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.197	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.971	0.971	0.971	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.306	0.764	
Kolmogorov-Smirnov (Full: no NDs)	0.102	0.169	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.983	0.983	0.983	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.962	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.106	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Mercury (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	3	25	89.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	25	0.019	0.06	0.0466	0.05	0.017
Statistics (Detects Only)	3	0.07	1.2	0.467	0.13	0.636
Statistics (All: NDs treated as DL value)	28	0.019	1.2	0.0916	0.06	0.218
Statistics (All: NDs treated as DL/2 value)	28	0.0095	1.2	0.0708	0.03	0.223
Statistics (Normal ROS Estimated Data)	28	-6.561	1.2	-3.164	-3.255	1.837
Statistics (Gamma ROS Estimated Data)	28	1E-09	1.2	0.05	1E-09	0.227
Statistics (Lognormal ROS Estimated Data)	28	6.8748E-09	1.2	0.0503	2.3931E-05	0.227

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.798	0.737	0.585	-1.506	1.494	-0.992
Statistics (NDs = DL)	0.982	0.901	0.0933	-2.979	0.795	-0.267
Statistics (NDs = DL/2)	0.644	0.598	0.11	-3.598	0.952	-0.265
Statistics (Gamma ROS Estimates)	0.0553	0.0732	0.904	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-10.44	4.519	-0.433

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.889	0.485	0.471	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.79	0.767	Data Appear Normal
Lilliefors (Detects Only)	0.368	0.512	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.268	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.468	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.253	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.466	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.974	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0965	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	0.694	0.731	0.95

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.439	N/A	
Kolmogorov-Smirnov (Detects Only)	0.373	N/A	
Anderson-Darling (NDs = DL)	4.794	0.775	
Kolmogorov-Smirnov (NDs = DL)	0.41	0.17	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.507	0.796	
Kolmogorov-Smirnov (NDs = DL/2)	0.458	0.173	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.082	1.229	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.564	0.206	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.951	0.826	0.826	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.904	0.767	Data Appear Lognormal
Lilliefors (Detects Only)	0.306	0.512	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.71	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.31	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.708	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.355	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.974	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0964	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Nickel (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	17	11	39.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	0.21	1.3	1.005	1.3	0.504
Statistics (Detects Only)	17	4.6	18.1	9.935	9.4	4.294
Statistics (All: NDs treated as DL value)	28	0.21	18.1	6.427	5.55	5.545
Statistics (All: NDs treated as DL/2 value)	28	0.105	18.1	6.23	5.55	5.741
Statistics (Normal ROS Estimated Data)	28	-7.045	18.1	5.574	5.55	6.652
Statistics (Gamma ROS Estimated Data)	28	1.974	18.1	9.082	8.465	3.849
Statistics (Lognormal ROS Estimated Data)	28	1.602	18.1	7.218	5.55	4.794

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	5.612	5.034	1.77	2.204	0.448	0.203
Statistics (NDs = DL)	0.953	0.874	6.748	1.251	1.353	1.082
Statistics (NDs = DL/2)	0.709	0.657	8.784	0.979	1.668	1.704
Statistics (Gamma ROS Estimates)	5.329	4.782	1.704	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.759	0.683	0.388

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.977	0.953	0.948	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.938	0.892	Data Appear Normal
Lilliefors (Detects Only)	0.12	0.215	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.891	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.215	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.88	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.227	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.977	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0932	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.986	0.947	0.923	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.276	0.741	
Kolmogorov-Smirnov (Detects Only)	0.133	0.21	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.909	0.776	
Kolmogorov-Smirnov (NDs = DL)	0.199	0.171	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.342	0.789	
Kolmogorov-Smirnov (NDs = DL/2)	0.225	0.172	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.176	0.748	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0785	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.984	0.942	0.929	0.986

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.949	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.125	0.215	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.872	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.188	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.847	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.236	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.959	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.107	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Potassium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	22	6	21.43%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	201	271	220	213	25.92
Statistics (Detects Only)	22	166	2350	735.4	509.5	632.6
Statistics (All: NDs treated as DL value)	28	166	2350	625	317.5	598.1
Statistics (All: NDs treated as DL/2 value)	28	100.5	2350	601.4	317.5	616.1
Statistics (Normal ROS Estimated Data)	28	-180.2	2350	544.7	317.5	671
Statistics (Gamma ROS Estimated Data)	28	135.6	2350	613.1	326.6	607.5
Statistics (Lognormal ROS Estimated Data)	28	142.4	2350	609.6	317.5	609.5

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.634	1.482	450.2	6.264	0.838	0.134
Statistics (NDs = DL)	1.53	1.39	408.6	6.076	0.826	0.136
Statistics (NDs = DL/2)	1.2	1.095	501.1	5.928	0.989	0.167
Statistics (Gamma ROS Estimates)	1.347	1.226	455.3	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	5.992	0.91	0.152

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.914	0.87	0.889	0.938

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.83	0.911	Data Not Normal
Lilliefors (Detects Only)	0.222	0.189	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.756	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.239	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.787	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.874	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.176	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.987	0.977	0.987	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.667	0.758	
Kolmogorov-Smirnov (Detects Only)	0.154	0.188	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.637	0.762	
Kolmogorov-Smirnov (NDs = DL)	0.21	0.168	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.858	0.769	
Kolmogorov-Smirnov (NDs = DL/2)	0.151	0.169	Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	1.093	0.766	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.171	0.169	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.948	0.977	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.939	0.911	Data Appear Lognormal
Lilliefors (Detects Only)	0.123	0.189	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.882	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.187	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.934	0.924	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.102	0.167	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.9	0.924	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Selenium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	2	26	92.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	26	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Estimated Data)	28	N/A	N/A	N/A	N/A	N/A

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilks (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilks (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilks (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Silver (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	1	27	96.43%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Silver (rfaap bkgrd-ss) was not processed!

Sodium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	1	27	96.43%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Sodium (rfaap bkgrd-ss) was not processed!

Thallium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	4	24	85.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	24	0.13	0.41	0.195	0.14	0.102
Statistics (Detects Only)	4	1.3	2.1	1.85	2	0.37
Statistics (All: NDs treated as DL value)	28	0.13	2.1	0.431	0.14	0.61
Statistics (All: NDs treated as DL/2 value)	28	0.065	2.1	0.348	0.07	0.638
Statistics (Normal ROS Estimated Data)	28	-1.016	2.1	0.463	0.263	0.766
Statistics (Gamma ROS Estimated Data)	28	1.3	2.1	1.854	1.856	0.123
Statistics (Lognormal ROS Estimated Data)	28	0.329	2.1	0.886	0.706	0.466

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	28.68	25.63	0.0645	0.598	0.225	0.376
Statistics (NDs = DL)	1.025	0.939	0.421	-1.403	0.921	-0.657
Statistics (NDs = DL/2)	0.649	0.604	0.535	-1.997	1.149	-0.575
Statistics (Gamma ROS Estimates)	199.2	177.9	0.00931	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.229	0.457	-1.992

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.85	0.729	0.691	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.737	0.748	Data Not Normal
Lilliefors (Detects Only)	0.408	0.443	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.532	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.371	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.481	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.446	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.952	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.138	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.806	0.898	0.892	0.668

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.755	0.657	
Kolmogorov-Smirnov (Detects Only)	0.436	0.394	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	4.636	0.773	
Kolmogorov-Smirnov (NDs = DL)	0.342	0.17	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.51	0.795	
Kolmogorov-Smirnov (NDs = DL/2)	0.351	0.173	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.198	0.743	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.415	0.165	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.838	0.829	0.804	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.717	0.748	Data Not Lognormal
Lilliefors (Detects Only)	0.415	0.443	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.678	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.311	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.639	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.318	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.951	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Vanadium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	12.2	101	33.89	33.8	17.78

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.392	3.946	7.716	3.405	0.497	0.146

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.902	0.902	0.902	0.902

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.832	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.141	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.943	0.943	0.943	0.943

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.622	0.749	
Kolmogorov-Smirnov (Full: no NDs)	0.111	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.969	0.969	0.969	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.939	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Zinc (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	7.1	216	41.21	29.7	40.24

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.826	1.654	22.56	3.421	0.761	0.223

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.798	0.798	0.798	0.798

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.665	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.203	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.913	0.913	0.913	0.913

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.54	0.76	
Kolmogorov-Smirnov (Full: no NDs)	0.105	0.168	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.985	0.985	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.975	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.1	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1				**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**								
2			**User Selected Options**									
3			From File	Detects.wst								
4			Full Precision	OFF								
5			Confidence Coefficient	95%								
6			Substantial Difference	0								
7			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
8			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
9												
10												
11	**Area of Concern Data: Aluminum(swmu 48 ts)**											
12	**Background Data: Aluminum(bkgrd ts)**											
13												
14				**Raw Statistics**								
15					Site	Background						
16				Number of Valid Observations	13	79						
17				Number of Missing Values	2	0						
18				Number of Distinct Observations	13	75						
19				Minimum	2940	3620						
20				Maximum	47900	47900						
21				Mean	22088	14204						
22				Median	22700	12100						
23				SD	11731	9433						
24				SE of Mean	3254	1061						
25												
26				**Wilcoxon-Mann-Whitney (WMW) Test**								
27												
28	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
29												
30				Site Rank Sum W-Stat	838.5							
31				WMW Test U-Stat	2.617							
32				WMW Critical Value (0.050)	1.645							
33				P-Value	0.00443							
34												
35	**Conclusion with Alpha = 0.05**											
36	**Reject H0, Conclude Site > Background**											
37	**P-Value < alpha (0.05)**											
38												

	A	B	C	D	E	F	G	H	I	J	K	L
39				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
40			**User Selected Options**									
41			From File	Detects.wst								
42			Full Precision	OFF								
43			Confidence Coefficient	95%								
44			Substantial Difference	0								
45			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
46			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
47												
48												
49	**Area of Concern Data: Arsenic(swmu 48 ts)**											
50	**Background Data: Arsenic(bkgrd ts)**											
51												
52				**Raw Statistics**								
53					Site	Background						
54				Number of Valid Data	15	79						
55				Number of Non-Detect Data	4	3						
56				Number of Detect Data	11	76						
57				Minimum Non-Detect	0.16	0.09						
58				Maximum Non-Detect	2.5	0.12						
59				Percent Non detects	26.67%	3.80%						
60				Minimum Detected	0.6	1.2						
61				Maximum Detected	8.19	35.9						
62				Mean of Detected Data	3.603	4.989						
63				Median of Detected Data	3.1	3.2						
64				SD of Detected Data	2.526	5.36						
65												
66				**Site vs Background Gehan Test**								
67												
68	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
69												
70				Gehan z Test Value	-1.841							
71				Critical z (0.95)	1.645							
72				P-Value	0.967							
73												
74	**Conclusion with Alpha = 0.05**											
75	**Do Not Reject H0, Conclude Site <= Background**											
76	**P-Value >= alpha (0.05)**											
77												

	A	B	C	D	E	F	G	H	I	J	K	L
78				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
79			**User Selected Options**									
80			From File	Detects.wst								
81			Full Precision	OFF								
82			Confidence Coefficient	95%								
83			Substantial Difference	0								
84			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
85			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
86												
87												
88	**Area of Concern Data: Cobalt(swmu 48 ts)**											
89	**Background Data: Cobalt(bkgrd ts)**											
90												
91				**Raw Statistics**								
92					Site	Background						
93				Number of Valid Data	13	79						
94				Number of Missing Values	2	0						
95				Number of Non-Detect Data	0	23						
96				Number of Detect Data	13	56						
97				Minimum Non-Detect	N/A	0.11						
98				Maximum Non-Detect	N/A	0.84						
99				Percent Non detects	0.00%	29.11%						
100				Minimum Detected	2.4	5.9						
101				Maximum Detected	58.2	130						
102				Mean of Detected Data	10.94	22.23						
103				Median of Detected Data	6.1	13.3						
104				SD of Detected Data	14.85	23.94						
105												
106				**Site vs Background Gehan Test**								
107												
108	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
109												
110				Gehan z Test Value	-1.011							
111				Critical z (0.95)	1.645							
112				P-Value	0.844							
113												
114	**Conclusion with Alpha = 0.05**											
115	**Do Not Reject H0, Conclude Site <= Background**											
116	**P-Value >= alpha (0.05)**											
117												

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
From File	Detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Chromium(swmu 48 ts)

Background Data: Chromium(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	15	79
Number of Distinct Observations	14	70
Minimum	5.34	6.3
Maximum	36.1	75.8
Mean	23.15	26.86
Median	27.3	26
SD	9.184	12.51
SE of Mean	2.371	1.408

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	92	-1.092	1.662	0.861
Welch-Satterthwaite (Unequal Varian	25.1	-1.345	1.708	0.905

Pooled SD 12.067

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background

* Welch-Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Variance of Site	84.34
Variance of Background	156.6

Numerator DF	Denominator DF	F-Test Value	P-Value
78	14	1.857	0.195

Conclusion with Alpha = 0.05

* Two variances appear to be equal

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
From File	Detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Iron(swmu 48 ts)

Background Data: Iron(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	13	79
Number of Missing Values	2	0
Number of Distinct Observations	13	72
Minimum	8550	7250
Maximum	81800	67700
Mean	37904	26963
Median	27500	25200
SD	25586	11990
SE of Mean	7096	1349

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	90	2.511	1.662	0.007
Welch-Satterthwaite (Unequal Varian	12.9	1.515	1.771	0.077

Pooled SD 14555.830

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Reject H0, Conclude Site > Background

* Welch-Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Variance of Site	654600000
Variance of Background	143800000

Numerator DF	Denominator DF	F-Test Value	P-Value
12	78	4.554	0

Conclusion with Alpha = 0.05

* Two variances are not equal

	A	B	C	D	E	F	G	H	I	J	K	L
215				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
216			**User Selected Options**									
217			From File	Detects.wst								
218			Full Precision	OFF								
219			Confidence Coefficient	95%								
220			Substantial Difference	0								
221			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
222			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
223												
224												
225	**Area of Concern Data: Mercury(swmu 48 ts)**											
226	**Background Data: Mercury(bkgrd ts)**											
227												
228				**Raw Statistics**								
229					Site	Background						
230				Number of Valid Data	15	79						
231				Number of Non-Detect Data	4	61						
232				Number of Detect Data	11	18						
233				Minimum Non-Detect	0.05	0.019						
234				Maximum Non-Detect	0.13	0.06						
235				Percent Non detects	26.67%	77.22%						
236				Minimum Detected	0.016	0.038						
237				Maximum Detected	2.6	1.2						
238				Mean of Detected Data	0.386	0.187						
239				Median of Detected Data	0.041	0.125						
240				SD of Detected Data	0.801	0.259						
241												
242				**Site vs Background Gehan Test**								
243												
244	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
245												
246				Gehan z Test Value	1.293							
247				Critical z (0.95)	1.645							
248				P-Value	0.098							
249												
250	**Conclusion with Alpha = 0.05**											
251	**Do Not Reject H0, Conclude Site <= Background**											
252	**P-Value >= alpha (0.05)**											
253												

	A	B	C	D	E	F	G	H	I	J	K	L
254				**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**								
255			**User Selected Options**									
256			From File	Detects.wst								
257			Full Precision	OFF								
258			Confidence Coefficient	95%								
259			Substantial Difference	0								
260			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
261			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
262												
263												
264	**Area of Concern Data: Manganese(swmu 48 ts)**											
265	**Background Data: Manganese(bkgrd ts)**											
266												
267				**Raw Statistics**								
268					Site	Background						
269			Number of Valid Observations		13	79						
270			Number of Missing Values		2	0						
271			Number of Distinct Observations		13	78						
272			Minimum		39.4	16.7						
273			Maximum		2070	2040						
274			Mean		420	471.4						
275			Median		242	359						
276			SD		551.6	467.1						
277			SE of Mean		153	52.55						
278												
279				**Wilcoxon-Mann-Whitney (WMW) Test**								
280												
281	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
282												
283			Site Rank Sum W-Stat		538							
284			WMW Test U-Stat		-0.751							
285			WMW Critical Value (0.050)		1.645							
286			P-Value		0.774							
287												
288	**Conclusion with Alpha = 0.05**											
289	**Do Not Reject H0, Conclude Site <= Background**											
290	**P-Value >= alpha (0.05)**											
291												

	A	B	C	D	E	F	G	H	I	J	K	L
292				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
293			**User Selected Options**									
294			From File	Detects.wst								
295			Full Precision	OFF								
296			Confidence Coefficient	95%								
297			Substantial Difference	0								
298			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
299			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
300												
301												
302	**Area of Concern Data: Thallium(swmu 48 ts)**											
303	**Background Data: Thallium(bkgrd ts)**											
304												
305				**Raw Statistics**								
306					Site	Background						
307				Number of Valid Data	15	79						
308				Number of Non-Detect Data	8	64						
309				Number of Detect Data	7	15						
310				Minimum Non-Detect	0.099	0.13						
311				Maximum Non-Detect	34.3	0.45						
312				Percent Non detects	53.33%	81.01%						
313				Minimum Detected	0.097	1.3						
314				Maximum Detected	0.27	5						
315				Mean of Detected Data	0.161	2.527						
316				Median of Detected Data	0.14	2.2						
317				SD of Detected Data	0.062	0.932						
318												
319				**Site vs Background Gehan Test**								
320												
321	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
322												
323				Gehan z Test Value	0.518							
324				Critical z (0.95)	1.645							
325				P-Value	0.302							
326												
327	**Conclusion with Alpha = 0.05**											
328	**Do Not Reject H0, Conclude Site <= Background**											
329	**P-Value >= alpha (0.05)**											
330												

331	**t-Test Site vs Background Comparison for Full Data Sets without NDs**											
332	**User Selected Options**											
333	From File	Detects.wst										
334	Full Precision	OFF										
335	Confidence Coefficient	95%										
336	Substantial Difference (S)	0										
337	Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)										
338	Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean										
339												
340												
341	**Area of Concern Data: Vanadium(swmu 48 ts)**											
342	**Background Data: Vanadium(bkgrd ts)**											
343												
344												
345	**Raw Statistics**											
346			Site	Background								
347	Number of Valid Observations		13	79								
348	Number of Missing Values		2	0								
349	Number of Distinct Observations		13	76								
350	Minimum		8.97	12.2								
351	Maximum		96.4	114								
352	Mean		45.69	45.84								
353	Median		34.3	41.4								
354	SD		23.84	20.38								
355	SE of Mean		6.612	2.293								
356												
357	**Site vs Background Two-Sample t-Test**											
358												
359	**H0: Mu of Site - Mu of Background <= 0**											
360				t-Test	Critical							
361	Method		DF	Value	t (0.050)	P-Value						
362	Pooled (Equal Variance)		90	-0.024	1.662	0.51						
363	Welch-Satterthwaite (Unequal Varian		15	-0.021	1.753	0.508						
364	Pooled SD 20.876											
365	Conclusion with Alpha = 0.050											
366	* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background											
367	* Welch-Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background											
368												
369												
370	**Test of Equality of Variances**											
371												
372	Variance of Site		568.4									
373	Variance of Background		415.4									
374												
375	Numerator DF	Denominator DF	F-Test Value	P-Value								
376	12	78	1.368	0.399								
377	Conclusion with Alpha = 0.05											
378	* Two variances appear to be equal											

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options **Units = mg/kg**

From File H:\Risk DB\Radford - Background Statistics

Full Precision OFF

Confidence Coefficient 0.95

Lead (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	2.1	256	22.04	12	39.85

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.186	1.149	18.59	2.615	0.783	0.299

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.597	0.597	0.597	0.597

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.344	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.803	0.803	0.803	0.803

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	7.671	0.777	
Kolmogorov-Smirnov (Full: no NDs)	0.245	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.929	0.929	0.929	0.929

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.147	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Aluminum (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	3620	47900	14204	12100	9433

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	2.787	2.689	5097	9.371	0.618	0.0659

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.923	0.923	0.923	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.15	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.988	0.988	0.988	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.604	0.76	
Kolmogorov-Smirnov (Full: no NDs)	0.0772	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.995	0.995	0.995	0.995

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0626	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Antimony (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	41	38	0	38	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony (mg/kg) (rfaap bkgrd ts) was not processed!

Arsenic (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	76	3	3.80%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.09	0.12	0.103	0.1	0.0153
Statistics (Detects Only)	76	1.2	35.9	4.989	3.2	5.36
Statistics (All: NDs treated as DL value)	79	0.09	35.9	4.804	3.1	5.339
Statistics (All: NDs treated as DL/2 value)	79	0.045	35.9	4.802	3.1	5.341
Statistics (Normal ROS Estimated Data)	79	-5.169	35.9	4.604	3.1	5.608
Statistics (Gamma ROS Estimated Data)	79	1E-09	35.9	4.8	3.1	5.343
Statistics (Lognormal ROS Estimated Data)	79	0.728	35.9	4.828	3.1	5.32

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.819	1.759	2.742	1.308	0.692	0.529
Statistics (NDs = DL)	1.401	1.356	3.429	1.172	0.968	0.826
Statistics (NDs = DL/2)	1.323	1.281	3.631	1.146	1.067	0.932
Statistics (Gamma ROS Estimates)	0.568	0.555	8.454	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	0.748	0.6

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.765	0.778	0.778	0.817

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.282	0.102	Data Not Normal
Lilliefors (NDs = DL)	0.279	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.279	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.263	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.916	0.932	0.935	0.972

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.409	0.766	
Kolmogorov-Smirnov (Detects Only)	0.213	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.469	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.182	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.587	0.774	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.103	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.23	0.812	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.332	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.958	0.919	0.886	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.151	0.102	Data Not Lognormal
Lilliefors (NDs = DL)	0.159	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Barium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	63	16	20.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	0.36	1.1	0.821	1	0.3
Statistics (Detects Only)	63	23.4	174	68.4	56.7	40.39
Statistics (All: NDs treated as DL value)	79	0.36	174	54.71	45.5	45.21
Statistics (All: NDs treated as DL/2 value)	79	0.18	174	54.63	45.5	45.31
Statistics (Normal ROS Estimated Data)	79	-54.83	174	50.41	45.5	51.24
Statistics (Gamma ROS Estimated Data)	79	1E-09	174	58.64	45.5	41.27
Statistics (Lognormal ROS Estimated Data)	79	10.45	174	58.03	45.5	41.56

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.354	3.236	20.39	4.069	0.555	0.136
Statistics (NDs = DL)	0.737	0.717	74.26	3.188	1.839	0.577
Statistics (NDs = DL/2)	0.642	0.626	85.13	3.047	2.109	0.692
Statistics (Gamma ROS Estimates)	1.061	1.029	55.28	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.817	0.71	0.186

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.932	0.955	0.955	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.211	0.112	Data Not Normal
Lilliefors (NDs = DL)	0.154	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.153	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.13	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.977	0.947	0.938	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.567	0.757	
Kolmogorov-Smirnov (Detects Only)	0.142	0.113	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	4.488	0.794	
Kolmogorov-Smirnov (NDs = DL)	0.207	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.552	0.804	
Kolmogorov-Smirnov (NDs = DL/2)	0.235	0.105	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.925	0.78	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.215	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.875	0.857	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.114	0.112	Data Not Lognormal
Lilliefors (NDs = DL)	0.29	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.317	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0679	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Beryllium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	40	39	49.37%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	0.022	0.03	0.0286	0.03	0.00265
Statistics (Detects Only)	40	0.61	5.4	1.449	1.1	1.086
Statistics (All: NDs treated as DL value)	79	0.022	5.4	0.748	0.61	1.049
Statistics (All: NDs treated as DL/2 value)	79	0.011	5.4	0.74	0.61	1.054
Statistics (Normal ROS Estimated Data)	79	-3.53	5.4	0.149	0.61	1.644
Statistics (Gamma ROS Estimated Data)	79	1E-09	5.4	1.439	1.3	0.88
Statistics (Lognormal ROS Estimated Data)	79	0.0819	5.4	0.892	0.61	0.959

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.116	3.006	0.465	0.202	0.533	2.643
Statistics (NDs = DL)	0.47	0.461	1.589	-1.654	1.93	-1.167
Statistics (NDs = DL/2)	0.39	0.383	1.9	-1.996	2.273	-1.138
Statistics (Gamma ROS Estimates)	1.38	1.336	1.043	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.504	0.875	-1.735

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.81	0.829	0.83	0.978

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.666	0.94	Data Not Normal
Lilliefors (Detects Only)	0.256	0.14	Data Not Normal
Lilliefors (NDs = DL)	0.247	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.248	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.117	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.915	0.976	0.973	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.172	0.754	
Kolmogorov-Smirnov (Detects Only)	0.198	0.14	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.807	0.826	
Kolmogorov-Smirnov (NDs = DL)	0.32	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	7.311	0.844	
Kolmogorov-Smirnov (NDs = DL/2)	0.323	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	5.881	0.773	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.232	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.947	0.883	0.873	0.996

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.891	0.94	Data Not Lognormal
Lilliefors (Detects Only)	0.155	0.14	Data Not Lognormal
Lilliefors (NDs = DL)	0.325	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.328	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0541	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cadmium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	13	66	83.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	66	0.02	0.05	0.0256	0.02	0.00861
Statistics (Detects Only)	13	0.57	2.5	1.152	1.1	0.585
Statistics (All: NDs treated as DL value)	79	0.02	2.5	0.211	0.02	0.479
Statistics (All: NDs treated as DL/2 value)	79	0.01	2.5	0.2	0.01	0.483
Statistics (Normal ROS Estimated Data)	79	-4.148	2.5	-1.016	-1.143	1.342
Statistics (Gamma ROS Estimated Data)	79	0.197	2.987	1.943	2.175	0.717
Statistics (Lognormal ROS Estimated Data)	79	0.0167	2.5	0.338	0.174	0.444

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	5.194	5.005	0.222	0.0424	0.448	10.55
Statistics (NDs = DL)	0.424	0.416	0.498	-3.093	1.437	-0.465
Statistics (NDs = DL/2)	0.329	0.325	0.609	-3.672	1.69	-0.46
Statistics (Gamma ROS Estimates)	5.206	5.016	0.373	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.649	1.046	-0.634

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.905	0.675	0.671	0.995

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.82	0.866	Data Not Normal
Lilliefors (Detects Only)	0.246	0.246	Data Not Normal
Lilliefors (NDs = DL)	0.467	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.477	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0689	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.955	0.948	0.957	0.92

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.512	0.736	
Kolmogorov-Smirnov (Detects Only)	0.181	0.237	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	17.17	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.422	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	18.08	0.858	
Kolmogorov-Smirnov (NDs = DL/2)	0.448	0.109	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.804	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.164	0.101	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.969	0.778	0.764	0.995

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.934	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.246	Data Appear Lognormal
Lilliefors (NDs = DL)	0.327	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.348	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0689	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Chromium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	6.3	75.8	26.86	26	12.51

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.546	4.382	5.91	3.177	0.501	0.158

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.971	0.971	0.971	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0734	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.99	0.99	0.99	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.591	0.755	
Kolmogorov-Smirnov (Full: no NDs)	0.0909	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.984	0.984	0.984	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.122	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cobalt (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	56	23	29.11%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	23	0.11	0.84	0.587	0.73	0.286
Statistics (Detects Only)	56	5.9	130	22.23	13.3	23.94
Statistics (All: NDs treated as DL value)	79	0.11	130	15.93	11.4	22.41
Statistics (All: NDs treated as DL/2 value)	79	0.055	130	15.84	11.4	22.47
Statistics (Normal ROS Estimated Data)	79	-40.83	130	8.784	11.4	29.44
Statistics (Gamma ROS Estimated Data)	79	1E-09	130	17.57	11.9	21.54
Statistics (Lognormal ROS Estimated Data)	79	1.86	130	16.76	11.4	21.87

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.78	1.721	12.49	2.795	0.701	0.251
Statistics (NDs = DL)	0.61	0.595	26.11	1.758	1.787	1.017
Statistics (NDs = DL/2)	0.523	0.511	30.31	1.556	2.08	1.337
Statistics (Gamma ROS Estimates)	0.504	0.494	34.83	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.331	0.947	0.406

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.767	0.788	0.789	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.263	0.118	Data Not Normal
Lilliefors (NDs = DL)	0.24	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.241	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.17	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.914	0.965	0.969	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.203	0.765	
Kolmogorov-Smirnov (Detects Only)	0.162	0.121	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.127	0.807	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.851	0.816	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.036	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.36	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.956	0.941	0.924	0.986

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.13	0.118	Data Not Lognormal
Lilliefors (NDs = DL)	0.213	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0915	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Copper (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	77	2	2.53%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.17	0.17	0.17	0.17	0
Statistics (Detects Only)	77	1.6	38.7	12.25	9.1	9.397
Statistics (All: NDs treated as DL value)	79	0.17	38.7	11.95	9	9.47
Statistics (All: NDs treated as DL/2 value)	79	0.085	38.7	11.94	9	9.473
Statistics (Normal ROS Estimated Data)	79	-11.93	38.7	11.67	9	9.957
Statistics (Gamma ROS Estimated Data)	79	1E-09	38.7	11.94	9	9.475
Statistics (Lognormal ROS Estimated Data)	79	0.988	38.7	11.97	9	9.441

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.754	1.696	6.985	2.194	0.828	0.378
Statistics (NDs = DL)	1.438	1.391	8.31	2.094	1.03	0.492
Statistics (NDs = DL/2)	1.381	1.337	8.649	2.076	1.101	0.53
Statistics (Gamma ROS Estimates)	0.698	0.68	17.1	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.141	0.882	0.412

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.941	0.944	0.944	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.152	0.101	Data Not Normal
Lilliefors (NDs = DL)	0.155	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.155	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.136	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.982	0.98	0.979	0.955

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.936	0.767	
Kolmogorov-Smirnov (Detects Only)	0.117	0.103	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.591	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.0861	0.102	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.619	0.773	
Kolmogorov-Smirnov (NDs = DL/2)	0.0788	0.103	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	4.964	0.798	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.209	0.105	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.988	0.951	0.927	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.082	0.101	Data Appear Lognormal
Lilliefors (NDs = DL)	0.0741	0.0997	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.0933	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0707	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Iron (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	7250	67700	26963	25200	11990

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.607	4.441	5852	10.09	0.508	0.0503

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.979	0.979	0.979	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0648	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.984	0.984	0.984	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.831	0.755	
Kolmogorov-Smirnov (Full: no NDs)	0.082	0.101	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.97	0.97	0.97	0.97

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.115	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Magnesium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	72	7	8.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.8	5	4.686	4.8	0.402
Statistics (Detects Only)	72	139	58100	6394	1270	12925
Statistics (All: NDs treated as DL value)	79	3.8	58100	5828	1080	12466
Statistics (All: NDs treated as DL/2 value)	79	1.9	58100	5827	1080	12466
Statistics (Normal ROS Estimated Data)	79	-19110	58100	4438	1080	13862
Statistics (Gamma ROS Estimated Data)	79	1E-09	58100	5827	1080	12466
Statistics (Lognormal ROS Estimated Data)	79	28.2	58100	5832	1080	12464

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.484	0.474	13216	7.443	1.571	0.211
Statistics (NDs = DL)	0.379	0.373	15366	6.92	2.257	0.326
Statistics (NDs = DL/2)	0.368	0.363	15828	6.859	2.409	0.351
Statistics (Gamma ROS Estimates)	0.198	0.199	29431	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	7.129	1.812	0.254

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.71	0.697	0.697	0.812

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.323	0.104	Data Not Normal
Lilliefors (NDs = DL)	0.321	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.29	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.943	0.948	0.949	0.956

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.255	0.821	
Kolmogorov-Smirnov (Detects Only)	0.17	0.111	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.668	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.136	0.108	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.542	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.129	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	7.068	0.912	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.298	0.111	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.962	0.948	0.992

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0868	0.104	Data Appear Lognormal
Lilliefors (NDs = DL)	0.135	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.157	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0546	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Manganese (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	16.7	2040	471.4	359	467.1

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.121	1.087	420.6	5.647	1.118	0.198

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.894	0.894	0.894	0.894

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.165	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.982	0.982	0.982	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.359	0.779	
Kolmogorov-Smirnov (Full: no NDs)	0.0515	0.103	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.985	0.985	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.093	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Mercury (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	18	61	77.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	61	0.019	0.06	0.0484	0.06	0.0158
Statistics (Detects Only)	18	0.038	1.2	0.187	0.125	0.259
Statistics (All: NDs treated as DL value)	79	0.019	1.2	0.0799	0.06	0.135
Statistics (All: NDs treated as DL/2 value)	79	0.0095	1.2	0.0612	0.03	0.139
Statistics (Normal ROS Estimated Data)	79	-1.214	1.2	-0.361	-0.372	0.403
Statistics (Gamma ROS Estimated Data)	79	0.038	1.2	0.173	0.156	0.138
Statistics (Lognormal ROS Estimated Data)	79	0.0007952	1.2	0.0541	0.0171	0.141

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.552	1.501	0.12	-2.035	0.727	-0.358
Statistics (NDs = DL)	1.645	1.591	0.0485	-2.861	0.681	-0.238
Statistics (NDs = DL/2)	0.962	0.934	0.0636	-3.396	0.902	-0.266
Statistics (Gamma ROS Estimates)	3.073	2.965	0.0563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.029	1.44	-0.357

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.64	0.523	0.527	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.442	0.897	Data Not Normal
Lilliefors (Detects Only)	0.384	0.209	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.067	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.801	0.683	0.741	0.816

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.702	0.756	
Kolmogorov-Smirnov (Detects Only)	0.274	0.207	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.715	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.33	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	8.44	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.725	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0728	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.919	0.916	0.914	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.871	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.193	0.209	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.062	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Nickel (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	61	18	22.78%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	18	0.21	1.4	1.066	1.3	0.466
Statistics (Detects Only)	61	4.6	94.2	17.95	13.2	15.68
Statistics (All: NDs treated as DL value)	79	0.21	94.2	14.1	9.4	15.49
Statistics (All: NDs treated as DL/2 value)	79	0.105	94.2	13.98	9.4	15.59
Statistics (Normal ROS Estimated Data)	79	-32.3	94.2	10.45	9.4	19.82
Statistics (Gamma ROS Estimated Data)	79	1E-09	94.2	14.69	9.8	15.1
Statistics (Lognormal ROS Estimated Data)	79	1.082	94.2	14.48	9.4	15.18

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.974	1.908	9.092	2.614	0.722	0.276
Statistics (NDs = DL)	0.89	0.865	15.85	1.989	1.367	0.687
Statistics (NDs = DL/2)	0.743	0.723	18.82	1.831	1.622	0.886
Statistics (Gamma ROS Estimates)	0.377	0.371	38.92	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.235	0.959	0.429

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.86	0.87	0.874	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.197	0.113	Data Not Normal
Lilliefors (NDs = DL)	0.185	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.156	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.969	0.99	0.992	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.996	0.763	
Kolmogorov-Smirnov (Detects Only)	0.096	0.115	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.633	0.787	
Kolmogorov-Smirnov (NDs = DL)	0.112	0.104	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	1.261	0.794	
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	11.39	0.847	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.343	0.108	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.986	0.963	0.942	0.997

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.087	0.113	Data Appear Lognormal
Lilliefors (NDs = DL)	0.14	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.198	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0586	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Potassium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	67	12	15.19%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	201	271	223.1	217	20.78
Statistics (Detects Only)	67	123	10900	1690	694	2232
Statistics (All: NDs treated as DL value)	79	123	10900	1467	618	2120
Statistics (All: NDs treated as DL/2 value)	79	100.5	10900	1450	618	2131
Statistics (Normal ROS Estimated Data)	79	-1878	10900	1235	618	2322
Statistics (Gamma ROS Estimated Data)	79	1E-09	10900	1433	618	2142
Statistics (Lognormal ROS Estimated Data)	79	104.7	10900	1456	618	2127

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.92	0.893	1837	6.798	1.115	0.164
Statistics (NDs = DL)	0.837	0.814	1752	6.586	1.143	0.174
Statistics (NDs = DL/2)	0.75	0.73	1933	6.481	1.273	0.196
Statistics (Gamma ROS Estimates)	0.163	0.165	8778	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.525	1.216	0.186

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.813	0.789	0.795	0.88

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.247	0.108	Data Not Normal
Lilliefors (NDs = DL)	0.263	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.263	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.972	0.968	0.974	0.962

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.945	0.784	
Kolmogorov-Smirnov (Detects Only)	0.153	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.288	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.171	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.192	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	14.88	0.944	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.392	0.113	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.989	0.973	0.983	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0982	0.108	Data Appear Lognormal
Lilliefors (NDs = DL)	0.106	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.0732	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0941	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Selenium (mg.kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	2	77	97.47%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	77	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	79	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	79	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Estimated Data)	79	N/A	N/A	N/A	N/A	N/A

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Silver (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	1	78	98.73%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Silver (mg/kg) (rfaap bkgrd ts) was not processed!

Sodium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	6	73	92.41%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	73	10.8	25.9	15.02	12	4.717
Statistics (Detects Only)	6	114	151	131.7	127	14.76
Statistics (All: NDs treated as DL value)	79	10.8	151	23.88	12.1	31.65
Statistics (All: NDs treated as DL/2 value)	79	5.4	151	16.94	6.05	33.39
Statistics (Normal ROS Estimated Data)	79	-8.416	151	43.69	36.98	33.18
Statistics (Gamma ROS Estimated Data)	79	114	151	131.6	131.6	3.738
Statistics (Lognormal ROS Estimated Data)	79	45.83	151	70.08	64.41	20.82

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	97.1	93.42	1.356	4.875	0.111	0.0227
Statistics (NDs = DL)	1.618	1.565	14.76	2.833	0.653	0.23
Statistics (NDs = DL/2)	0.916	0.889	18.5	2.193	0.823	0.376
Statistics (Gamma ROS Estimates)	1276	1227	0.103	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	4.216	0.249	0.059

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.957	0.639	0.59	0.936

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.901	0.788	Data Appear Normal
Lilliefors (Detects Only)	0.212	0.362	Data Appear Normal
Lilliefors (NDs = DL)	0.404	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.472	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.2	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.959	0.811	0.809	0.571

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.389	0.696	
Kolmogorov-Smirnov (Detects Only)	0.22	0.332	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	13.6	0.769	
Kolmogorov-Smirnov (NDs = DL)	0.302	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	17.64	0.786	
Kolmogorov-Smirnov (NDs = DL/2)	0.386	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	22.97	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.448	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.963	0.798	0.753	0.936

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.913	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.198	0.362	Data Appear Lognormal
Lilliefors (NDs = DL)	0.246	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.27	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.2	0.0997	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Thallium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	15	64	81.01%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	64	0.13	0.45	0.189	0.15	0.0931
Statistics (Detects Only)	15	1.3	5	2.527	2.2	0.932
Statistics (All: NDs treated as DL value)	79	0.13	5	0.633	0.16	1.007
Statistics (All: NDs treated as DL/2 value)	79	0.065	5	0.556	0.08	1.039
Statistics (Normal ROS Estimated Data)	79	-4.787	5	-0.573	-0.722	1.972
Statistics (Gamma ROS Estimated Data)	79	1.3	5	2.489	2.468	0.399
Statistics (Lognormal ROS Estimated Data)	79	0.155	5	0.998	0.707	0.884

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	8.698	8.377	0.29	0.868	0.352	0.405
Statistics (NDs = DL)	0.753	0.733	0.841	-1.253	1.097	-0.876
Statistics (NDs = DL/2)	0.515	0.504	1.08	-1.814	1.358	-0.748
Statistics (Gamma ROS Estimates)	44.1	42.44	0.0564	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.291	0.738	-2.538

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.938	0.746	0.729	0.991

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.893	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.17	0.229	Data Appear Normal
Lilliefors (NDs = DL)	0.382	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.435	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0779	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.964	0.943	0.944	0.777

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.367	0.738	
Kolmogorov-Smirnov (Detects Only)	0.145	0.222	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	12.86	0.793	
Kolmogorov-Smirnov (NDs = DL)	0.361	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	14.62	0.817	
Kolmogorov-Smirnov (NDs = DL/2)	0.371	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.13	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.835	0.815	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.134	0.229	Data Appear Lognormal
Lilliefors (NDs = DL)	0.334	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.34	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0779	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Vanadium (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	12.2	114	45.84	41.4	20.38

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.973	4.792	9.218	3.721	0.477	0.128

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.98	0.98	0.98	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0967	0.0997	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.997	0.997	0.997	0.997

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.228	0.754	
Kolmogorov-Smirnov (Full: no NDs)	0.054	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.988	0.988	0.988	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0843	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Zinc (mg/kg) (rfaap bkgrd ts)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	79	0	79	79	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	79	4.7	598	54.94	30.2	87.15

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.083	1.05	50.74	3.478	0.93	0.267

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.683	0.683	0.683	0.683

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.291	0.0997	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.88	0.88	0.88	0.88

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	3.363	0.78	
Kolmogorov-Smirnov (Full: no NDs)	0.145	0.103	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.982	0.982	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Lilliefors (Full: no NDs)	0.0696	0.0997	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1				**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**								
2			**User Selected Options**									
3			From File	Sheet1.wst								
4			Full Precision	OFF								
5			Confidence Coefficient	95%								
6			Substantial Difference	0								
7			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
8			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
9												
10												
11	**Area of Concern Data: Aluminum(swmu 48 ss)**											
12	**Background Data: Aluminum(bkgrd ss)**											
13												
14				**Raw Statistics**								
15					Site	Background						
16				Number of Valid Observations	2	28						
17				Number of Missing Values	2	0						
18				Number of Distinct Observations	2	28						
19				Minimum	10900	3620						
20				Maximum	12600	20100						
21				Mean	11750	8300						
22				Median	11750	6705						
23				SD	1202	4279						
24				SE of Mean	850	808.6						
25												
26				**Wilcoxon-Mann-Whitney (WMW) Test**								
27												
28	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
29												
30				Site Rank Sum W-Stat	48							
31				WMW Test U-Stat	1.372							
32				WMW Critical Value (0.050)	1.645							
33				P-Value	0.0851							
34												
35	**Conclusion with Alpha = 0.05**											
36	**Do Not Reject H0, Conclude Site <= Background**											
37	**P-Value >= alpha (0.05)**											
38												

39				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
40			**User Selected Options**									
41			From File	Sheet1.wst								
42			Full Precision	OFF								
43			Confidence Coefficient	95%								
44			Substantial Difference	0								
45			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
46			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
47												
48												
49	**Area of Concern Data: Arsenic(swmu 48 ss)**											
50	**Background Data: Arsenic(bkgrd ss)**											
51												
52				**Raw Statistics**								
53					Site	Background						
54				Number of Valid Data	4	28						
55				Number of Non-Detect Data	1	0						
56				Number of Detect Data	3	28						
57				Minimum Non-Detect	2.5	N/A						
58				Maximum Non-Detect	2.5	N/A						
59				Percent Non detects	25.00%	0.00%						
60				Minimum Detected	1.46	1.5						
61				Maximum Detected	3.42	10.2						
62				Mean of Detected Data	2.5	3.732						
63				Median of Detected Data	2.62	2.75						
64				SD of Detected Data	0.985	2.33						
65												
66				**Site vs Background Gehan Test**								
67												
68	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
69												
70				Gehan z Test Value	-1.204							
71				Critical z (0.95)	1.645							
72				P-Value	0.886							
73												
74	**Conclusion with Alpha = 0.05**											
75	**Do Not Reject H0, Conclude Site <= Background**											
76	**P-Value >= alpha (0.05)**											
77												

78				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
79			**User Selected Options**									
80			From File	Sheet1.wst								
81			Full Precision	OFF								
82			Confidence Coefficient	95%								
83			Substantial Difference	0								
84			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
85			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
86												
87												
88	**Area of Concern Data: Barium(swmu 48 ss)**											
89	**Background Data: Barium(bkgrd ss)**											
90												
91				**Raw Statistics**								
92					Site	Background						
93				Number of Valid Data	4	28						
94				Number of Non-Detect Data	0	4						
95				Number of Detect Data	4	24						
96				Minimum Non-Detect	N/A	0.36						
97				Maximum Non-Detect	N/A	1						
98				Percent Non detects	0.00%	14.29%						
99				Minimum Detected	73.3	23.4						
100				Maximum Detected	572	174						
101				Mean of Detected Data	213.8	75.55						
102				Median of Detected Data	105	61.85						
103				SD of Detected Data	239.3	43.2						
104												
105				**Site vs Background Gehan Test**								
106												
107	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
108												
109				Gehan z Test Value	1.825							
110				Critical z (0.95)	1.645							
111				P-Value	0.034							
112												
113	**Conclusion with Alpha = 0.05**											
114	**Reject H0, Conclude Site > Background**											
115	**P-Value < alpha (0.05)**											
116												

117				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
118			**User Selected Options**									
119			From File	Sheet1.wst								
120			Full Precision	OFF								
121			Confidence Coefficient	95%								
122			Substantial Difference	0								
123			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
124			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
125												
126												
127	**Area of Concern Data: Cobalt(swmu 48 ss)**											
128	**Background Data: Cobalt(bkgrd ss)**											
129												
130				**Raw Statistics**								
131					Site	Background						
132				Number of Valid Data	2	28						
133				Number of Missing Values	2	0						
134				Number of Non-Detect Data	0	8						
135				Number of Detect Data	2	20						
136				Minimum Non-Detect	N/A	0.11						
137				Maximum Non-Detect	N/A	0.75						
138				Percent Non detects	0.00%	28.57%						
139				Minimum Detected	5.98	5.9						
140				Maximum Detected	10.3	45.4						
141				Mean of Detected Data	8.14	15.95						
142				Median of Detected Data	8.14	12.1						
143				SD of Detected Data	3.055	10.07						
144												
145				**Site vs Background Gehan Test**								
146												
147	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
148												
149				Gehan z Test Value	-0.336							
150				Critical z (0.95)	1.645							
151				P-Value	0.631							
152												
153	**Conclusion with Alpha = 0.05**											
154	**Do Not Reject H0, Conclude Site <= Background**											
155	**P-Value >= alpha (0.05)**											
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157				**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**								
158			**User Selected Options**									
159			From File	Sheet1.wst								
160			Full Precision	OFF								
161			Confidence Coefficient	95%								
162			Substantial Difference	0								
163			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
164			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
165												
166												
167	**Area of Concern Data: Chromium(swmu 48 ss)**											
168	**Background Data: Chromium(bkgrd ss)**											
169												
170				**Raw Statistics**								
171					Site	Background						
172				Number of Valid Observations	4	28						
173				Number of Distinct Observations	4	27						
174				Minimum	5.34	6.3						
175				Maximum	30.7	53.3						
176				Mean	21.96	21.09						
177				Median	25.9	22.4						
178				SD	11.38	10.5						
179				SE of Mean	5.692	1.985						
180												
181				**Wilcoxon-Mann-Whitney (WMW) Test**								
182												
183	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
184												
185				Site Rank Sum W-Stat	72							
186				WMW Test U-Stat	0.313							
187				WMW Critical Value (0.050)	1.645							
188				P-Value	0.377							
189												
190	**Conclusion with Alpha = 0.05**											
191	**Do Not Reject H0, Conclude Site <= Background**											
192	**P-Value >= alpha (0.05)**											
193												

194				**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**								
195			**User Selected Options**									
196			From File	Sheet1.wst								
197			Full Precision	OFF								
198			Confidence Coefficient	95%								
199			Substantial Difference	0								
200			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
201			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
202												
203												
204	**Area of Concern Data: Iron(swmu 48 ss)**											
205	**Background Data: Iron(bkgrd ss)**											
206												
207				**Raw Statistics**								
208					Site	Background						
209				Number of Valid Observations	2	28						
210				Number of Missing Values	2	0						
211				Number of Distinct Observations	2	26						
212				Minimum	12100	7250						
213				Maximum	15500	63000						
214				Mean	13800	20108						
215				Median	13800	19750						
216				SD	2404	11869						
217				SE of Mean	1700	2243						
218												
219				**Wilcoxon-Mann-Whitney (WMW) Test**								
220												
221	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
222												
223				Site Rank Sum W-Stat	22							
224				WMW Test U-Stat	-0.79							
225				WMW Critical Value (0.050)	1.645							
226				P-Value	0.785							
227												
228	**Conclusion with Alpha = 0.05**											
229	**Do Not Reject H0, Conclude Site <= Background**											
230	**P-Value >= alpha (0.05)**											
231												

	A	B	C	D	E	F	G	H	I	J	K	L
232				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
233			**User Selected Options**									
234			From File	Sheet1.wst								
235			Full Precision	OFF								
236			Confidence Coefficient	95%								
237			Substantial Difference	0								
238			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
239			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
240												
241												
242	**Area of Concern Data: Mercury(swmu 48 ss)**											
243	**Background Data: Mercury(bkgrd ss)**											
244												
245				**Raw Statistics**								
246					Site	Background						
247				Number of Valid Data	4	28						
248				Number of Non-Detect Data	1	25						
249				Number of Detect Data	3	3						
250				Minimum Non-Detect	0.05	0.019						
251				Maximum Non-Detect	0.05	0.06						
252				Percent Non detects	25.00%	89.29%						
253				Minimum Detected	0.03	0.07						
254				Maximum Detected	1.11	1.2						
255				Mean of Detected Data	0.392	0.467						
256				Median of Detected Data	0.037	0.13						
257				SD of Detected Data	0.622	0.636						
258												
259				**Site vs Background Gehan Test**								
260												
261	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
262												
263				Gehan z Test Value	1.51							
264				Critical z (0.95)	1.645							
265				P-Value	0.0655							
266												
267	**Conclusion with Alpha = 0.05**											
268	**Do Not Reject H0, Conclude Site <= Background**											
269	**P-Value >= alpha (0.05)**											
270												

271				**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**								
272			**User Selected Options**									
273			From File	Sheet1.wst								
274			Full Precision	OFF								
275			Confidence Coefficient	95%								
276			Substantial Difference	0								
277			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
278			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
279												
280												
281	**Area of Concern Data: Manganese(swmu 48 ss)**											
282	**Background Data: Manganese(bkgrd ss)**											
283												
284				**Raw Statistics**								
285					Site	Background						
286				Number of Valid Observations	2	28						
287				Number of Missing Values	2	0						
288				Number of Distinct Observations	2	28						
289				Minimum	248	43						
290				Maximum	998	2040						
291				Mean	623	695.9						
292				Median	623	490						
293				SD	530.3	591.5						
294				SE of Mean	375	111.8						
295												
296				**Wilcoxon-Mann-Whitney (WMW) Test**								
297												
298	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
299												
300				Site Rank Sum W-Stat	31							
301				WMW Test U-Stat	-0.0416							
302				WMW Critical Value (0.050)	1.645							
303				P-Value	0.517							
304												
305	**Conclusion with Alpha = 0.05**											
306	**Do Not Reject H0, Conclude Site <= Background**											
307	**P-Value >= alpha (0.05)**											
308												

	A	B	C	D	E	F	G	H	I	J	K	L
309				**Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects**								
310			**User Selected Options**									
311			From File	Sheet1.wst								
312			Full Precision	OFF								
313			Confidence Coefficient	95%								
314			Substantial Difference	0								
315			Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)								
316			Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median								
317												
318												
319	**Area of Concern Data: Thallium(swmu 48 ss)**											
320	**Background Data: Thallium(bkgrd ss)**											
321												
322				**Raw Statistics**								
323					Site	Background						
324				Number of Valid Data	4	28						
325				Number of Non-Detect Data	2	24						
326				Number of Detect Data	2	4						
327				Minimum Non-Detect	34.3	0.13						
328				Maximum Non-Detect	34.3	0.41						
329				Percent Non detects	50.00%	85.71%						
330				Minimum Detected	0.14	1.3						
331				Maximum Detected	0.14	2.1						
332				Mean of Detected Data	0.14	1.85						
333				Median of Detected Data	0.14	2						
334				SD of Detected Data	0	0.37						
335												
336				**Site vs Background Gehan Test**								
337												
338	**H0: Mean/Median of Site or AOC <= Mean/Median of background**											
339												
340				Gehan z Test Value	1.171							
341				Critical z (0.95)	1.645							
342				P-Value	0.121							
343												
344	**Conclusion with Alpha = 0.05**											
345	**Do Not Reject H0, Conclude Site <= Background**											
346	**P-Value >= alpha (0.05)**											
347												

348	**Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs**											
349	**User Selected Options**											
350	From File	Sheet1.wst										
351	Full Precision	OFF										
352	Confidence Coefficient	95%										
353	Substantial Difference	0										
354	Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)										
355	Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median										
356												
357												
358	**Area of Concern Data: Zinc(swmu 48 ss)**											
359	**Background Data: Zinc(bkgrd ss)**											
360												
361	**Raw Statistics**											
362		Site	Background									
363	Number of Valid Observations	2	28									
364	Number of Missing Values	2	0									
365	Number of Distinct Observations	2	28									
366	Minimum	23.8	7.1									
367	Maximum	24.4	216									
368	Mean	24.1	41.21									
369	Median	24.1	29.7									
370	SD	0.424	40.24									
371	SE of Mean	0.3	7.605									
372												
373	**Wilcoxon-Mann-Whitney (WMW) Test**											
374												
375	**H0: Mean/Median of Site or AOC <= Mean/Median of Background**											
376												
377	Site Rank Sum W-Stat	21										
378	WMW Test U-Stat	-0.873										
379	WMW Critical Value (0.050)	1.645										
380	P-Value	0.809										
381												
382	**Conclusion with Alpha = 0.05**											
383	**Do Not Reject H0, Conclude Site <= Background**											
384	**P-Value >= alpha (0.05)**											

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options **mg/kg**

From File H:\Risk DB\Radford - Background Statistics

Full Precision OFF

Confidence Coefficient 0.95

Aluminum (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	3620	20100	8300	6705	4279

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.541	4.078	1828	8.91	0.477	0.0535

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.935	0.935	0.935	0.935

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.871	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.208	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.982	0.982	0.982	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.741	0.749	
Kolmogorov-Smirnov (Full: no NDs)	0.171	0.166	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.98	0.98	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.948	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.142	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Antimony (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	14	14	0	14	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Antimony (rfaap bkgrd-ss) was not processed!

Arsenic (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	1.5	10.2	3.732	2.75	2.33

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	3.494	3.143	1.068	1.167	0.532	0.456

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.898	0.898	0.898	0.898

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.803	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.203	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.969	0.969	0.969	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	1.02	0.752	
Kolmogorov-Smirnov (Full: no NDs)	0.165	0.166	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.972	0.972	0.972	0.972

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.932	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Barium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	24	4	14.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	0.36	1	0.683	0.685	0.367
Statistics (Detects Only)	24	23.4	174	75.55	61.85	43.2
Statistics (All: NDs treated as DL value)	28	0.36	174	64.85	58.65	47.97
Statistics (All: NDs treated as DL/2 value)	28	0.18	174	64.8	58.65	48.04
Statistics (Normal ROS Estimated Data)	28	-33.62	174	61.51	58.65	53.13
Statistics (Gamma ROS Estimated Data)	28	1E-09	174	66.05	58.65	46.43
Statistics (Lognormal ROS Estimated Data)	28	14.2	174	67.13	58.65	45.07

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.215	2.894	23.5	4.161	0.597	0.144
Statistics (NDs = DL)	0.867	0.798	74.79	3.495	1.762	0.504
Statistics (NDs = DL/2)	0.769	0.711	84.25	3.396	1.997	0.588
Statistics (Gamma ROS Estimates)	0.566	0.529	116.7	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.967	0.734	0.185

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.963	0.976	0.976	0.989

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.917	0.916	Data Appear Normal
Lilliefors (Detects Only)	0.192	0.181	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.941	0.924	Data Appear Normal
Lilliefors (NDs = DL)	0.153	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.941	0.924	Data Appear Normal
Lilliefors (NDs = DL/2)	0.153	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.971	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.127	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.986	0.947	0.939	0.927

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.354	0.751	
Kolmogorov-Smirnov (Detects Only)	0.127	0.179	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.516	0.78	
Kolmogorov-Smirnov (NDs = DL)	0.191	0.171	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.873	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.217	0.172	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.326	0.804	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.279	0.174	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.987	0.853	0.833	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.916	Data Appear Lognormal
Lilliefors (Detects Only)	0.104	0.181	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.725	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.28	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.691	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.309	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.955	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.11	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Beryllium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	15	13	46.43%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	0.022	0.03	0.0278	0.03	0.00339
Statistics (Detects Only)	15	0.61	1.5	0.887	0.87	0.246
Statistics (All: NDs treated as DL value)	28	0.022	1.5	0.488	0.615	0.471
Statistics (All: NDs treated as DL/2 value)	28	0.011	1.5	0.481	0.615	0.477
Statistics (Normal ROS Estimated Data)	28	-0.178	1.5	0.577	0.615	0.402
Statistics (Gamma ROS Estimated Data)	28	0.498	1.5	0.87	0.879	0.206
Statistics (Lognormal ROS Estimated Data)	28	0.276	1.5	0.674	0.615	0.297

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	15.44	13.81	0.0574	-0.153	0.26	-1.698
Statistics (NDs = DL)	0.6	0.559	0.814	-1.748	1.757	-1.005
Statistics (NDs = DL/2)	0.478	0.45	1.008	-2.07	2.107	-1.018
Statistics (Gamma ROS Estimates)	19.32	17.28	0.045	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.483	0.427	-0.884

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.952	0.917	0.916	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.908	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.151	0.229	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.826	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.823	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.3	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.984	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0906	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.978	0.872	0.849	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.307	0.736	
Kolmogorov-Smirnov (Detects Only)	0.159	0.221	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	3.179	0.8	
Kolmogorov-Smirnov (NDs = DL)	0.312	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.391	0.815	
Kolmogorov-Smirnov (NDs = DL/2)	0.314	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.229	0.745	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.102	0.165	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.868	0.86	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.953	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.15	0.229	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.731	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.306	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.715	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.308	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.981	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0909	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cadmium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	2	26	92.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	26	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Estimated Data)	28	N/A	N/A	N/A	N/A	N/A

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilks (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilks (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilks (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Calcium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	23	5	17.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	4.6	6.6	5.12	4.8	0.844
Statistics (Detects Only)	23	116	7340	1197	885	1440
Statistics (All: NDs treated as DL value)	28	4.6	7340	983.9	761.5	1380
Statistics (All: NDs treated as DL/2 value)	28	2.3	7340	983.5	761.5	1380
Statistics (Normal ROS Estimated Data)	28	-1605	7340	751.5	761.5	1625
Statistics (Gamma ROS Estimated Data)	28	1E-09	7340	984.5	761.5	1380
Statistics (Lognormal ROS Estimated Data)	28	104.3	7340	1007	761.5	1364

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.506	1.368	794.6	6.72	0.84	0.125
Statistics (NDs = DL)	0.575	0.537	1712	5.81	2.128	0.366
Statistics (NDs = DL/2)	0.523	0.491	1879	5.686	2.383	0.419
Statistics (Gamma ROS Estimates)	0.178	0.183	5519	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.391	1.047	0.164

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.724	0.745	0.746	0.855

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.553	0.914	Data Not Normal
Lilliefors (Detects Only)	0.275	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.244	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.244	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.761	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.866	0.916	0.919	0.944

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.694	0.76	
Kolmogorov-Smirnov (Detects Only)	0.152	0.185	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.232	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.192	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.47	0.808	
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.572	0.907	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.184	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.974	0.886	0.869	0.976

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.0979	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.779	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.75	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.296	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.949	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Chromium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	6.3	53.3	21.09	22.4	10.5

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.111	3.695	5.13	2.922	0.529	0.181

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.956	0.956	0.956	0.956

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.92	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.11	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.974	0.974	0.974	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.612	0.75	
Kolmogorov-Smirnov (Full: no NDs)	0.145	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.974	0.974	0.974	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.946	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.17	0.167	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Cobalt (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	20	8	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.11	0.75	0.501	0.72	0.319
Statistics (Detects Only)	20	5.9	45.4	15.95	12.1	10.07
Statistics (All: NDs treated as DL value)	28	0.11	45.4	11.53	10.15	11.04
Statistics (All: NDs treated as DL/2 value)	28	0.055	45.4	11.46	10.15	11.11
Statistics (Normal ROS Estimated Data)	28	-10.02	45.4	9.494	10.15	13.45
Statistics (Gamma ROS Estimated Data)	28	3.774	45.4	13.39	10.15	9.473
Statistics (Lognormal ROS Estimated Data)	28	3.134	45.4	12.48	10.15	10.13

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.439	3.095	4.636	2.617	0.545	0.208
Statistics (NDs = DL)	0.701	0.65	16.45	1.583	1.793	1.132
Statistics (NDs = DL/2)	0.588	0.549	19.49	1.385	2.092	1.51
Statistics (Gamma ROS Estimates)	2.851	2.569	4.697	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.25	0.749	0.333

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.901	0.93	0.93	0.968

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.819	0.905	Data Not Normal
Lilliefors (Detects Only)	0.236	0.198	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.158	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.156	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.936	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.128	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.973	0.98	0.973	0.967

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.596	0.747	
Kolmogorov-Smirnov (Detects Only)	0.167	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.122	0.79	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.172	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.507	0.801	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.174	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.785	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.155	0.167	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.918	0.903	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.96	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.198	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.831	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.257	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.802	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.288	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.126	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Copper (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	26	2	7.14%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.17	0.17	0.17	0.17	0
Statistics (Detects Only)	26	2.2	13.6	6.919	5.35	3.696
Statistics (All: NDs treated as DL value)	28	0.17	13.6	6.437	5.2	3.973
Statistics (All: NDs treated as DL/2 value)	28	0.085	13.6	6.431	5.2	3.983
Statistics (Normal ROS Estimated Data)	28	-2.356	13.6	6.306	5.2	4.214
Statistics (Gamma ROS Estimated Data)	28	1E-09	13.6	6.44	5.2	3.969
Statistics (Lognormal ROS Estimated Data)	28	1.502	13.6	6.545	5.2	3.814

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.738	3.361	1.851	1.795	0.544	0.303
Statistics (NDs = DL)	1.699	1.541	3.788	1.54	1.072	0.696
Statistics (NDs = DL/2)	1.493	1.357	4.307	1.49	1.234	0.828
Statistics (Gamma ROS Estimates)	0.633	0.589	10.17	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.703	0.623	0.366

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.947	0.966	0.967	0.973

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.88	0.92	Data Not Normal
Lilliefors (Detects Only)	0.206	0.174	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.919	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.181	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.92	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.18	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.939	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.164	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.96	0.946	0.941	0.888

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.717	0.749	
Kolmogorov-Smirnov (Detects Only)	0.151	0.172	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.918	0.761	
Kolmogorov-Smirnov (NDs = DL)	0.152	0.168	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	1.191	0.763	
Kolmogorov-Smirnov (NDs = DL/2)	0.177	0.168	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.942	0.797	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.345	0.173	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.861	0.825	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.939	0.92	Data Appear Lognormal
Lilliefors (Detects Only)	0.135	0.174	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.748	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.222	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.69	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.258	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.952	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.118	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Iron (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	7250	63000	20108	19750	11869

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	3.411	3.069	5895	9.755	0.57	0.0584

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.912	0.912	0.912	0.912

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.846	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.139	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.961	0.961	0.961	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.612	0.752	
Kolmogorov-Smirnov (Full: no NDs)	0.151	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.97	0.97	0.97	0.97

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.932	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.153	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Lead (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	8.9	225	26.96	15.15	41.34

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.456	1.324	18.52	2.913	0.702	0.241

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.619	0.619	0.619	0.619

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.416	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.375	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.807	0.807	0.807	0.807

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	3.163	0.764	
Kolmogorov-Smirnov (Full: no NDs)	0.253	0.169	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.886	0.886	0.886	0.886

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.798	0.924	Data Not Lognormal
Lilliefors (Full: no NDs)	0.192	0.167	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Magnesium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	25	3	10.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	4.7	5	4.833	4.8	0.153
Statistics (Detects Only)	25	158	20400	2498	913	4334
Statistics (All: NDs treated as DL value)	28	4.7	20400	2231	741	4161
Statistics (All: NDs treated as DL/2 value)	28	2.35	20400	2230	741	4161
Statistics (Normal ROS Estimated Data)	28	-5148	20400	1678	741	4743
Statistics (Gamma ROS Estimated Data)	28	1E-09	20400	2230	741	4161
Statistics (Lognormal ROS Estimated Data)	28	56.13	20400	2236	741	4158

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.694	0.643	3600	6.951	1.272	0.183
Statistics (NDs = DL)	0.479	0.451	4657	6.375	2.075	0.325
Statistics (NDs = DL/2)	0.457	0.432	4879	6.301	2.257	0.358
Statistics (Gamma ROS Estimates)	0.198	0.201	11267	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.638	1.512	0.228

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.731	0.721	0.721	0.836

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.558	0.918	Data Not Normal
Lilliefors (Detects Only)	0.303	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.299	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.729	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.267	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.946	0.959	0.961	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.247	0.789	
Kolmogorov-Smirnov (Detects Only)	0.183	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.674	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.175	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.681	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.176	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.847	0.898	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.366	0.183	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.978	0.943	0.925	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.95	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.107	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.889	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.195	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.856	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.973	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0849	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Manganese (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	43	2040	695.9	490	591.5

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.442	1.311	482.6	6.16	0.971	0.158

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.923	0.923	0.923	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.84	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.197	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.971	0.971	0.971	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.306	0.764	
Kolmogorov-Smirnov (Full: no NDs)	0.102	0.169	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.983	0.983	0.983	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.962	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.106	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Mercury (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	3	25	89.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	25	0.019	0.06	0.0466	0.05	0.017
Statistics (Detects Only)	3	0.07	1.2	0.467	0.13	0.636
Statistics (All: NDs treated as DL value)	28	0.019	1.2	0.0916	0.06	0.218
Statistics (All: NDs treated as DL/2 value)	28	0.0095	1.2	0.0708	0.03	0.223
Statistics (Normal ROS Estimated Data)	28	-6.561	1.2	-3.164	-3.255	1.837
Statistics (Gamma ROS Estimated Data)	28	1E-09	1.2	0.05	1E-09	0.227
Statistics (Lognormal ROS Estimated Data)	28	6.8748E-09	1.2	0.0503	2.3931E-05	0.227

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.798	0.737	0.585	-1.506	1.494	-0.992
Statistics (NDs = DL)	0.982	0.901	0.0933	-2.979	0.795	-0.267
Statistics (NDs = DL/2)	0.644	0.598	0.11	-3.598	0.952	-0.265
Statistics (Gamma ROS Estimates)	0.0553	0.0732	0.904	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-10.44	4.519	-0.433

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.889	0.485	0.471	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.79	0.767	Data Appear Normal
Lilliefors (Detects Only)	0.368	0.512	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.268	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.468	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.253	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.466	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.974	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0965	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	0.694	0.731	0.95

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.439	N/A	
Kolmogorov-Smirnov (Detects Only)	0.373	N/A	
Anderson-Darling (NDs = DL)	4.794	0.775	
Kolmogorov-Smirnov (NDs = DL)	0.41	0.17	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.507	0.796	
Kolmogorov-Smirnov (NDs = DL/2)	0.458	0.173	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.082	1.229	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.564	0.206	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.951	0.826	0.826	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.904	0.767	Data Appear Lognormal
Lilliefors (Detects Only)	0.306	0.512	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.71	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.31	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.708	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.355	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.974	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0964	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Nickel (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	17	11	39.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	0.21	1.3	1.005	1.3	0.504
Statistics (Detects Only)	17	4.6	18.1	9.935	9.4	4.294
Statistics (All: NDs treated as DL value)	28	0.21	18.1	6.427	5.55	5.545
Statistics (All: NDs treated as DL/2 value)	28	0.105	18.1	6.23	5.55	5.741
Statistics (Normal ROS Estimated Data)	28	-7.045	18.1	5.574	5.55	6.652
Statistics (Gamma ROS Estimated Data)	28	1.974	18.1	9.082	8.465	3.849
Statistics (Lognormal ROS Estimated Data)	28	1.602	18.1	7.218	5.55	4.794

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	5.612	5.034	1.77	2.204	0.448	0.203
Statistics (NDs = DL)	0.953	0.874	6.748	1.251	1.353	1.082
Statistics (NDs = DL/2)	0.709	0.657	8.784	0.979	1.668	1.704
Statistics (Gamma ROS Estimates)	5.329	4.782	1.704	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.759	0.683	0.388

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.977	0.953	0.948	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.938	0.892	Data Appear Normal
Lilliefors (Detects Only)	0.12	0.215	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.891	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.215	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.88	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.227	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.977	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0932	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.986	0.947	0.923	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.276	0.741	
Kolmogorov-Smirnov (Detects Only)	0.133	0.21	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.909	0.776	
Kolmogorov-Smirnov (NDs = DL)	0.199	0.171	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.342	0.789	
Kolmogorov-Smirnov (NDs = DL/2)	0.225	0.172	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.176	0.748	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0785	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.984	0.942	0.929	0.986

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.949	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.125	0.215	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.872	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.188	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.847	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.236	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.959	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.107	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Potassium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	22	6	21.43%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	201	271	220	213	25.92
Statistics (Detects Only)	22	166	2350	735.4	509.5	632.6
Statistics (All: NDs treated as DL value)	28	166	2350	625	317.5	598.1
Statistics (All: NDs treated as DL/2 value)	28	100.5	2350	601.4	317.5	616.1
Statistics (Normal ROS Estimated Data)	28	-180.2	2350	544.7	317.5	671
Statistics (Gamma ROS Estimated Data)	28	135.6	2350	613.1	326.6	607.5
Statistics (Lognormal ROS Estimated Data)	28	142.4	2350	609.6	317.5	609.5

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.634	1.482	450.2	6.264	0.838	0.134
Statistics (NDs = DL)	1.53	1.39	408.6	6.076	0.826	0.136
Statistics (NDs = DL/2)	1.2	1.095	501.1	5.928	0.989	0.167
Statistics (Gamma ROS Estimates)	1.347	1.226	455.3	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	5.992	0.91	0.152

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.914	0.87	0.889	0.938

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.83	0.911	Data Not Normal
Lilliefors (Detects Only)	0.222	0.189	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.756	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.239	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.787	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.874	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.176	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.987	0.977	0.987	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.667	0.758	
Kolmogorov-Smirnov (Detects Only)	0.154	0.188	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.637	0.762	
Kolmogorov-Smirnov (NDs = DL)	0.21	0.168	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.858	0.769	
Kolmogorov-Smirnov (NDs = DL/2)	0.151	0.169	Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	1.093	0.766	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.171	0.169	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.948	0.977	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.939	0.911	Data Appear Lognormal
Lilliefors (Detects Only)	0.123	0.189	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.882	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.187	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.934	0.924	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.102	0.167	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.9	0.924	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Selenium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	2	26	92.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	26	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	28	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Estimated Data)	28	N/A	N/A	N/A	N/A	N/A

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilks (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilks (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilks (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Silver (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	1	27	96.43%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Silver (rfaap bkgrd-ss) was not processed!

Sodium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	1	27	96.43%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Sodium (rfaap bkgrd-ss) was not processed!

Thallium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	4	24	85.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	24	0.13	0.41	0.195	0.14	0.102
Statistics (Detects Only)	4	1.3	2.1	1.85	2	0.37
Statistics (All: NDs treated as DL value)	28	0.13	2.1	0.431	0.14	0.61
Statistics (All: NDs treated as DL/2 value)	28	0.065	2.1	0.348	0.07	0.638
Statistics (Normal ROS Estimated Data)	28	-1.016	2.1	0.463	0.263	0.766
Statistics (Gamma ROS Estimated Data)	28	1.3	2.1	1.854	1.856	0.123
Statistics (Lognormal ROS Estimated Data)	28	0.329	2.1	0.886	0.706	0.466

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	28.68	25.63	0.0645	0.598	0.225	0.376
Statistics (NDs = DL)	1.025	0.939	0.421	-1.403	0.921	-0.657
Statistics (NDs = DL/2)	0.649	0.604	0.535	-1.997	1.149	-0.575
Statistics (Gamma ROS Estimates)	199.2	177.9	0.00931	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.229	0.457	-1.992

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.85	0.729	0.691	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.737	0.748	Data Not Normal
Lilliefors (Detects Only)	0.408	0.443	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.532	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.371	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.481	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.446	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.952	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.138	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.806	0.898	0.892	0.668

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.755	0.657	
Kolmogorov-Smirnov (Detects Only)	0.436	0.394	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	4.636	0.773	
Kolmogorov-Smirnov (NDs = DL)	0.342	0.17	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.51	0.795	
Kolmogorov-Smirnov (NDs = DL/2)	0.351	0.173	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.198	0.743	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.415	0.165	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.838	0.829	0.804	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.717	0.748	Data Not Lognormal
Lilliefors (Detects Only)	0.415	0.443	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.678	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.311	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.639	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.318	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.951	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Vanadium (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	12.2	101	33.89	33.8	17.78

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	4.392	3.946	7.716	3.405	0.497	0.146

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.902	0.902	0.902	0.902

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.832	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.141	0.167	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.943	0.943	0.943	0.943

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.622	0.749	
Kolmogorov-Smirnov (Full: no NDs)	0.111	0.166	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.969	0.969	0.969	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.939	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.138	0.167	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Zinc (rfaap bkgrd-ss)

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	28	0	0.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Full: no NDs)	28	7.1	216	41.21	29.7	40.24

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Full: no NDs)	1.826	1.654	22.56	3.421	0.761	0.223

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.798	0.798	0.798	0.798

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.665	0.924	Data Not Normal
Lilliefors (Full: no NDs)	0.203	0.167	Data Not Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.913	0.913	0.913	0.913

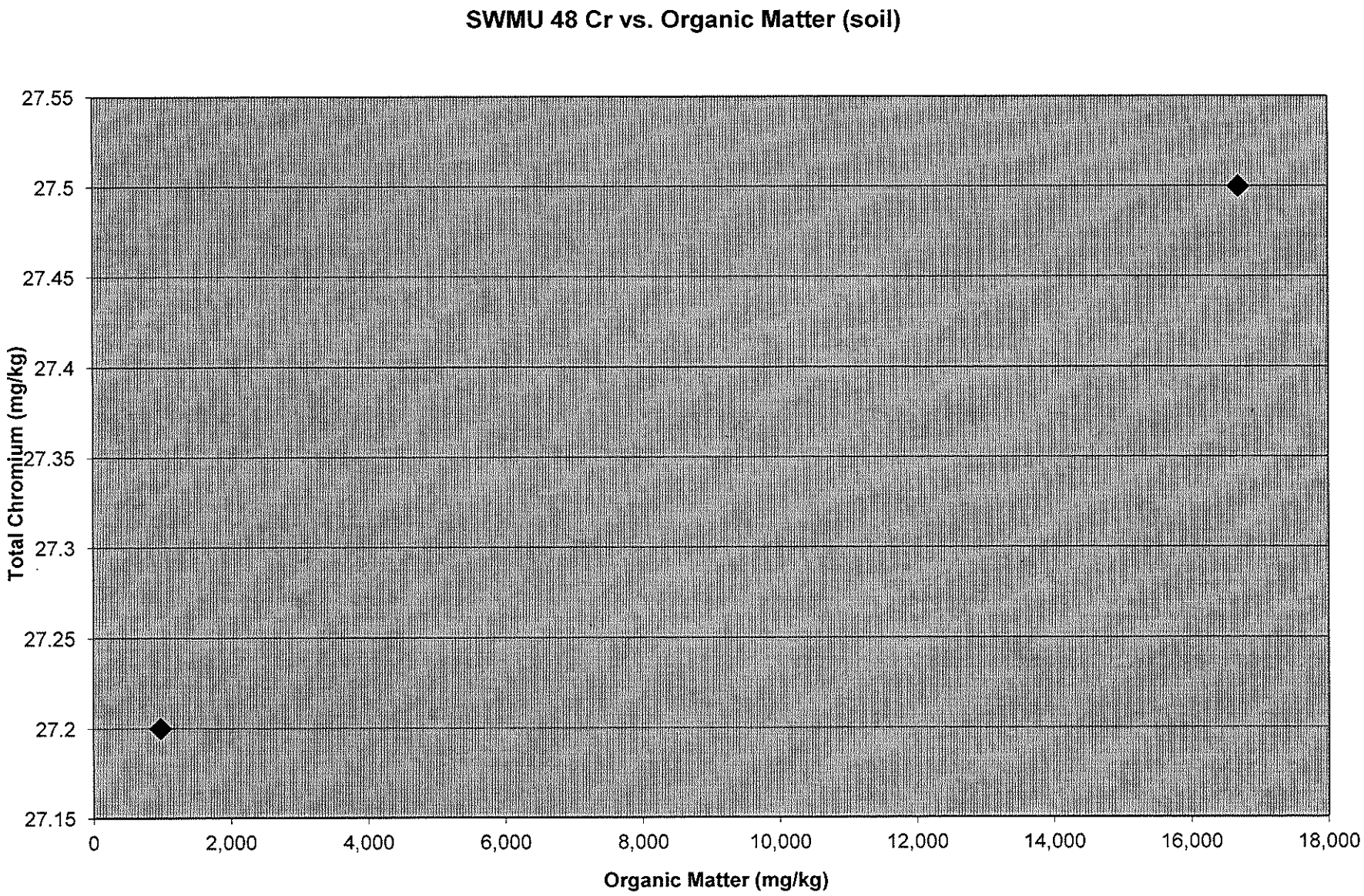
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Full: no NDs)	0.54	0.76	
Kolmogorov-Smirnov (Full: no NDs)	0.105	0.168	Data Appear Gamma Distributed

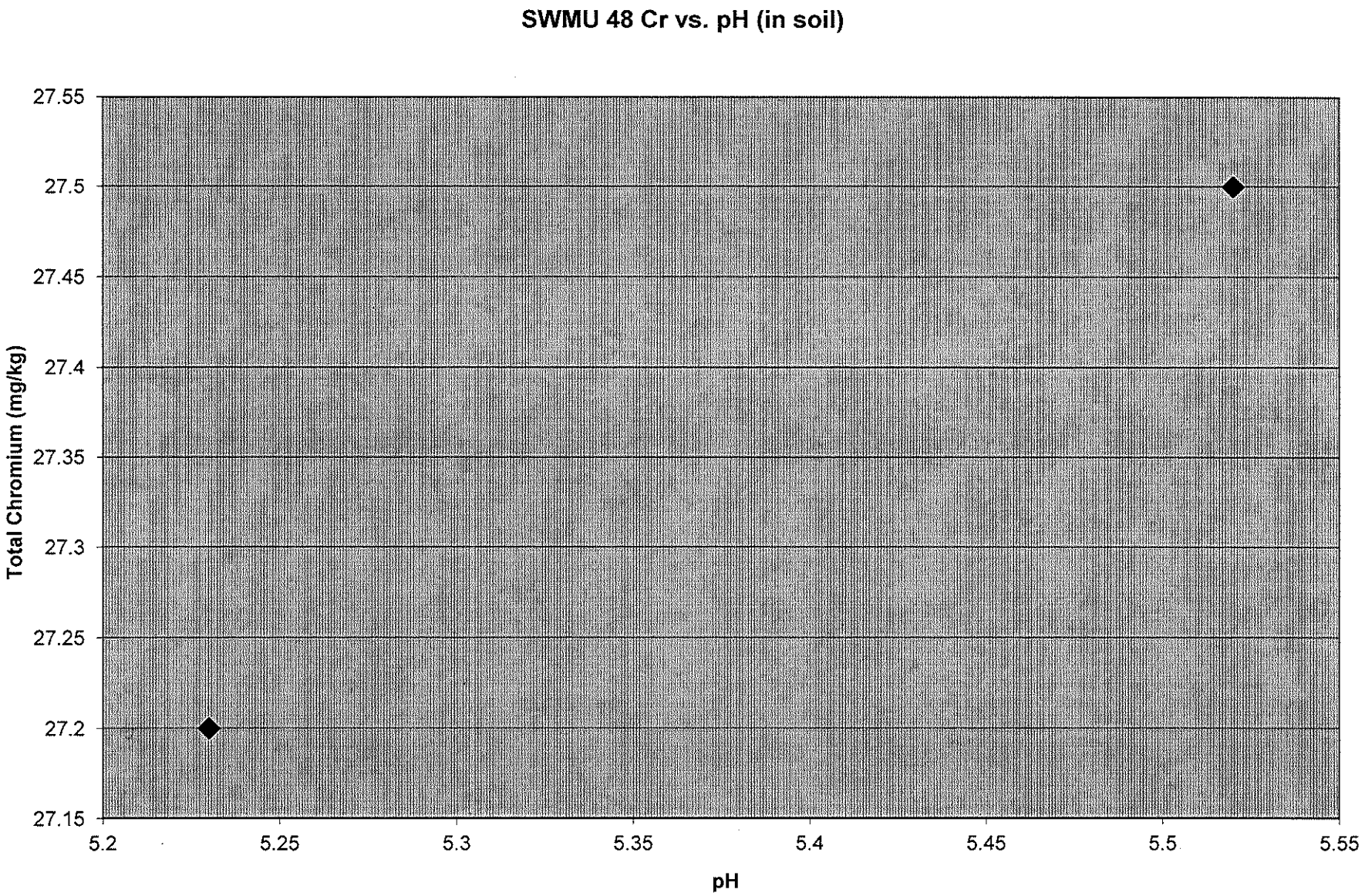
Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.985	0.985	0.985

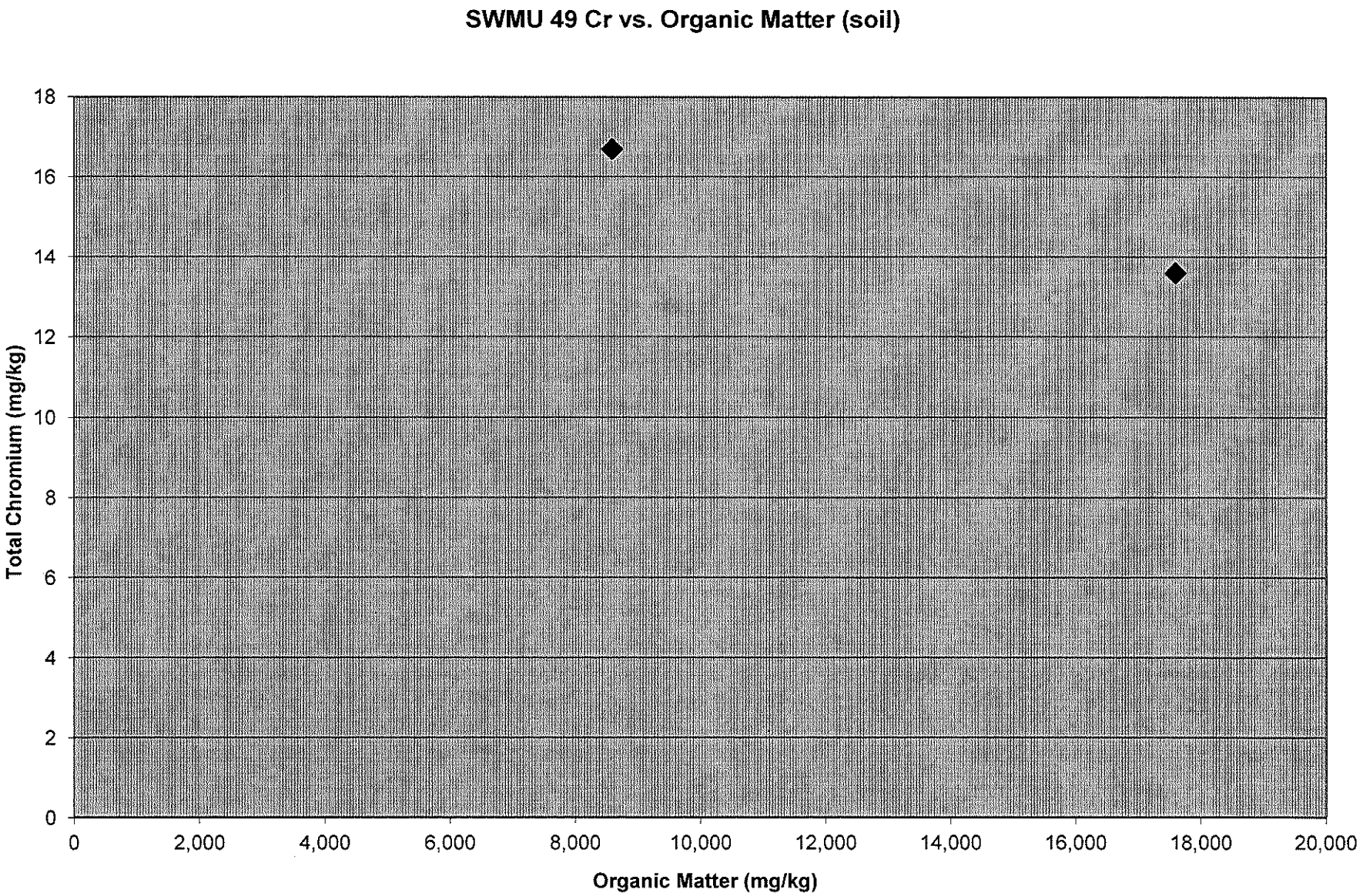
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Full: no NDs)	0.975	0.924	Data Appear Lognormal
Lilliefors (Full: no NDs)	0.1	0.167	Data Appear Lognormal

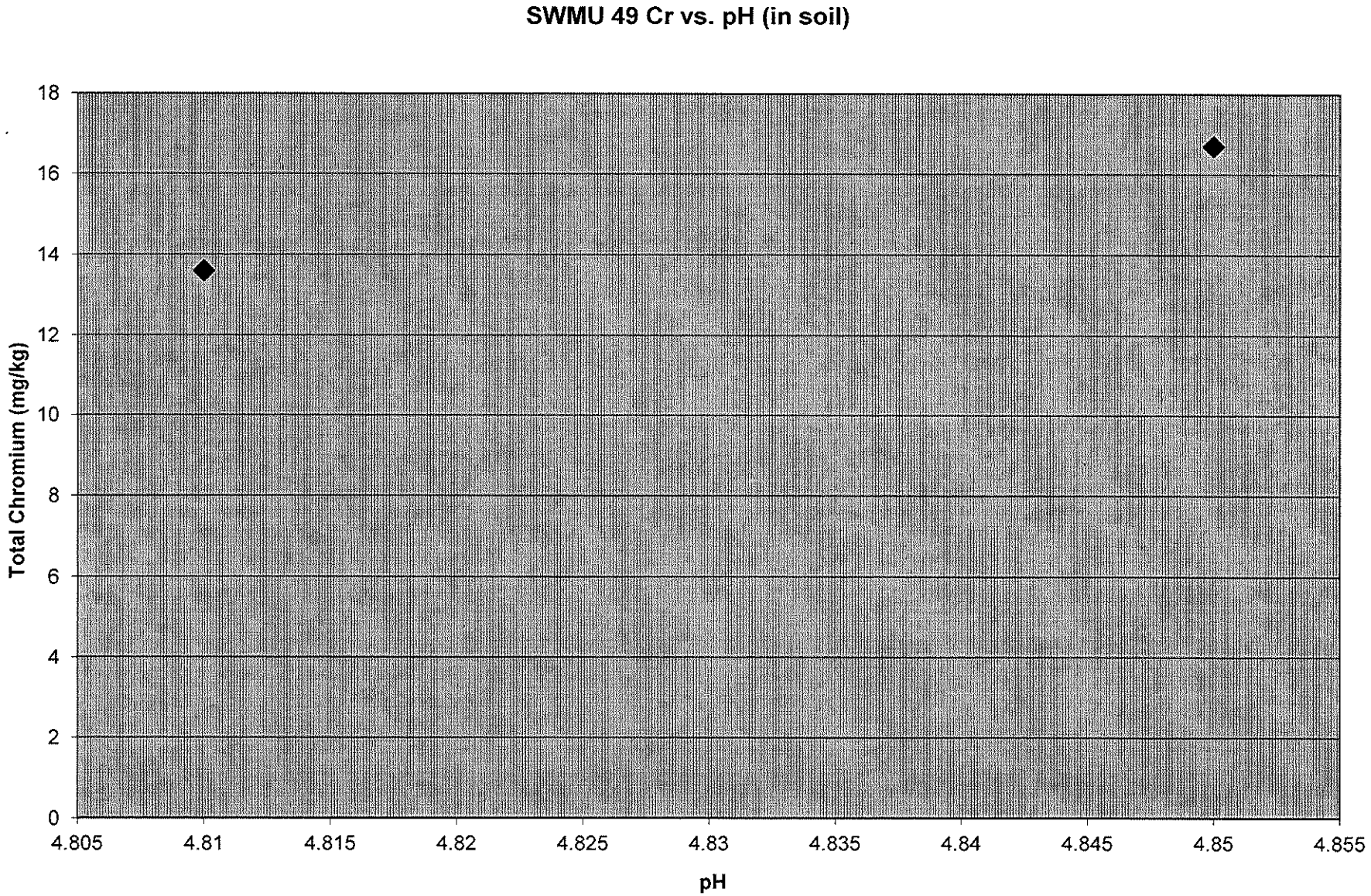
Note: Substitution methods such as DL or DL/2 are not recommended.


SWMU 48 Cr vs. Organic Matter (soil)
27.55
27.5
27.45
27.4
27.35
27.3
27.25
27.2
27.15
Total Chromium (mg/kg)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Organic Matter (mg/kg)


SWMU 48 Cr vs. pH (in soil)
Total Chromium (mg/kg)
27.55
27.5
27.45
27.4
27.35
27.3
27.25
27.2
27.15
5.2
5.25
5.3
5.35
5.4
5.45
5.5
5.55
pH

TOC ID	TOC	TOC units		pH ID	pH			Chromium	
48SB08A	16,700	UG/G	SS	48SB08A	5.52	STD	SS	27.5	mg/kg
48SB08C	975	UG/G	SB	48SB08C	5.23	STD	SB	27.2	mg/kg


SWMU 49 Cr vs. Organic Matter (soil)
Total Chromium (mg/kg)
18
16
14
12
10
8
6
4
2
0
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
Organic Matter (mg/kg)


SWMU 49 Cr vs. pH (in soil)
Total Chromium (mg/kg)
18
16
14
12
10
8
6
4
2
0
4.805
4.81
4.815
4.82
4.825
4.83
4.835
4.84
4.845
4.85
4.855
pH

TOC ID	TOC	TOC units		pH ID	pH			Chromium	
49SS01	17,600	UG/G	SS	49SS01	4.81	STD	SS	13.6	mg/kg
49SB02D	8,590	UG/G	SB	49SB02D	4.85	STD	SB	16.7	mg/kg

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75343	3.40E+00	1,1-Dichloroethane

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	2975	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	1.6E-06	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2775	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,328	4.74E-03	1.96E-01	1.79E-04	3.85E-03	3.68E-05	4.71E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2775	200	6.67E+02	0.10	8.33E+01	3.85E-03	4.00E+02	7.74E+234	1.20E-05	7.99E-03	1.6E-06	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	5.06E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.3E-09	NA

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
107062	4.00E+00	1,2-Dichloroethane

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	2975	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	9.90E-06	9.77E-04	25	7,643	356.65	561.00	1.74E+01	8.52E+03	2.6E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2775	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,401	8.05E-04	3.34E-02	1.79E-04	5.40E-03	1.06E-04	1.21E-03

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2775	200	1.33E+02	0.10	8.33E+01	5.40E-03	4.00E+02	2.53E+167	3.07E-05	4.10E-03	2.6E-05	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.52E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.4E-08	NA

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	2.90E+00	cis-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	2975	SIC	21	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2775	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,623	3.42E-03	1.42E-01	1.79E-04	3.82E-03	4.31E-05	5.40E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2775	200	4.10E+02	0.10	8.33E+01	3.82E-03	4.00E+02	5.75E+236	1.37E-05	5.64E-03	NA	3.5E-02

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.5E-04

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
56235	1.80E+02	Carbon tetrachloride

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	2975	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	1.74E+02	7.93E+02	1.5E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2775	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,747	2.54E-02	1.05E+00	1.79E-04	4.05E-03	2.68E-05	3.56E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2775	200	1.89E+05	0.10	8.33E+01	4.05E-03	4.00E+02	3.27E+223	9.05E-06	1.71E+00	1.5E-05	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	7.93E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.1E-05	NA

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	2.30E+00	Tetrachloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	2975	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2775	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,441	1.48E-02	6.12E-01	1.79E-04	3.74E-03	2.62E-05	3.45E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2775	200	1.41E+03	0.10	8.33E+01	3.74E-03	4.00E+02	1.35E+242	8.79E-06	1.24E-02	5.9E-06	6.0E-01

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.0E-08	2.0E-05

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	3.30E+01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	2975	SIC	21	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC	OR		SIC	1.38	0.481	0.216

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2775	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,420	8.47E-03	3.51E-01	1.79E-04	4.10E-03	3.15E-05	4.12E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2775	200	1.16E+04	0.10	8.33E+01	4.10E-03	4.00E+02	4.58E+220	1.05E-05	1.21E-01	1.1E-04	4.0E-02

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.5E-06	2.9E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75343	3.40E+00	1,1-Dichloroethane

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	1470	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	1.6E-06	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1270	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,328	4.74E-03	1.96E-01	1.79E-04	3.85E-03	3.68E-05	2.31E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1270	200	6.67E+02	0.10	8.33E+01	3.85E-03	4.00E+02	7.74E+234	1.28E-05	8.55E-03	1.6E-06	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	5.06E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.6E-09	NA

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
107062	4.00E+00	1,2-Dichloroethane

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	1470	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	9.90E-06	9.77E-04	25	7,643	356.65	561.00	1.74E+01	8.52E+03	2.6E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1270	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,401	8.05E-04	3.34E-02	1.79E-04	5.40E-03	1.06E-04	6.33E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1270	200	1.33E+02	0.10	8.33E+01	5.40E-03	4.00E+02	2.53E+167	3.49E-05	4.66E-03	2.6E-05	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.52E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.0E-08	NA

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	2.90E+00	cis-1,2-Dichloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	1470	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC	OR		SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1270	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,623	3.42E-03	1.42E-01	1.79E-04	3.82E-03	4.31E-05	2.68E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1270	200	4.10E+02	0.10	8.33E+01	3.82E-03	4.00E+02	5.75E+236	1.49E-05	6.10E-03	NA	3.5E-02

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.7E-04

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
56235	1.80E+02	Carbon tetrachloride

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	1470	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	1.74E+02	7.93E+02	1.5E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1270	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,747	2.54E-02	1.05E+00	1.79E-04	4.05E-03	2.68E-05	1.71E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1270	200	1.89E+05	0.10	8.33E+01	4.05E-03	4.00E+02	3.27E+223	9.50E-06	1.80E+00	1.5E-05	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	7.93E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.1E-05	NA

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	2.30E+00	Tetrachloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	1470	SIC	21	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC	OR		SIC	1.38	0.481	0.216

MORE

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1270	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,441	1.48E-02	6.12E-01	1.79E-04	3.74E-03	2.62E-05	1.66E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1270	200	1.41E+03	0.10	8.33E+01	3.74E-03	4.00E+02	1.35E+242	9.25E-06	1.30E-02	5.9E-06	6.0E-01

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.2E-08	2.1E-05

MESSAGE SUMMARY BELOW:

END

]

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	3.30E+01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	1470	SIC	21	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC	OR		SIC	1.38	0.481	0.216

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1270	0.265	0.284	1.51E-09	0.844	1.28E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,420	8.47E-03	3.51E-01	1.79E-04	4.10E-03	3.15E-05	1.99E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1270	200	1.16E+04	0.10	8.33E+01	4.10E-03	4.00E+02	4.58E+220	1.11E-05	1.28E-01	1.1E-04	4.0E-02

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.8E-06	3.1E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

TABLE E.2-91
RAGS D IEUBK LEAD WORKSHEET
Radford Army Ammunition Plant – SWMU 49
Child (Age 0 – 84 Months), Exposure to Groundwater

1. Lead Screening Questions

Medium	Lead Concentration Used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Soil	26.0	mg/kg	Average Detected Value	400	mg/kg	Recommended Soil Screening Level
Water	85	ug/L	Average Detected Value	15	ug/L	Recommended Drinking Water Action Level

2. Lead Model Questions

Question	Response for Residential Lead Model
What lead model (version and date) was used?	Lead Model for Windows, Version 1.0 Build 264
Where are the input values located in the risk assessment report?	Located in Appendix E, IEUBKwin OUTPUT (Attached)
What range of media concentrations were used for the model?	Lead was selected as a COPC for groundwater. Lead was detected in 4 of 12 samples. Values ranged from 10.8 to 237 ug/L.
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Arithmetic Mean Concentration; Data are Located in Appendix E
Was soil sample taken from top 2 cm? If not, why?	No – Future scenario based on assumption that soil would be disturbed. Surface and subsurface data sets were combined to represent total soil. Lead was not selected as a COPC in soil.
Was soil sample sieved? What size screen was used? If not sieved, provide rationale.	No -- Soil samples were collected for multiple analyses. Lead was not selected as a COPC for soil.
What was the point of exposure/location?	Groundwater and total soil in SWMU 49. Data are located in Appendix E.
Where are the output values located in the risk assessment report?	IEUBKwin OUTPUT (Attached)
Was the model run using default values only?	No – Assumed site-specific arithmetic mean concentration of lead in groundwater and total soil.
Was the default soil bioavailability used?	Yes -- Default is 30%
Was the default soil ingestion rate used?	Yes -- Default values for 7 age groups are 85, 135, 135, 100, 090, and 85 mg/day
If non-default values were used, where is the rationale for the values located in the risk assessment report?	Located in Appendix E.

3. Final Result

Medium	Result	Comment/PRG [1]
Total Soil	Input value of 85 µg/L in groundwater and 26.0 mg/kg in total soil results in 26.6% of children above a blood lead level of 10 ug/dL. Geometric mean blood lead = 7.5 ug/dL. This is above the blood lead goal as described in the 1994 OSWER Directive of no more than 5% of children exceeding 10 ug/dL blood lead.	PRG not calculated.

1. Attach the IEUBK text output file and graph upon which the PRG was based as an appendix. For additional information, see www.epa.gov/superfund/programs/lead

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0 Build 264
User Name: Shaw Environmental, Inc.
Date: 08/29/2008
Site Name: Radford AAP
Operable Unit: SWMU 49
Run Mode: Site Risk Assessment

Water Data
Arithmetic mean concentration at SWMU 49
Soil/Dust Data
Arithmetic mean concentration at SWMU 49

The time step used in this model run: 1 - Every 4 Hours (6 times a day).

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 85.000 ug Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 28.228 ug/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	26.040	28.228
1-2	26.040	28.228
2-3	26.040	28.228
3-4	26.040	28.228
4-5	26.040	28.228
5-6	26.040	28.228
6-7	26.040	28.228

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

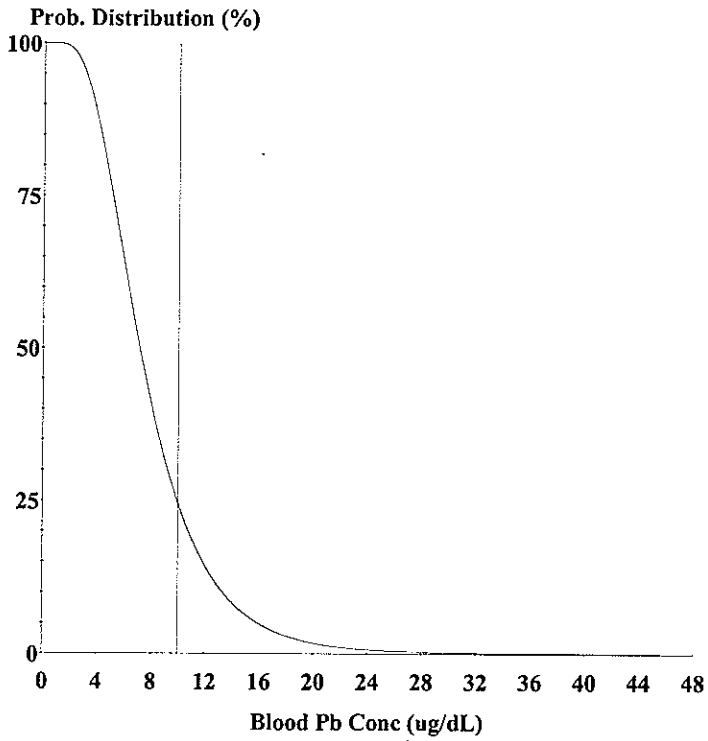
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (ug/day)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.447	0.000	7.524
1-2	0.034	2.395	0.000	17.611
2-3	0.062	2.738	0.000	18.648
3-4	0.067	2.687	0.000	19.401
4-5	0.067	2.631	0.000	20.467
5-6	0.093	2.799	0.000	21.762
6-7	0.093	3.111	0.000	22.287

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	0.615	10.607	5.7
1-2	0.914	20.955	8.3
2-3	0.931	22.379	8.2
3-4	0.950	23.105	8.0
4-5	0.716	23.881	7.8
5-6	0.649	25.303	7.6
6-7	0.617	26.109	7.3



Cutoff = 10.000 ug/dl
Geo Mean = 7.459
GSD = 1.600
% Above = 26.643

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Site Risk Assessment

TABLE E.2-81
RAGS D IEUBK LEAD WORKSHEET
Radford Army Ammunition Plant – SWMU 49
Child (Age 0 – 84 Months), Exposure to Groundwater

1. Lead Screening Questions

Medium	Lead Concentration Used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Soil	26.0	mg/kg	Average Detected Value	400	mg/kg	Recommended Soil Screening Level
Water	85	ug/L	Average Detected Value	15	ug/L	Recommended Drinking Water Action Level

2. Lead Model Questions

Question	Response for Residential Lead Model
What lead model (version and date) was used?	Lead Model for Windows, Version 1.1 Build 11
Where are the input values located in the risk assessment report?	Located in Appendix E, IEUBKwin OUTPUT (Attached)
What range of media concentrations were used for the model?	Lead was selected as a COPC for groundwater. Lead was detected in 4 of 12 samples. Values ranged from 10.8 to 237 ug/L.
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Arithmetic Mean Concentration; Data are Located in Appendix E
Was soil sample taken from top 2 cm? If not, why?	No – Future scenario based on assumption that soil would be disturbed. Surface and subsurface data sets were combined to represent total soil. Lead was not selected as a COPC in soil.
Was soil sample sieved? What size screen was used? If not sieved, provide rationale.	No -- Soil samples were collected for multiple analyses. Lead was not selected as a COPC for soil.
What was the point of exposure/location?	Groundwater and total soil in SWMU 49. Data are located in Appendix E.
Where are the output values located in the risk assessment report?	IEUBKwin OUTPUT (Attached)
Was the model run using default values only?	No – Assumed site-specific arithmetic mean concentration of lead in groundwater and total soil.
Was the default soil bioavailability used?	Yes -- Default is 30%
Was the default soil ingestion rate used?	Yes -- Default values for 7 age groups are 85, 135, 135, 100, 090, and 85 mg/day
If non-default values were used, where is the rationale for the values located in the risk assessment report?	Located in Appendix E.

3. Final Result

Medium	Result	Comment/PRG [1]
Total Soil	Input value of 85 µg/L in groundwater and 26.0 mg/kg in total soil results in 21.4% of children above a blood lead level of 10 ug/dL. Geometric mean blood lead = 6.9 ug/dL. This is above the blood lead goal as described in the 1994 OSWER Directive of no more than 5% of children exceeding 10 ug/dL blood lead.	PRG not calculated.

1. Attach the IEUBK text output file and graph upon which the PRG was based as an appendix. For additional information, see www.epa.gov/superfund/programs/lead

LEAD MODEL FOR WINDOWS Version 1.1

==========

Model Version: 1.1 Build11
User Name: Shaw Environmental, Inc.
Date: 05/23/2012
Site Name: Radford Army Ammunition Plant
Operable Unit: SWMU 49
Run Mode: Site Risk Assessment

Soil/Dust Data
Soil - Arithmetic Mean - 26 mg/kg
Water Data
Groundwater - Arithmetic Mean = 85 ug/L

==========

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 85.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 28.200 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	26.000	28.200
1-2	26.000	28.200
2-3	26.000	28.200
3-4	26.000	28.200
4-5	26.000	28.200
5-6	26.000	28.200
6-7	26.000	28.200

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

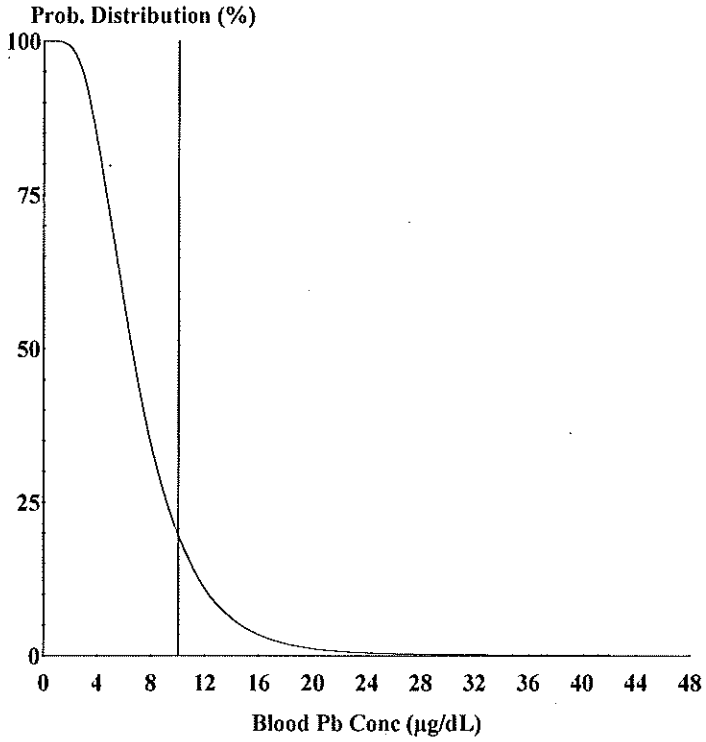
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.016	0.000	7.640
1-2	0.034	0.822	0.000	17.831
2-3	0.062	0.910	0.000	18.881
3-4	0.067	0.888	0.000	19.607
4-5	0.067	0.861	0.000	20.653
5-6	0.093	0.913	0.000	21.949
6-7	0.093	0.995	0.000	22.485

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	0.624	9.301	5.0
1-2	0.925	19.613	7.7
2-3	0.941	20.794	7.6
3-4	0.959	21.520	7.4
4-5	0.721	22.302	7.3
5-6	0.654	23.609	7.1
6-7	0.622	24.196	6.8



Cutoff = 10.000 µg/dl
Geo Mean = 6.885
GSD = 1.600
% Above = 21.354

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment

TABLE E.1-81
RAGS D IEUBK LEAD WORKSHEET
Radford Army Ammunition Plant – SWMU 48
Child (Age 0 – 84 Months), Exposure to Groundwater

1. Lead Screening Questions

Medium	Lead Concentration Used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Soil	24.4	mg/kg	Average Detected Value	400	mg/kg	Recommended Soil Screening Level
Water	85	ug/L	Average Detected Value	15	ug/L	Recommended Drinking Water Action Level

2. Lead Model Questions

Question	Response for Residential Lead Model
What lead model (version and date) was used?	Lead Model for Windows, Version 1.1 Build 11
Where are the input values located in the risk assessment report?	Located in Appendix E, IEUBKwin OUTPUT (Attached)
What range of media concentrations were used for the model?	Lead was selected as a COPC for groundwater. Lead was detected in 4 of 12 samples. Values ranged from 10.8 to 237 ug/L.
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Arithmetic Mean Concentration; Data are Located in Appendix E
Was soil sample taken from top 2 cm? If not, why?	No – Future scenario based on assumption that soil would be disturbed. Surface and subsurface data sets were combined to represent total soil. Lead was not selected as a COPC in soil.
Was soil sample sieved? What size screen was used? If not sieved, provide rationale.	No -- Soil samples were collected for multiple analyses. Lead was not selected as a COPC for soil.
What was the point of exposure/location?	Groundwater and total soil in SWMU 48. Data are located in Appendix E.
Where are the output values located in the risk assessment report?	IEUBKwin OUTPUT (Attached)
Was the model run using default values only?	No – Assumed site-specific arithmetic mean concentration of lead in groundwater and total soil.
Was the default soil bioavailability used?	Yes -- Default is 30%
Was the default soil ingestion rate used?	Yes -- Default values for 7 age groups are 85, 135, 135, 100, 090, and 85 mg/day
If non-default values were used, where is the rationale for the values located in the risk assessment report?	Located in Appendix E.

3. Final Result

Medium	Result	Comment/PRG [1]
Total Soil	Input value of 85 µg/L in groundwater and 24.4 mg/kg in total soil results in 21.2% of children above a blood lead level of 10 ug/dL. Geometric mean blood lead = 6.9 ug/dL. This is above the blood lead goal as described in the 1994 OSWER Directive of no more than 5% of children exceeding 10 ug/dL blood lead.	PRG not calculated.

1. Attach the IEUBK text output file and graph upon which the PRG was based as an appendix. For additional information, see www.epa.gov/superfund/programs/lead

LEAD MODEL FOR WINDOWS Version 1.1

==========

Model Version: 1.1 Build11
User Name: Shaw Environmental, Inc.
Date: 05/18/2012
Site Name: Radford Army Ammunition Plant
Operable Unit: SWMUs 48 & 49
Run Mode: Site Risk Assessment

Soil/Dust Data
Arithmetic Mean = 24.4 mg/kg
Water Data
Arithmetic Mean = 85 ug/L

==========

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 85.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 27.080 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	24.400	27.080
1-2	24.400	27.080
2-3	24.400	27.080
3-4	24.400	27.080
4-5	24.400	27.080
5-6	24.400	27.080
6-7	24.400	27.080

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

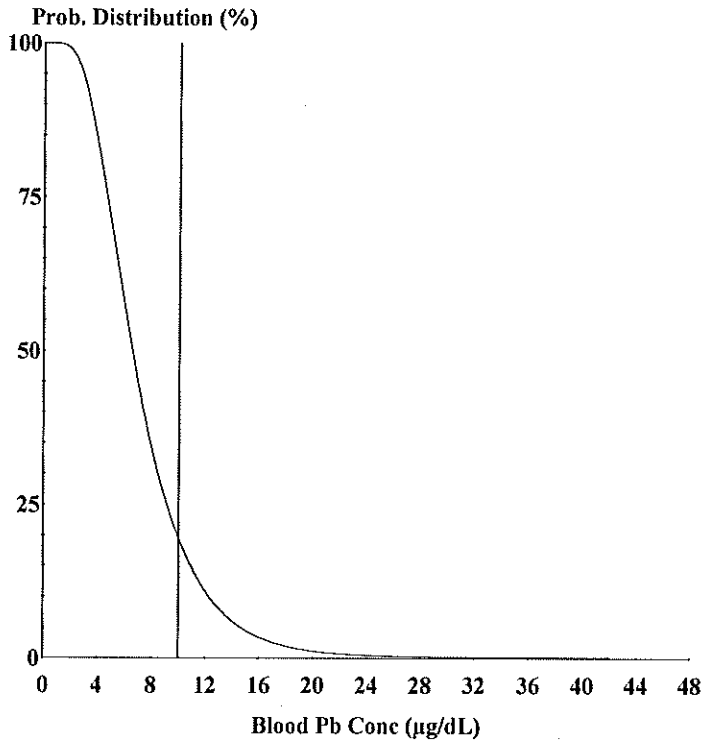
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.016	0.000	7.643
1-2	0.034	0.823	0.000	17.838
2-3	0.062	0.910	0.000	18.887
3-4	0.067	0.888	0.000	19.612
4-5	0.067	0.862	0.000	20.656
5-6	0.093	0.913	0.000	21.952
6-7	0.093	0.995	0.000	22.488

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	0.593	9.273	5.0
1-2	0.880	19.574	7.7
2-3	0.896	20.754	7.6
3-4	0.912	21.479	7.4
4-5	0.686	22.270	7.2
5-6	0.622	23.580	7.1
6-7	0.592	24.169	6.8



Cutoff = 10.000 µg/dl
Geo Mean = 6.873
GSD = 1.600
% Above = 21.245

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment

Background Statistics
RFAAP SWMU 49 - Total Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(swmu 49 ts)
Background Data: Aluminum(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	11	79
Number of Missing Values	3	0
Number of Distinct Observations	11	75
Minimum	9220	3620
Maximum	33700	47900
Mean	20615	14204
Median	22700	12100
SD	8556	9433
SE of Mean	2580	1061

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	696.5
WMW Test U-Stat	2.408
WMW Critical Value (0.050)	1.645
P-Value	0.00801

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Total Soil

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Chromium(swmu 49 ts)
Background Data: Chromium(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	14	79
Number of Distinct Observations	14	70
Minimum	11.8	6.3
Maximum	30.3	75.8
Mean	20.01	26.86
Median	19.5	26
SD	6.075	12.51
SE of Mean	1.624	1.408

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	91	-2.001	1.662	0.976
Satterthwaite (Unequal Variance)	36.5	-3.189	1.688	0.999

Pooled SD 11.811

Conclusion with Alpha = 0.050

*** Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background**

*** Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background**

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	13	4.243	0.006

Conclusion with Alpha = 0.05

* Two variances are not equal

Background Statistics
RFAAP SWMU 49 - Total Soil

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Iron(swmu 49 ts)
Background Data: Iron(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	11	79
Number of Missing Values	3	0
Number of Distinct Observations	10	72
Minimum	9060	7250
Maximum	34500	67700
Mean	23687	26963
Median	26900	25200
SD	9314	11990
SE of Mean	2808	1349

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	88	-0.869	1.662	0.806
Satterthwaite (Unequal Variance)	15	-1.052	1.753	0.845

Pooled SD 11716.506

Conclusion with Alpha = 0.050

*** Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background**

*** Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background**

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	10	1.657	0.387

Conclusion with Alpha = 0.05

* Two variances appear to be equal

Background Statistics
RFAAP SWMU 49 - Total Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(swmu 49 ts)
Background Data: Manganese(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	11	79
Number of Missing Values	3	0
Number of Distinct Observations	11	78
Minimum	74.5	16.7
Maximum	570	2040
Mean	232	471.4
Median	165	359
SD	151.1	467.1
SE of Mean	45.56	52.55

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	373.5
WMW Test U-Stat	-1.571
WMW Critical Value (0.050)	1.645
P-Value	0.0581

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Total Soil

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_detects.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(swmu 49 ts)
Background Data: Vanadium(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Observations	11	79
Number of Missing Values	3	0
Number of Distinct Observations	11	76
Minimum	20.3	12.2
Maximum	69.8	114
Mean	46.94	45.84
Median	56.3	41.4
SD	19.26	20.38
SE of Mean	5.808	2.293

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	519.5
WMW Test U-Stat	0.228
WMW Critical Value (0.050)	1.645
P-Value	0.41

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Total Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(swmu 49 ts)
Background Data: Arsenic(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Data	14	79
Number of Non-Detect Data	2	3
Number of Detect Data	12	76
Minimum Non-Detect	0.597	0.09
Maximum Non-Detect	2.5	0.12
Percent Non detects	14.29%	3.80%
Minimum Detected	0.51	1.2
Maximum Detected	8.2	35.9
Mean of Detected Data	2.914	4.989
Median of Detected Data	2.75	3.2
SD of Detected Data	2.385	5.36

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	-1.986
Critical z (0.95)	1.645
P-Value	0.976

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Total Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(swmu 49 ts)
Background Data: Cobalt(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Data	11	79
Number of Missing Values	3	0
Number of Non-Detect Data	0	23
Number of Detect Data	11	56
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.84
Percent Non detects	0.00%	29.11%
Minimum Detected	3.1	5.9
Maximum Detected	6.6	130
Mean of Detected Data	4.645	22.23
Median of Detected Data	4	13.3
SD of Detected Data	1.285	23.94

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	-2.193
Critical z (0.95)	1.645
P-Value	0.986

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Background Statistics
RFAAP SWMU 49 - Total Soil

Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	H:\Risk DB\Radford\SWMU 48-49-50-59\SWMUs 48_49_January 2010\Background\Bkgrd TS vs SWMU 49 soil_NDs.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Thallium(swmu 49 ts)
Background Data: Thallium(bkgrd ts)

Raw Statistics

	Site	Background
Number of Valid Data	14	79
Number of Non-Detect Data	8	64
Number of Detect Data	6	15
Minimum Non-Detect	1.3	0.13
Maximum Non-Detect	34.3	0.45
Percent Non detects	57.14%	81.01%
Minimum Detected	0.092	1.3
Maximum Detected	1.125	5
Mean of Detected Data	0.395	2.527
Median of Detected Data	0.135	2.2
SD of Detected Data	0.446	0.932

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	0.51
Critical z (0.95)	1.645
P-Value	0.305

Conclusion with Alpha = 0.05

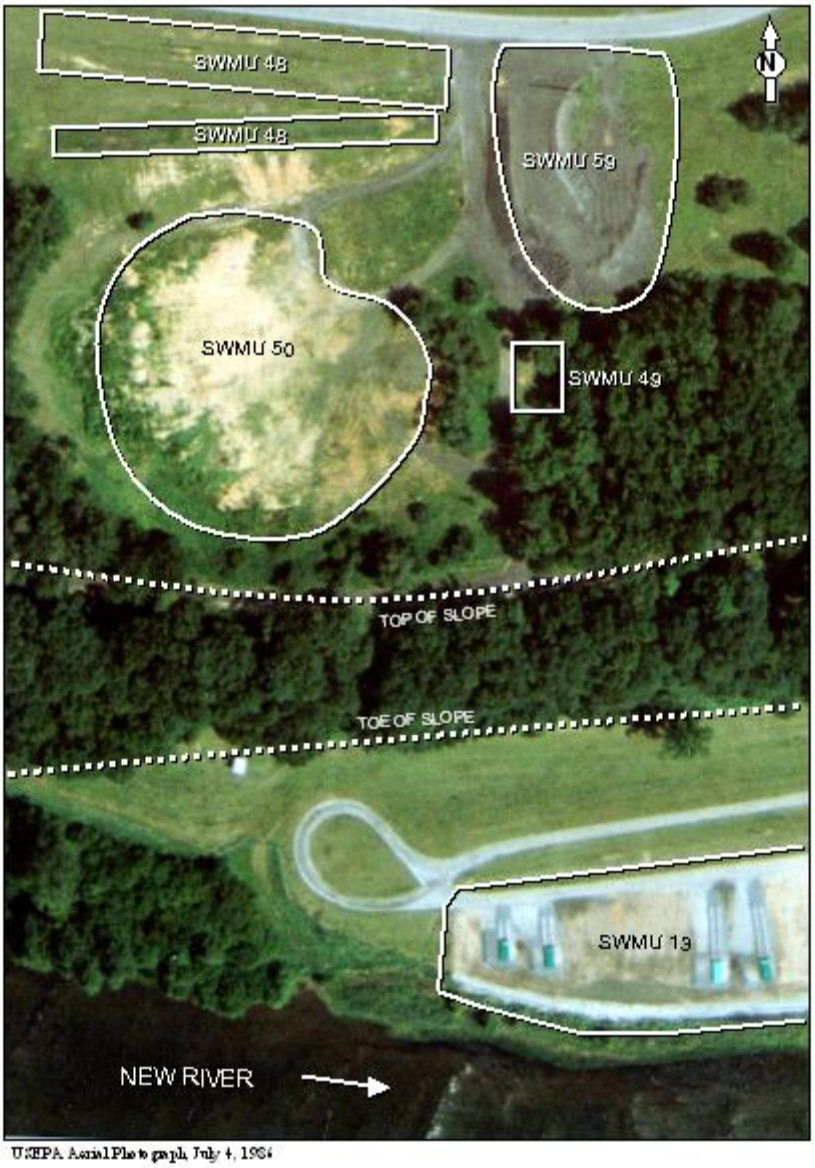
Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Appendix F

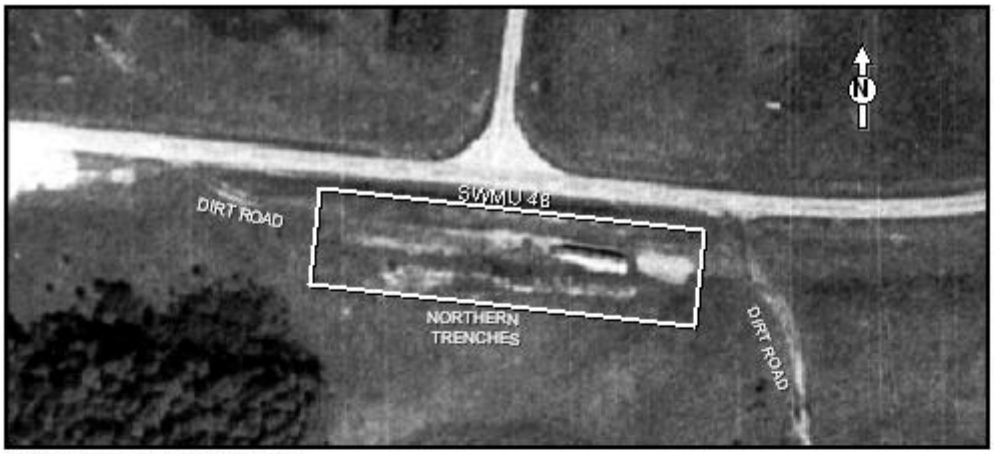
SLERA Tables
and
Site Photographs

Appendix F-1 Site Photographs
Appendix F-2 SLERA Risk Characterization Tables

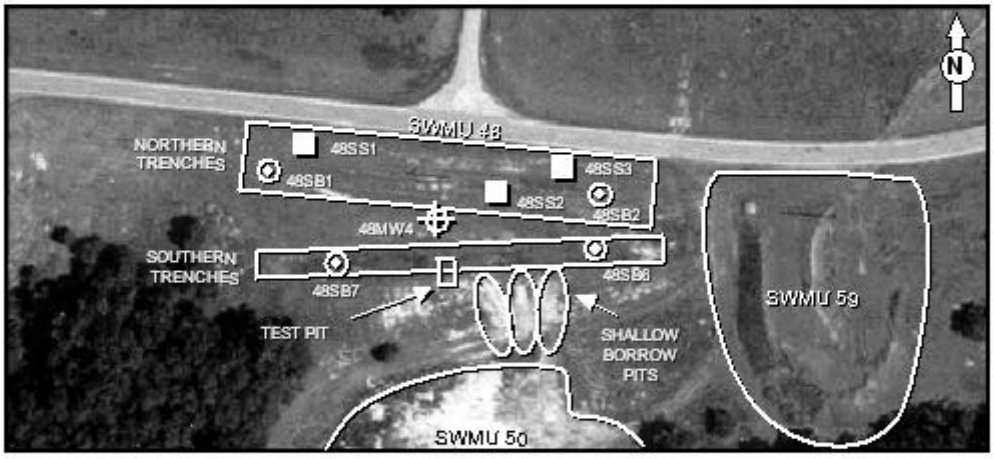


USEPA Aerial Photograph July 4, 1984

Photo F-1. Aerial Photograph of SWMUs 48 and 49.

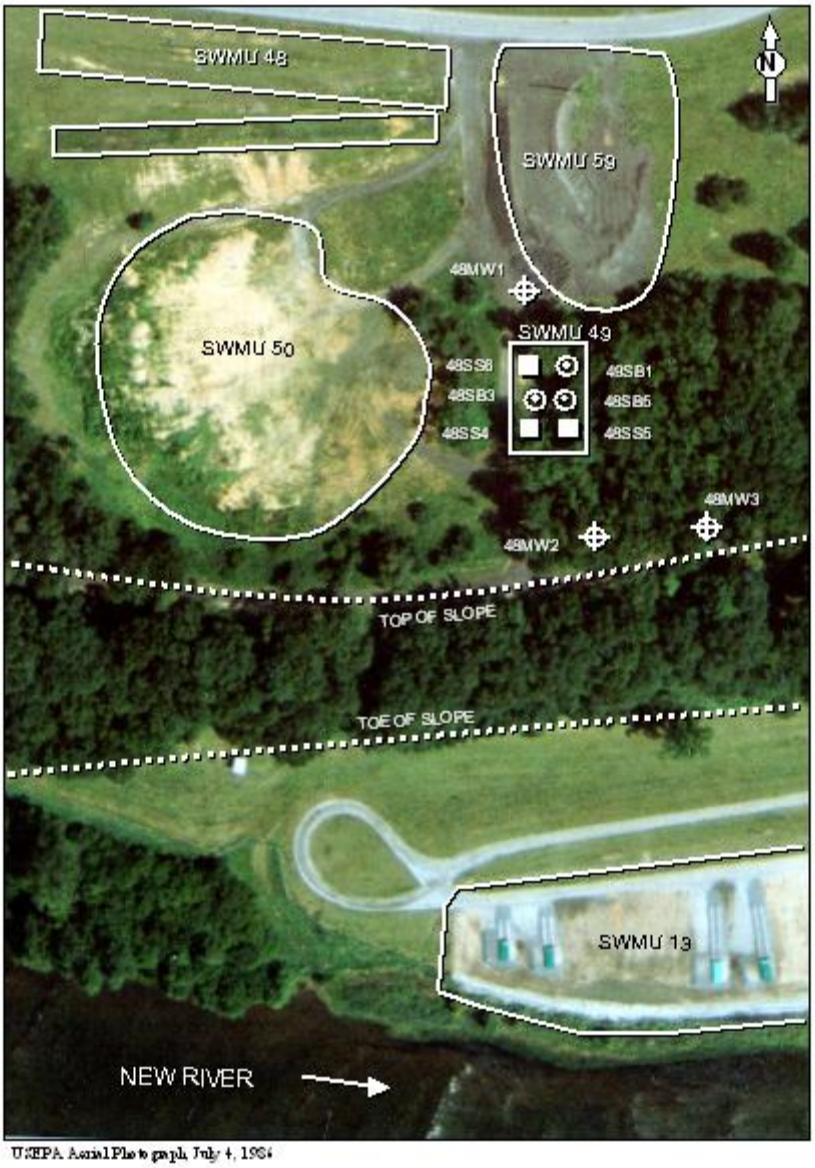


USEPA Aerial Photograph, October 8, 1971



USEPA Aerial Photograph, July 4, 1984

Photo F-2. Aerial Photographs of SWMU 48.



USEPA Aerial Photograph, July 4, 1984

Photo F-3. Aerial Photograph of SWMU 49 and Vicinity.

Photo F-4. SWMU 48 Looking West.

Photo F-5. SWMU 48 Monitoring Well.

Photo F-6. Photograph of SWMU 49.

Photo F-7. Photograph of SWMUs 48 and 50.

Table F-1
Data Used to Model Exposure[a] in the Indicator Wildlife Species

Indicator Species	Body Weight Range (average) (kg)	Average Home Range (ha) [ac]	Maximum Dietary Intake[b] (kg[dw]/day)	Average Dietary Intake[c] (kg[dw]/day)	Soil/Sed. Intake[d] (%Diet) (Avg – Max) (kg[dw]/day)	Maximum Water Intake[b] (L/day)	Average Water Intake[c] (L/day)	Trophic Level	Dietary Composition
Meadow vole (*Microtus pennsylvanicus*)	0.0170-0.0524 (0.037)	0.036 [0.089]	0.010	0.0080	(2.4%) 0.00019-0.00024	0.0070	0.0051	Herbivore	Plants: 100%
Short-tailed shrew *(Blarina brevicauda)*	0.0125-0.0225 (0.015)	0.39 [0.96]	0.0030	0.0022	(10.4%) 0.00023-0.00031	0.0033	0.0023	Insectivore	Terr. Inverts: 100%
American robin *(Turdus migratorius)*	0.0635-0.103 (0.0773)	0.48 [1.2]	0.020	0.016	(4%) 0.00064-0.00080	0.013	0.011	Omnivore	Plants: 62% Terr Inverts: 38%
Red-tailed hawk (*Buteo jamaicensis*)	0.957-1.235 (1.134)	842 [2081]	0.063	0.059	(0%)	0.068	0.064	Carnivore	Mammals: 76% Birds: 24%
Red fox *(Vulpes vulpes)*	2.95-7.04 (4.53)	892 [2204]	0.34	0.24	(2.8%) 0.0067-0.0095	0.57	0.39	Carnivore	Mammals: 65% Birds: 14% Plants: 17% Terr. Inverts: 4%

[a] From USEPA (1993), except as noted.
[b] Maximum dietary and water intake based on appropriate allometric equation using maximum body weight.
[c] Average dietary and water intake based on appropriate allometric equation using average body weight.
[d] Soil/sediment ingestion rate based on estimated percent soil in diet (dry weight), and maximum or average dietary intake.

Allometric equations for mammals and birds from USEPA (1993), as follows, where FI = food ingestion (dry weight [dw]), WI = water ingestion, Wt = body weight, kg = kilogram, L = liter, and g = gram:
FI (kg/day) = 0.0687 $Wt^{0.822}$ for mammals (shrew and red fox),
FI (g/day) = 0.577 $Wt^{0.727}$ for herbivores (meadow vole),
FI (g/day) = 0.301 $Wt^{0.751}$ for non-passerine birds (red-tail hawk),
FI (g/day) = 0.398 $Wt^{0.850}$ for passerine birds (American robin).
WI (L/day) = 0.099 $Wt^{0.90}$ (Wt in kg) for mammals,
WI (L/day) = 0.059 $Wt^{0.67}$ (Wt in kg) for birds.

ha = hectare
ac = acre, and a hectare = 2.471 acres.

Notes:
The soil ingestion rate for the shrew set equal to the rate for the American woodcock (10.4% of diet), as both species feed predominantly on earthworms.
The soil ingestion rate for the American robin set equal to 48% of the American woodcock value (0.38 x 10.4% = 4%), based on a robin diet of 38% invertebrates (earthworms).

Table ####
Wildlife EEQ Hazard Summary for SWMU 48

Receptor	Tier 1[a]		Tier 2[b]	
	NOAEL-Based EEQ	LOAEL-Based EEQ	NOAEL-Based EEQ	LOAEL-Based EEQ
Meadow vole	11	3	4	0.97
Hazard Driver(s)[c]:	Arsenic and Selenium - plant ingestion		Arsenic and Selenium - plant and soil ingestion	
Short-tailed shrew	664	84	46	6
Hazard Driver(s)[c]:	TCDD - terrestrial invertebrate ingestion		TCDD and Selenium - terrestrial invertebrate ingestion	
American robin	182	55	35	7
Hazard Driver(s)[c]:	Mercury - terrestrial invertebrate ingestion		Chromium and Zinc - terrestrial invertebrate ingestion	
Red-tailed hawk	70	8	0.03	0.003
Hazard Driver(s)[c]:	Selenium - small mammal ingestion		--	
Red fox	27	4	0.003	0.0005
Hazard Driver(s)[c]:	Selenium - small mammal ingestion		--	

[a] Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.

[b] Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR less than or equal to 1.

[c] Hazard drivers are those chemicals contributing the most to the total estimated EEQ, and the primary route of exposure associated with this driver.

Notes:

EEQ = Ecological Effects Quotient.

LOAEL = Lowest Observed Adverse Effect Level

NOAEL = No Observed Adverse Effect Level

Table F-2
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Meadow Voles at SWMU 48

Hazard Estimate - Tier 1
Meadow Vole

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	8.71E-08	NA	NA	0.00E+00	3.49E-07	0.00E+00	0.00E+00	4.36E-07	4	1.00E-06	2.50E-07	1.74E+00	1.00E-05	2.50E-06	1.74E-01	16.32%	6.59%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	5.49E-06	NA	NA	0.00E+00	5.58E-05	0.00E+00	0.00E+00	6.13E-05	4	8.00E-01	2.00E-01	3.07E-04	4.00E+00	1.00E+00	6.13E-05	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	3.26E-05	NA	NA	0.00E+00	1.43E-04	0.00E+00	0.00E+00	1.75E-04	4	8.00E-01	2.00E-01	8.76E-04	4.00E+00	1.00E+00	1.75E-04	0.01%	0.01%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	1.00E-05	NA	NA	0.00E+00	7.75E-04	0.00E+00	0.00E+00	7.85E-04	4	6.56E+01	1.64E+01	4.79E-05	1.10E+02	2.75E+01	2.85E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	1.09E-03	NA	NA	0.00E+00	3.94E-03	0.00E+00	0.00E+00	5.02E-03	4	1.40E-01	3.50E-02	1.43E-01	6.80E-01	1.70E-01	2.95E-02	1.34%	1.12%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	6.21E-05	NA	NA	0.00E+00	1.56E-03	0.00E+00	0.00E+00	1.62E-03	4	6.15E-01	1.54E-01	1.05E-02	3.07E+00	7.68E-01	2.11E-03	0.10%	0.08%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	5.08E-05	NA	NA	0.00E+00	3.10E-04	0.00E+00	0.00E+00	3.61E-04	4	6.15E-01	1.54E-01	2.35E-03	3.07E+00	7.68E-01	4.70E-04	0.02%	0.02%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	1.12E-04	NA	NA	0.00E+00	1.44E-03	0.00E+00	0.00E+00	1.55E-03	4	6.15E-01	1.54E-01	1.01E-02	3.07E+00	7.68E-01	2.02E-03	0.09%	0.08%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	3.39E-05	NA	NA	0.00E+00	1.85E-04	0.00E+00	0.00E+00	2.18E-04	4	6.15E-01	1.54E-01	1.42E-03	3.07E+00	7.68E-01	2.85E-04	0.01%	0.01%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	2.82E-05	NA	NA	0.00E+00	3.26E-04	0.00E+00	0.00E+00	3.54E-04	4	6.15E-01	1.54E-01	2.30E-03	3.07E+00	7.68E-01	4.61E-04	0.02%	0.02%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	1.21E-03	NA	NA	0.00E+00	9.13E-03	0.00E+00	0.00E+00	1.03E-02	4	6.15E-01	1.54E-01	6.72E-02	3.07E+00	7.68E-01	1.35E-02	0.63%	0.51%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	1.04E-05	NA	NA	0.00E+00	5.66E-05	0.00E+00	0.00E+00	6.70E-05	4	6.15E-01	1.54E-01	4.36E-04	3.07E+00	7.68E-01	8.73E-05	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	5.90E-06	NA	NA	0.00E+00	5.66E-04	0.00E+00	0.00E+00	5.71E-04	4	1.50E-01	3.75E-02	1.52E-02	7.50E-01	1.88E-01	3.05E-03	0.14%	0.12%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	7.76E-06	NA	NA	0.00E+00	2.21E-04	0.00E+00	0.00E+00	2.28E-04	4	9.20E-02	2.30E-02	9.93E-03	9.20E-01	2.30E-01	9.93E-04	0.09%	0.04%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	1.55E-04	NA	NA	0.00E+00	3.24E-03	0.00E+00	0.00E+00	3.39E-03	4	6.15E-01	1.54E-01	2.21E-02	3.07E+00	7.68E-01	4.42E-03	0.21%	0.17%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	1.55E-05	NA	NA	0.00E+00	5.42E-06	0.00E+00	0.00E+00	2.09E-05	4	6.56E+01	1.64E+01	1.28E-06	1.10E+02	2.75E+01	7.62E-07	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	4.09E-05	NA	NA	0.00E+00	1.88E-04	0.00E+00	0.00E+00	2.29E-04	4	6.15E-01	1.54E-01	1.49E-03	3.07E+00	7.68E-01	2.98E-04	0.01%	0.01%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	3.81E-03	NA	NA	0.00E+00	2.21E-01	0.00E+00	0.00E+00	2.25E-01	4	6.56E+01	1.64E+01	1.37E-02	1.10E+02	2.75E+01	8.18E-03	0.13%	0.31%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	1.34E-04	NA	NA	0.00E+00	4.02E-03	0.00E+00	0.00E+00	4.16E-03	4	6.15E-01	1.54E-01	2.70E-02	3.07E+00	7.68E-01	5.42E-03	0.25%	0.20%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	4.83E-02	NA	NA	0.00E+00	7.55E-02	0.00E+00	0.00E+00	1.24E-01	4	1.26E-01	3.15E-02	3.93E+00	1.26E+00	3.15E-01	3.93E-01	36.80%	14.85%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	4.33E-01	NA	NA	0.00E+00	7.40E-01	0.00E+00	0.00E+00	1.17E+00	4	2.74E+03	6.84E+02	1.72E-03	1.37E+04	3.42E+03	3.43E-04	0.02%	0.01%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	9.30E-02	NA	NA	0.00E+00	2.41E+00	0.00E+00	0.00E+00	2.50E+00	8	1.17E+01	1.46E+00	1.71E+00	1.51E+01	1.89E+00	1.33E+00	16.04%	50.15%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	2.64E-01	NA	NA	0.00E+00	8.06E-01	0.00E+00	0.00E+00	1.07E+00	4	8.00E+00	2.00E+00	5.35E-01	8.00E+01	2.00E+01	5.35E-02	5.01%	2.02%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	3.30E+01	3.51E-01	1.05E+00	1.05E+00	NA	NA	1.57E-02	NA	NA	0.00E+00	2.29E-01	0.00E+00	0.00E+00	2.45E-01	8	1.00E+00	1.25E-01	1.96E+00	5.00E+00	6.25E-01	3.91E-01	18.33%	14.79%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	7.80E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	1.26E-01	NA	NA	0.00E+00	3.28E-01	0.00E+00	0.00E+00	4.54E-01	4	4.00E+01	1.00E+01	4.54E-02	8.00E+01	2.00E+01	2.27E-02	0.42%	0.86%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	3.46E-04	NA	NA	0.00E+00	2.02E-04	0.00E+00	0.00E+00	5.48E-04	4	2.22E+01	5.55E+00	9.87E-05	2.22E+02	5.55E+01	9.87E-06	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	3.44E-01	NA	NA	0.00E+00	1.67E+01	0.00E+00	0.00E+00	1.70E+01	4	1.60E+02	4.00E+01	4.26E-01	3.20E+02	8.00E+01	2.13E-01	3.99%	8.04%
																									Hazard Index (Total EEQ):	1.07E+01			2.65E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	1	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00024	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.01	kg/d
Body weight =	0.017	kg
Home range =	0.089	acres
Water intake rate =	0.007	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-3
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for Meadow Voles at SWMU 48

Hazard Estimate - Tier 2
Meadow Vole

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	3.94E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	3.17E-08	NA	NA	0.00E+00	1.28E-07	0.00E+00	0.00E+00	1.60E-07	4	1.00E-06	2.50E-07	6.39E-01	1.00E-05	2.50E-06	6.39E-02	16.32%	6.58%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	2.00E-06	NA	NA	0.00E+00	2.05E-05	0.00E+00	0.00E+00	2.25E-05	4	8.00E-01	2.00E-01	1.13E-04	4.00E+00	1.00E+00	2.25E-05	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	1.19E-05	NA	NA	0.00E+00	5.24E-05	0.00E+00	0.00E+00	6.43E-05	4	8.00E-01	2.00E-01	3.22E-04	4.00E+00	1.00E+00	6.43E-05	0.01%	0.01%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	3.65E-06	NA	NA	0.00E+00	2.85E-04	0.00E+00	0.00E+00	2.88E-04	4	6.56E+01	1.64E+01	1.76E-05	1.10E+02	2.75E+01	1.05E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	2.87E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	3.95E-04	NA	NA	0.00E+00	1.45E-03	0.00E+00	0.00E+00	1.84E-03	4	1.40E-01	3.50E-02	5.26E-02	6.80E-01	1.70E-01	1.08E-02	1.34%	1.12%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	2.26E-05	NA	NA	0.00E+00	5.73E-04	0.00E+00	0.00E+00	5.96E-04	4	6.15E-01	1.54E-01	3.87E-03	3.07E+00	7.68E-01	7.76E-04	0.10%	0.08%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	1.85E-05	NA	NA	0.00E+00	1.14E-04	0.00E+00	0.00E+00	1.33E-04	4	6.15E-01	1.54E-01	8.62E-04	3.07E+00	7.68E-01	1.73E-04	0.02%	0.02%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	4.06E-05	NA	NA	0.00E+00	5.30E-04	0.00E+00	0.00E+00	5.70E-04	4	6.15E-01	1.54E-01	3.71E-03	3.07E+00	7.68E-01	7.43E-04	0.09%	0.08%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	1.23E-05	NA	NA	0.00E+00	6.78E-05	0.00E+00	0.00E+00	8.02E-05	4	6.15E-01	1.54E-01	5.21E-04	3.07E+00	7.68E-01	1.04E-04	0.01%	0.01%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	1.03E-05	NA	NA	0.00E+00	1.20E-04	0.00E+00	0.00E+00	1.30E-04	4	6.15E-01	1.54E-01	8.45E-04	3.07E+00	7.68E-01	1.69E-04	0.02%	0.02%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	4.42E-04	NA	NA	0.00E+00	3.35E-03	0.00E+00	0.00E+00	3.80E-03	4	6.15E-01	1.54E-01	2.47E-02	3.07E+00	7.68E-01	4.95E-03	0.63%	0.51%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	3.80E-06	NA	NA	0.00E+00	2.08E-05	0.00E+00	0.00E+00	2.46E-05	4	6.15E-01	1.54E-01	1.60E-04	3.07E+00	7.68E-01	3.21E-05	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	2.15E-06	NA	NA	0.00E+00	2.08E-04	0.00E+00	0.00E+00	2.10E-04	4	1.50E-01	3.75E-02	5.60E-03	7.50E-01	1.88E-01	1.12E-03	0.14%	0.12%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	2.82E-06	NA	NA	0.00E+00	8.11E-05	0.00E+00	0.00E+00	8.39E-05	4	9.20E-02	2.30E-02	3.65E-03	9.20E-01	2.30E-01	3.65E-04	0.09%	0.04%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	5.65E-05	NA	NA	0.00E+00	1.19E-03	0.00E+00	0.00E+00	1.25E-03	4	6.15E-01	1.54E-01	8.10E-03	3.07E+00	7.68E-01	1.62E-03	0.21%	0.17%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	5.65E-06	NA	NA	0.00E+00	1.99E-06	0.00E+00	0.00E+00	7.64E-06	4	6.56E+01	1.64E+01	4.66E-07	1.10E+02	2.75E+01	2.78E-07	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	1.49E-05	NA	NA	0.00E+00	6.90E-05	0.00E+00	0.00E+00	8.39E-05	4	6.15E-01	1.54E-01	5.45E-04	3.07E+00	7.68E-01	1.09E-04	0.01%	0.01%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	1.39E-03	NA	NA	0.00E+00	8.13E-02	0.00E+00	0.00E+00	8.26E-02	4	6.56E+01	1.64E+01	5.04E-03	1.10E+02	2.75E+01	3.01E-03	0.13%	0.31%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	4.88E-05	NA	NA	0.00E+00	1.48E-03	0.00E+00	0.00E+00	1.53E-03	4	6.15E-01	1.54E-01	9.94E-03	3.07E+00	7.68E-01	1.99E-03	0.25%	0.20%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	1.76E-02	NA	NA	0.00E+00	2.77E-02	0.00E+00	0.00E+00	4.53E-02	4	1.26E-01	3.15E-02	1.44E+00	1.26E+00	3.15E-01	1.44E-01	36.73%	14.81%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	1.58E-01	NA	NA	0.00E+00	2.72E-01	0.00E+00	0.00E+00	4.30E-01	4	2.74E+03	6.84E+02	6.28E-04	1.37E+04	3.42E+03	1.26E-04	0.02%	0.01%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	3.38E-02	NA	NA	0.00E+00	8.86E-01	0.00E+00	0.00E+00	9.20E-01	8	1.17E+01	1.46E+00	6.29E-01	1.51E+01	1.89E+00	4.88E-01	16.07%	50.19%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	9.60E-02	NA	NA	0.00E+00	2.96E-01	0.00E+00	0.00E+00	3.92E-01	4	8.00E+00	2.00E+00	1.96E-01	8.00E+01	2.00E+01	1.96E-02	5.01%	2.02%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	1.01E+00	3.51E-01	1.92E-01	1.92E-01	NA	NA	5.70E-03	NA	NA	0.00E+00	8.42E-02	0.00E+00	0.00E+00	8.99E-02	8	1.00E+00	1.25E-01	7.19E-01	5.00E+00	6.25E-01	1.44E-01	18.36%	14.80%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	1.06E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	4.59E-02	NA	NA	0.00E+00	1.20E-01	0.00E+00	0.00E+00	1.66E-01	4	4.00E+01	1.00E+01	1.66E-02	8.00E+01	2.00E+01	8.31E-03	0.42%	0.86%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	1.26E-04	NA	NA	0.00E+00	7.42E-05	0.00E+00	0.00E+00	2.00E-04	4	2.22E+01	5.55E+00	3.60E-05	2.22E+02	5.55E+01	3.60E-06	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	1.25E-01	NA	NA	0.00E+00	6.13E+00	0.00E+00	0.00E+00	6.26E+00	4	1.60E+02	4.00E+01	1.56E-01	3.20E+02	8.00E+01	7.82E-02	3.99%	8.05%
																									Hazard Index (Total EEQ):			3.9E+00			9.7E-01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	1	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00019	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.008	kg/d
Body weight =	0.037	kg
Home range =	0.089	acres
Water intake rate =	0.0051	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-4
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Short-Tailed Shrews at SWMU 48

Hazard Estimate - Tier 1
Short-tailed Shrew

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL		LOAEL	Adjusted LOAEL		Percent Contribution to	Percent Contribution to
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	1.53E-07	NA	NA	6.24E-05	0.00E+00	0.00E+00	0.00E+00	6.25E-05	8	1.00E-06	1.25E-07	5.00E+02	1.00E-05	1.25E-06	5.00E+01	75.27%	59.61%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	9.65E-06	NA	NA	3.21E-03	0.00E+00	0.00E+00	0.00E+00	3.22E-03	8	8.00E-01	1.00E-01	3.22E-02	4.00E+00	5.00E-01	6.43E-03	0.00%	0.01%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	5.73E-05	NA	NA	1.03E-02	0.00E+00	0.00E+00	0.00E+00	1.03E-02	8	8.00E-01	1.00E-01	1.03E-01	4.00E+00	5.00E-01	2.07E-02	0.02%	0.02%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	1.76E-05	NA	NA	4.12E-04	0.00E+00	0.00E+00	0.00E+00	4.30E-04	8	6.56E+01	8.20E+00	5.24E-05	1.10E+02	1.38E+01	3.13E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	1.91E-03	NA	NA	1.20E+00	0.00E+00	0.00E+00	0.00E+00	1.21E+00	8	1.40E-01	1.75E-02	6.89E+01	6.80E-01	8.50E-02	1.42E+01	10.36%	16.90%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	1.09E-04	NA	NA	1.68E-03	0.00E+00	0.00E+00	0.00E+00	1.79E-03	8	6.15E-01	7.69E-02	2.33E-02	3.07E+00	3.84E-01	4.66E-03	0.00%	0.01%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	8.93E-05	NA	NA	1.15E-03	0.00E+00	0.00E+00	0.00E+00	1.24E-03	8	6.15E-01	7.69E-02	1.61E-02	3.07E+00	3.84E-01	3.23E-03	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	1.96E-04	NA	NA	4.93E-03	0.00E+00	0.00E+00	0.00E+00	5.13E-03	8	6.15E-01	7.69E-02	6.67E-02	3.07E+00	3.84E-01	1.34E-02	0.01%	0.02%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	5.95E-05	NA	NA	1.69E-03	0.00E+00	0.00E+00	0.00E+00	1.75E-03	8	6.15E-01	7.69E-02	2.28E-02	3.07E+00	3.84E-01	4.57E-03	0.00%	0.01%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	4.96E-05	NA	NA	1.25E-03	0.00E+00	0.00E+00	0.00E+00	1.30E-03	8	6.15E-01	7.69E-02	1.69E-02	3.07E+00	3.84E-01	3.38E-03	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	2.13E-03	NA	NA	4.73E-02	0.00E+00	0.00E+00	0.00E+00	4.94E-02	8	6.15E-01	7.69E-02	6.43E-01	3.07E+00	3.84E-01	1.29E-01	0.10%	0.15%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	1.84E-05	NA	NA	4.10E-04	0.00E+00	0.00E+00	0.00E+00	4.29E-04	8	6.15E-01	7.69E-02	5.58E-03	3.07E+00	3.84E-01	1.12E-03	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	1.04E-05	NA	NA	6.58E-05	0.00E+00	0.00E+00	0.00E+00	7.62E-05	8	1.50E-01	1.88E-02	4.06E-03	7.50E-01	9.38E-02	8.13E-04	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	1.36E-05	NA	NA	6.94E-04	0.00E+00	0.00E+00	0.00E+00	7.08E-04	8	9.20E-02	1.15E-02	6.16E-02	9.20E-01	1.15E-01	6.16E-03	0.01%	0.01%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	2.73E-04	NA	NA	8.03E-03	0.00E+00	0.00E+00	0.00E+00	8.30E-03	8	6.15E-01	7.69E-02	1.08E-01	3.07E+00	3.84E-01	2.16E-02	0.02%	0.03%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	2.73E-05	NA	NA	2.53E-03	0.00E+00	0.00E+00	0.00E+00	2.55E-03	8	6.56E+01	8.20E+00	3.11E-04	1.10E+02	1.38E+01	1.86E-04	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	7.19E-05	NA	NA	1.99E-03	0.00E+00	0.00E+00	0.00E+00	2.06E-03	8	6.15E-01	7.69E-02	2.68E-02	3.07E+00	3.84E-01	5.37E-03	0.00%	0.01%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	6.70E-03	NA	NA	1.11E-01	0.00E+00	0.00E+00	0.00E+00	1.18E-01	8	6.56E+01	8.20E+00	1.44E-02	1.10E+02	1.38E+01	8.59E-03	0.00%	0.01%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	2.36E-04	NA	NA	3.99E-03	0.00E+00	0.00E+00	0.00E+00	4.23E-03	8	6.15E-01	7.69E-02	5.50E-02	3.07E+00	3.84E-01	1.10E-02	0.01%	0.01%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	8.48E-02	NA	NA	1.38E-01	0.00E+00	0.00E+00	0.00E+00	2.23E-01	8	1.26E-01	1.58E-02	1.42E+01	1.26E+00	1.58E-01	1.42E+00	2.13%	1.69%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	7.61E-01	NA	NA	2.25E+00	0.00E+00	0.00E+00	0.00E+00	3.02E+00	8	2.74E+03	3.42E+02	8.82E-03	1.37E+04	1.71E+03	1.76E-03	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	1.63E-01	NA	NA	8.15E-01	0.00E+00	0.00E+00	0.00E+00	9.78E-01	8	1.17E+01	1.46E+00	6.69E-01	1.51E+01	1.89E+00	5.18E-01	0.10%	0.62%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	4.64E-01	NA	NA	2.05E+00	0.00E+00	0.00E+00	0.00E+00	2.51E+00	8	8.00E+00	1.00E+00	2.51E+00	8.00E+01	1.00E+01	2.51E-01	0.38%	0.30%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	3.30E+01	3.51E-01	1.05E+00	1.05E+00	NA	NA	2.75E-02	NA	NA	8.79E+00	0.00E+00	0.00E+00	0.00E+00	8.82E+00	8	1.00E+00	1.25E-01	7.05E+01	5.00E+00	6.25E-01	1.41E+01	10.62%	16.82%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	7.80E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	2.21E-01	NA	NA	1.67E+01	0.00E+00	0.00E+00	0.00E+00	1.69E+01	8	4.00E+01	5.00E+00	3.39E+00	8.00E+01	1.00E+01	1.69E+00	0.51%	2.02%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	6.08E-04	NA	NA	1.21E-02	0.00E+00	0.00E+00	0.00E+00	1.27E-02	8	2.22E+01	2.78E+00	4.56E-03	2.22E+02	2.78E+01	4.56E-04	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	6.05E-01	NA	NA	5.85E+01	0.00E+00	0.00E+00	0.00E+00	5.91E+01	8	1.60E+02	2.00E+01	2.96E+00	3.20E+02	4.00E+01	1.48E+00	0.45%	1.76%
																						Hazard Index (Total EEQ):			6.64E+02			8.4E+01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	1	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00031	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.003	kg/d
Body weight =	0.0125	kg
Home range =	0.96	acres
Water intake rate =	0.0033	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-5
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for Short-Tailed Shrews at SWMU 48

Hazard Estimate - Tier 2
Short-tailed Shrew

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	3.94E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	9.46E-08	NA	NA	3.57E-06	0.00E+00	0.00E+00	0.00E+00	3.66E-06	8	1.00E-06	1.25E-07	2.93E+01	1.00E-05	1.25E-06	2.93E+00	63.47%	47.56%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	5.96E-06	NA	NA	1.96E-03	0.00E+00	0.00E+00	0.00E+00	1.97E-03	8	8.00E-01	1.00E-01	1.97E-02	4.00E+00	5.00E-01	3.93E-03	0.04%	0.06%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	3.54E-05	NA	NA	6.29E-03	0.00E+00	0.00E+00	0.00E+00	6.32E-03	8	8.00E-01	1.00E-01	6.32E-02	4.00E+00	5.00E-01	1.26E-02	0.14%	0.21%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	1.09E-05	NA	NA	2.52E-04	0.00E+00	0.00E+00	0.00E+00	2.63E-04	8	6.56E+01	8.20E+00	3.21E-05	1.10E+02	1.38E+01	1.91E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	2.87E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	1.18E-03	NA	NA	3.23E-02	0.00E+00	0.00E+00	0.00E+00	3.35E-02	8	1.40E-01	1.75E-02	1.91E+00	6.80E-01	8.50E-02	3.94E-01	4.15%	6.40%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	6.75E-05	NA	NA	1.03E-03	0.00E+00	0.00E+00	0.00E+00	1.09E-03	8	6.15E-01	7.69E-02	1.42E-02	3.07E+00	3.84E-01	2.85E-03	0.03%	0.05%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	5.52E-05	NA	NA	7.02E-04	0.00E+00	0.00E+00	0.00E+00	7.57E-04	8	6.15E-01	7.69E-02	9.85E-03	3.07E+00	3.84E-01	1.97E-03	0.02%	0.03%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	1.21E-04	NA	NA	3.01E-03	0.00E+00	0.00E+00	0.00E+00	3.13E-03	8	6.15E-01	7.69E-02	4.08E-02	3.07E+00	3.84E-01	8.17E-03	0.09%	0.13%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	3.68E-05	NA	NA	1.03E-03	0.00E+00	0.00E+00	0.00E+00	1.07E-03	8	6.15E-01	7.69E-02	1.39E-02	3.07E+00	3.84E-01	2.79E-03	0.03%	0.05%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	3.07E-05	NA	NA	7.63E-04	0.00E+00	0.00E+00	0.00E+00	7.93E-04	8	6.15E-01	7.69E-02	1.03E-02	3.07E+00	3.84E-01	2.07E-03	0.02%	0.03%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	1.32E-03	NA	NA	2.89E-02	0.00E+00	0.00E+00	0.00E+00	3.02E-02	8	6.15E-01	7.69E-02	3.93E-01	3.07E+00	3.84E-01	7.87E-02	0.85%	1.28%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	1.13E-05	NA	NA	2.51E-04	0.00E+00	0.00E+00	0.00E+00	2.62E-04	8	6.15E-01	7.69E-02	3.41E-03	3.07E+00	3.84E-01	6.83E-04	0.01%	0.01%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	6.41E-06	NA	NA	3.97E-05	0.00E+00	0.00E+00	0.00E+00	4.61E-05	8	1.50E-01	1.88E-02	2.46E-03	7.50E-01	9.38E-02	4.92E-04	0.01%	0.01%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	8.43E-06	NA	NA	4.19E-04	0.00E+00	0.00E+00	0.00E+00	4.27E-04	8	9.20E-02	1.15E-02	3.71E-02	9.20E-01	1.15E-01	3.71E-03	0.08%	0.06%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	1.69E-04	NA	NA	4.90E-03	0.00E+00	0.00E+00	0.00E+00	5.07E-03	8	6.15E-01	7.69E-02	6.60E-02	3.07E+00	3.84E-01	1.32E-02	0.14%	0.21%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	1.69E-05	NA	NA	1.54E-03	0.00E+00	0.00E+00	0.00E+00	1.56E-03	8	6.56E+01	8.20E+00	1.90E-04	1.10E+02	1.38E+01	1.14E-04	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	4.45E-05	NA	NA	1.22E-03	0.00E+00	0.00E+00	0.00E+00	1.26E-03	8	6.15E-01	7.69E-02	1.64E-02	3.07E+00	3.84E-01	3.29E-03	0.04%	0.05%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	4.14E-03	NA	NA	6.81E-02	0.00E+00	0.00E+00	0.00E+00	7.23E-02	8	6.56E+01	8.20E+00	8.81E-03	1.10E+02	1.38E+01	5.25E-03	0.02%	0.09%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	1.46E-04	NA	NA	2.44E-03	0.00E+00	0.00E+00	0.00E+00	2.58E-03	8	6.15E-01	7.69E-02	3.36E-02	3.07E+00	3.84E-01	6.73E-03	0.07%	0.11%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	5.24E-02	NA	NA	8.44E-02	0.00E+00	0.00E+00	0.00E+00	1.37E-01	8	1.26E-01	1.58E-02	8.69E+00	1.26E+00	1.58E-01	8.69E-01	18.83%	14.11%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	4.71E-01	NA	NA	1.38E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+00	8	2.74E+03	3.42E+02	5.40E-03	1.37E+04	1.71E+03	1.08E-03	0.01%	0.02%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	1.01E-01	NA	NA	4.98E-01	0.00E+00	0.00E+00	0.00E+00	5.99E-01	8	1.17E+01	1.46E+00	4.09E-01	1.51E+01	1.89E+00	3.17E-01	0.89%	5.15%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	2.87E-01	NA	NA	1.25E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+00	8	8.00E+00	1.00E+00	1.54E+00	8.00E+01	1.00E+01	1.54E-01	3.34%	2.50%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	1.01E+00	3.51E-01	1.92E-01	1.92E-01	NA	NA	1.70E-02	NA	NA	1.64E-01	0.00E+00	0.00E+00	0.00E+00	1.81E-01	8	1.00E+00	1.25E-01	1.45E+00	5.00E+00	6.25E-01	2.90E-01	3.14%	4.71%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	1.06E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	1.37E-01	NA	NA	1.39E+00	0.00E+00	0.00E+00	0.00E+00	1.52E+00	8	4.00E+01	5.00E+00	3.05E-01	8.00E+01	1.00E+01	1.52E-01	0.66%	2.48%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	3.76E-04	NA	NA	7.37E-03	0.00E+00	0.00E+00	0.00E+00	7.74E-03	8	2.22E+01	2.78E+00	2.79E-03	2.22E+02	2.78E+01	2.79E-04	0.01%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	3.74E-01	NA	NA	3.58E+01	0.00E+00	0.00E+00	0.00E+00	3.61E+01	8	1.60E+02	2.00E+01	1.81E+00	3.20E+02	4.00E+01	9.04E-01	3.92%	14.68%
																								Hazard Index (Total EEQ):		4.6E+01			6.2E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x \, Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	1	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00023	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.0022	kg/d
Body weight =	0.015	kg
Home range =	0.96	acres
Water intake rate =	0.0023	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-6
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for American Robins at SWMU 48

Hazard Estimate - Tier 1
American Robin

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	7.78E-08	NA	NA	3.11E-05	1.16E-07	0.00E+00	0.00E+00	3.13E-05	8	1.40E-05	1.75E-06	1.79E+01	1.40E-04	1.75E-05	1.79E+00	9.85%	3.26%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	4.90E-06	NA	NA	1.60E-03	1.85E-05	0.00E+00	0.00E+00	1.62E-03	8	2.80E-03	3.50E-04	4.64E+00	2.80E-02	3.50E-03	4.64E-01	2.55%	0.84%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	2.91E-05	NA	NA	5.13E-03	4.74E-05	0.00E+00	0.00E+00	5.21E-03	8	2.80E-03	3.50E-04	1.49E+01	2.80E-02	3.50E-03	1.49E+00	8.19%	2.71%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	8.94E-06	NA	NA	2.06E-04	2.57E-04	0.00E+00	0.00E+00	4.72E-04	8	5.53E+02	6.91E+01	6.83E-06	2.77E+03	3.46E+02	1.37E-06	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	9.69E-04	NA	NA	6.00E-01	1.31E-03	0.00E+00	0.00E+00	6.02E-01	8	1.80E-01	2.25E-02	2.68E+01	1.80E+00	2.25E-01	2.68E+00	14.74%	4.88%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	5.54E-05	NA	NA	8.37E-04	5.18E-04	0.00E+00	0.00E+00	1.41E-03	8	5.53E+02	6.91E+01	2.04E-05	2.77E+03	3.46E+02	4.08E-06	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	4.54E-05	NA	NA	5.73E-04	1.03E-04	0.00E+00	0.00E+00	7.21E-04	8	5.53E+02	6.91E+01	1.04E-05	2.77E+03	3.46E+02	2.09E-06	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	9.95E-05	NA	NA	2.46E-03	4.78E-04	0.00E+00	0.00E+00	3.04E-03	8	5.53E+02	6.91E+01	4.39E-05	2.77E+03	3.46E+02	8.78E-06	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	3.02E-05	NA	NA	8.44E-04	6.13E-05	0.00E+00	0.00E+00	9.36E-04	8	5.53E+02	6.91E+01	1.35E-05	2.77E+03	3.46E+02	2.71E-06	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	2.52E-05	NA	NA	6.22E-04	1.08E-04	0.00E+00	0.00E+00	7.56E-04	8	5.53E+02	6.91E+01	1.09E-05	2.77E+03	3.46E+02	2.19E-06	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	1.08E-03	NA	NA	2.36E-02	3.03E-03	0.00E+00	0.00E+00	2.77E-02	8	5.53E+02	6.91E+01	4.00E-04	2.77E+03	3.46E+02	8.01E-05	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	9.32E-06	NA	NA	2.05E-04	1.88E-05	0.00E+00	0.00E+00	2.33E-04	8	5.53E+02	6.91E+01	3.37E-06	2.77E+03	3.46E+02	6.73E-07	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	5.27E-06	NA	NA	3.28E-05	1.88E-04	0.00E+00	0.00E+00	2.26E-04	8	1.00E+01	1.25E+00	1.81E-04	5.00E+01	6.25E+00	3.61E-05	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	6.93E-06	NA	NA	3.46E-04	7.32E-05	0.00E+00	0.00E+00	4.26E-04	8	3.00E-01	3.75E-02	1.14E-02	1.50E+00	1.88E-01	2.27E-03	0.01%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	1.39E-04	NA	NA	4.00E-03	1.07E-03	0.00E+00	0.00E+00	5.21E-03	8	5.53E+02	6.91E+01	7.54E-05	2.77E+03	3.46E+02	1.51E-05	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	1.39E-05	NA	NA	1.26E-03	1.80E-06	0.00E+00	0.00E+00	1.28E-03	8	5.53E+02	6.91E+01	1.85E-05	2.77E+03	3.46E+02	3.69E-06	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	3.65E-05	NA	NA	9.93E-04	6.23E-05	0.00E+00	0.00E+00	1.09E-03	8	5.53E+02	6.91E+01	1.58E-05	2.77E+03	3.46E+02	3.16E-06	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	3.40E-03	NA	NA	5.56E-02	7.34E-02	0.00E+00	0.00E+00	1.32E-01	8	5.53E+02	6.91E+01	1.91E-03	2.77E+03	3.46E+02	3.83E-04	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	1.20E-04	NA	NA	1.99E-03	1.34E-03	0.00E+00	0.00E+00	3.45E-03	8	5.53E+02	6.91E+01	4.98E-05	2.77E+03	3.46E+02	9.97E-06	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	4.31E-02	NA	NA	6.89E-02	2.51E-02	0.00E+00	0.00E+00	1.37E-01	8	5.14E+00	6.43E-01	2.13E-01	1.28E+01	1.61E+00	8.54E-02	0.12%	0.16%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	3.87E-01	NA	NA	1.12E+00	2.46E-01	0.00E+00	0.00E+00	1.76E+00	8	1.00E+00	1.25E-01	1.41E+01	2.78E+00	3.48E-01	5.06E+00	7.74%	9.21%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	8.30E-02	NA	NA	4.06E-01	8.01E-01	0.00E+00	0.00E+00	1.29E+00	8	4.70E+01	5.88E+00	2.20E-01	6.20E+01	7.75E+00	1.66E-01	0.12%	0.30%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	2.36E-01	NA	NA	1.02E+00	2.68E-01	0.00E+00	0.00E+00	1.53E+00	8	3.85E+00	4.81E-01	3.17E+00	1.93E+01	2.41E+00	6.34E-01	1.75%	1.15%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	3.30E+01	3.51E-01	1.05E+00	1.05E+00	NA	NA	1.40E-02	NA	NA	4.38E+00	7.60E-02	0.00E+00	0.00E+00	4.47E+00	8	4.50E-01	5.63E-02	7.95E+01	9.00E-01	1.13E-01	3.98E+01	43.80%	72.43%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	7.80E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	1.13E-01	NA	NA	8.34E+00	1.09E-01	0.00E+00	0.00E+00	8.56E+00	8	7.74E+01	9.68E+00	8.85E-01	1.07E+02	1.34E+01	6.40E-01	0.49%	1.17%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	3.09E-04	NA	NA	6.01E-03	6.70E-05	0.00E+00	0.00E+00	6.39E-03	8	1.78E+02	2.23E+01	2.87E-04	8.90E+02	1.11E+02	5.74E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	3.07E-01	NA	NA	2.92E+01	5.54E+00	0.00E+00	0.00E+00	3.50E+01	8	1.45E+01	1.81E+00	1.93E+01	1.31E+02	1.64E+01	2.14E+00	10.65%	3.90%
																					Hazard Index (Total EEQ):				1.8E+02			5.5E+01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.62	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.38	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.0008	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.02	kg/d
Body weight =	0.0635	kg
Home range =	1.2	acres
Water intake rate =	0.013	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-7
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for American Robins at SWMU 48

Hazard Estimate - Tier 2
American Robin

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	3.94E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	4.26E-08	NA	NA	1.59E-06	6.34E-08	0.00E+00	0.00E+00	1.70E-06	8	1.40E-05	1.75E-06	9.71E-01	1.40E-04	1.75E-05	9.71E-02	2.78%	1.43%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	2.68E-06	NA	NA	8.76E-04	1.02E-05	0.00E+00	0.00E+00	8.89E-04	8	2.80E-03	3.50E-04	2.54E+00	2.80E-02	3.50E-03	2.54E-01	7.28%	3.73%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	1.59E-05	NA	NA	2.81E-03	2.59E-05	0.00E+00	0.00E+00	2.85E-03	8	2.80E-03	3.50E-04	8.14E+00	2.80E-02	3.50E-03	8.14E-01	23.36%	11.96%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	4.90E-06	NA	NA	1.13E-04	1.41E-04	0.00E+00	0.00E+00	2.58E-04	8	5.53E+02	6.91E+01	3.74E-06	2.77E+03	3.46E+02	7.48E-07	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	2.87E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	5.31E-04	NA	NA	1.44E-02	7.15E-04	0.00E+00	0.00E+00	1.57E-02	8	1.80E-01	2.25E-02	6.98E-01	1.80E+00	2.25E-01	6.98E-02	2.00%	1.02%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	3.04E-05	NA	NA	4.59E-04	2.83E-04	0.00E+00	0.00E+00	7.72E-04	8	5.53E+02	6.91E+01	1.12E-05	2.77E+03	3.46E+02	2.23E-06	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	2.48E-05	NA	NA	3.14E-04	5.64E-05	0.00E+00	0.00E+00	3.95E-04	8	5.53E+02	6.91E+01	5.72E-06	2.77E+03	3.46E+02	1.14E-06	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	5.45E-05	NA	NA	1.35E-03	2.62E-04	0.00E+00	0.00E+00	1.66E-03	8	5.53E+02	6.91E+01	2.41E-05	2.77E+03	3.46E+02	4.81E-06	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	1.66E-05	NA	NA	4.62E-04	3.36E-05	0.00E+00	0.00E+00	5.13E-04	8	5.53E+02	6.91E+01	7.42E-06	2.77E+03	3.46E+02	1.48E-06	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	1.38E-05	NA	NA	3.41E-04	5.92E-05	0.00E+00	0.00E+00	4.14E-04	8	5.53E+02	6.91E+01	5.99E-06	2.77E+03	3.46E+02	1.20E-06	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	5.93E-04	NA	NA	1.29E-02	1.66E-03	0.00E+00	0.00E+00	1.52E-02	8	5.53E+02	6.91E+01	2.19E-04	2.77E+03	3.46E+02	4.39E-05	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	5.11E-06	NA	NA	1.12E-04	1.03E-05	0.00E+00	0.00E+00	1.27E-04	8	5.53E+02	6.91E+01	1.84E-06	2.77E+03	3.46E+02	3.69E-07	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	2.88E-06	NA	NA	1.78E-05	1.03E-04	0.00E+00	0.00E+00	1.23E-04	8	1.00E+01	1.25E+00	9.88E-05	5.00E+01	6.25E+00	1.98E-05	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	3.79E-06	NA	NA	1.87E-04	4.01E-05	0.00E+00	0.00E+00	2.31E-04	8	3.00E-01	3.75E-02	6.16E-03	1.50E+00	1.88E-01	1.23E-03	0.02%	0.02%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	7.59E-05	NA	NA	2.19E-03	5.88E-04	0.00E+00	0.00E+00	2.86E-03	8	5.53E+02	6.91E+01	4.13E-05	2.77E+03	3.46E+02	8.26E-06	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	7.59E-06	NA	NA	6.90E-04	9.85E-07	0.00E+00	0.00E+00	6.99E-04	8	5.53E+02	6.91E+01	1.01E-05	2.77E+03	3.46E+02	2.02E-06	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	2.00E-05	NA	NA	5.44E-04	3.41E-05	0.00E+00	0.00E+00	5.98E-04	8	5.53E+02	6.91E+01	8.65E-06	2.77E+03	3.46E+02	1.73E-06	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	1.86E-03	NA	NA	3.04E-02	4.02E-02	0.00E+00	0.00E+00	7.25E-02	8	5.53E+02	6.91E+01	1.05E-03	2.77E+03	3.46E+02	2.10E-04	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	6.55E-05	NA	NA	1.09E-03	7.31E-04	0.00E+00	0.00E+00	1.89E-03	8	5.53E+02	6.91E+01	2.73E-05	2.77E+03	3.46E+02	5.46E-06	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	2.36E-02	NA	NA	3.77E-02	1.37E-02	0.00E+00	0.00E+00	7.50E-02	8	5.14E+00	6.43E-01	1.17E-01	1.28E+01	1.61E+00	4.67E-02	0.33%	0.69%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	2.12E-01	NA	NA	6.16E-01	1.35E-01	0.00E+00	0.00E+00	9.62E-01	8	1.00E+00	1.25E-01	7.70E+00	2.78E+00	3.48E-01	2.77E+00	22.07%	40.67%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	4.55E-02	NA	NA	2.22E-01	4.38E-01	0.00E+00	0.00E+00	7.06E-01	8	4.70E+01	5.88E+00	1.20E-01	6.20E+01	7.75E+00	9.11E-02	0.34%	1.34%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	1.29E-01	NA	NA	5.60E-01	1.47E-01	0.00E+00	0.00E+00	8.36E-01	8	3.85E+00	4.81E-01	1.74E+00	1.93E+01	2.41E+00	3.47E-01	4.98%	5.10%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	1.01E+00	3.51E-01	1.92E-01	1.92E-01	NA	NA	7.66E-03	NA	NA	7.33E-02	4.16E-02	0.00E+00	0.00E+00	1.23E-01	8	4.50E-01	5.63E-02	2.18E+00	9.00E-01	1.13E-01	1.09E+00	6.25%	16.01%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	1.06E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	6.16E-02	NA	NA	6.20E-01	5.96E-02	0.00E+00	0.00E+00	7.41E-01	8	7.74E+01	9.68E+00	7.66E-02	1.07E+02	1.34E+01	5.54E-02	0.22%	0.81%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	1.69E-04	NA	NA	3.29E-03	3.67E-05	0.00E+00	0.00E+00	3.50E-03	8	1.78E+02	2.23E+01	1.57E-04	8.90E+02	1.11E+02	3.14E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	1.68E-01	NA	NA	1.60E+01	3.03E+00	0.00E+00	0.00E+00	1.92E+01	8	1.45E+01	1.81E+00	1.06E+01	1.31E+02	1.64E+01	1.17E+00	30.36%	17.21%
																					Hazard Index (Total EEQ):				3.5E+01			6.8E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.62	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.38	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00064	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.016	kg/d
Body weight =	0.0773	kg
Home range =	1.2	acres
Water intake rate =	0.011	L/d
Site Area =	1	acres
Frac. home range (FHR) =	8.33E-01	unitless

Table F-8
Tier 1 Chemicals of Potnetial Concern EEQs and Hazard Indices for Red-Tailed Hawks at SWMU 48

Hazard Estimate - Tier 1
Red-tailed Hawk

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	6.79E-07	2.15E-07	8.94E-07	8	1.40E-05	1.75E-06	5.11E-01	1.40E-04	1.75E-05	5.11E-02	0.73%	0.63%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.95E-05	6.15E-06	2.56E-05	8	2.80E-03	3.50E-04	7.32E-02	2.80E-02	3.50E-03	7.32E-03	0.10%	0.09%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.66E-02	5.23E-03	2.18E-02	8	2.80E-03	3.50E-04	6.22E+01	2.80E-02	3.50E-03	6.22E+00	88.71%	76.57%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.85E-03	1.21E-03	5.06E-03	8	1.80E-01	2.25E-02	2.25E-01	1.80E+00	2.25E-01	2.25E-02	0.32%	0.28%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.09E-05	6.60E-06	2.75E-05	8	1.00E+01	1.25E+00	2.20E-05	5.00E+01	6.25E+00	4.40E-06	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.75E-05	8.69E-06	3.62E-05	8	3.00E-01	3.75E-02	9.66E-04	1.50E+00	1.88E-01	1.93E-04	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.08E-03	3.39E-04	1.41E-03	8	5.14E+00	6.43E-01	2.20E-03	1.28E+01	1.61E+00	8.81E-04	0.00%	0.01%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.43E-01	4.53E-02	1.89E-01	8	1.00E+00	1.25E-01	1.51E+00	2.78E+00	3.48E-01	5.43E-01	2.15%	6.68%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.06E-01	1.60E-01	6.66E-01	8	4.70E+01	5.88E+00	1.13E-01	6.20E+01	7.75E+00	8.59E-02	0.16%	1.06%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.97E-01	6.22E-02	2.59E-01	8	3.85E+00	4.81E-01	5.39E-01	1.93E+01	2.41E+00	1.08E-01	0.77%	1.33%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	3.30E+01	3.51E-01	1.05E+00	1.05E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.81E-02	1.83E-02	7.64E-02	8	4.50E-01	5.63E-02	1.36E+00	9.00E-01	1.13E-01	6.79E-01	1.94%	8.36%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	7.80E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.08E-01	3.42E-02	1.43E-01	8	7.74E+01	9.68E+00	1.47E-02	1.07E+02	1.34E+01	1.07E-02	0.02%	0.13%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.90E-06	1.55E-06	6.45E-06	8	1.78E+02	2.23E+01	2.90E-07	8.90E+02	1.11E+02	5.80E-08	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.92E+00	1.55E+00	6.48E+00	8	1.45E+01	1.81E+00	3.57E+00	1.31E+02	1.64E+01	3.95E-01	5.09%	4.87%
																									Hazard Index (Total EEQ):			7.0E+01			8.1E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0.76	unitless
Bird diet fraction =	0.24	unitless
Soil ingestion rate =	0	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.063	kg/d
Body weight =	0.957	kg
Home range =	2081	acres
Water intake rate =	0.068	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-9
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for Red-Tailed Hawks at SWMU 48

Hazard Estimate - Tier 2
Red-tailed Hawk

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	3.94E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.58E-10	8.15E-11	3.40E-10	8	1.40E-05	1.75E-06	1.94E-04	1.40E-04	1.75E-05	1.94E-05	0.74%	0.68%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.70E-09	1.17E-09	4.86E-09	8	2.80E-03	3.50E-04	1.39E-05	2.80E-02	3.50E-03	1.39E-06	0.05%	0.05%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	6.29E-06	1.99E-06	8.27E-06	8	2.80E-03	3.50E-04	2.36E-02	2.80E-02	3.50E-03	2.36E-03	90.33%	82.34%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	2.87E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	7.31E-07	2.31E-07	9.61E-07	8	1.80E-01	2.25E-02	4.27E-05	1.80E+00	2.25E-01	4.27E-06	0.16%	0.15%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.97E-09	1.25E-09	5.23E-09	8	1.00E+01	1.25E+00	4.18E-09	5.00E+01	6.25E+00	8.36E-10	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.23E-09	1.65E-09	6.88E-09	8	3.00E-01	3.75E-02	1.83E-07	1.50E+00	1.88E-01	3.67E-08	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.08E-07	1.29E-07	5.37E-07	8	5.14E+00	6.43E-01	8.36E-07	1.28E+01	1.61E+00	3.35E-07	0.00%	0.01%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.45E-05	1.72E-05	7.16E-05	8	1.00E+00	1.25E-01	5.73E-04	2.78E+00	3.48E-01	2.06E-04	2.19%	7.18%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.92E-04	6.07E-05	2.53E-04	8	4.70E+01	5.88E+00	4.30E-05	6.20E+01	7.75E+00	3.26E-05	0.16%	1.14%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	7.49E-05	2.36E-05	9.85E-05	8	3.85E+00	4.81E-01	2.05E-04	1.93E+01	2.41E+00	4.09E-05	0.78%	1.43%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	1.01E+00	3.51E-01	1.92E-01	1.92E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.05E-06	1.28E-06	5.33E-06	8	4.50E-01	5.63E-02	9.47E-05	9.00E-01	1.13E-01	4.74E-05	0.36%	1.65%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	1.06E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.12E-05	1.30E-05	5.42E-05	8	7.74E+01	9.68E+00	5.60E-06	1.07E+02	1.34E+01	4.05E-06	0.02%	0.14%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.86E-09	5.88E-10	2.45E-09	8	1.78E+02	2.23E+01	1.10E-10	8.90E+02	1.11E+02	2.20E-11	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.87E-03	5.90E-04	2.46E-03	8	1.45E+01	1.81E+00	1.36E-03	1.31E+02	1.64E+01	1.50E-04	5.19%	5.23%
																									Hazard Index (Total EEQ):		2.6E-02			2.9E-03	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0.76	unitless
Bird diet fraction =	0.24	unitless
Soil ingestion rate =	0	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.059	kg/d
Body weight =	1.134	kg
Home range =	2081	acres
Water intake rate =	0.064	L/d
Site Area =	1	acres
Frac. home range (FHR) =	4.81E-04	unitless

Table F-10
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 48

Hazard Estimate - Tier 1
Red Fox

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	1.99E-08	NA	NA	1.20E-06	1.16E-08	1.02E-06	2.19E-07	2.47E-06	8	1.00E-06	1.25E-07	1.97E+01	1.00E-05	1.25E-06	1.97E+00	72.80%	50.64%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	1.25E-06	NA	NA	6.16E-05	1.86E-06	2.91E-05	6.28E-06	1.00E-04	8	8.00E-01	1.00E-01	1.00E-03	4.00E+00	5.00E-01	2.00E-04	0.00%	0.01%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	7.44E-06	NA	NA	1.98E-04	4.75E-06	2.48E-02	5.34E-03	3.03E-02	8	8.00E-01	1.00E-01	3.03E-01	4.00E+00	5.00E-01	6.07E-02	1.12%	1.56%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	2.29E-06	NA	NA	7.92E-06	2.58E-05	0.00E+00	0.00E+00	3.60E-05	8	6.56E+01	8.20E+00	4.39E-06	1.10E+02	1.38E+01	2.62E-06	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	2.48E-04	NA	NA	2.31E-02	1.31E-04	5.76E-03	1.24E-03	3.05E-02	8	1.40E-01	1.75E-02	1.74E+00	6.80E-01	8.50E-02	3.59E-01	6.43%	9.21%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	1.42E-05	NA	NA	3.23E-05	5.19E-05	0.00E+00	0.00E+00	9.83E-05	8	6.15E-01	7.69E-02	1.28E-03	3.07E+00	3.84E-01	2.56E-04	0.00%	0.01%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	1.16E-05	NA	NA	2.21E-05	1.03E-05	0.00E+00	0.00E+00	4.40E-05	8	6.15E-01	7.69E-02	5.72E-04	3.07E+00	3.84E-01	1.15E-04	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	2.54E-05	NA	NA	9.47E-05	4.80E-05	0.00E+00	0.00E+00	1.68E-04	8	6.15E-01	7.69E-02	2.19E-03	3.07E+00	3.84E-01	4.38E-04	0.01%	0.01%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	7.73E-06	NA	NA	3.25E-05	6.15E-06	0.00E+00	0.00E+00	4.64E-05	8	6.15E-01	7.69E-02	6.04E-04	3.07E+00	3.84E-01	1.21E-04	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	6.44E-06	NA	NA	2.40E-05	1.08E-05	0.00E+00	0.00E+00	4.13E-05	8	6.15E-01	7.69E-02	5.37E-04	3.07E+00	3.84E-01	1.08E-04	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	2.77E-04	NA	NA	9.08E-04	3.04E-04	0.00E+00	0.00E+00	1.49E-03	8	6.15E-01	7.69E-02	1.94E-02	3.07E+00	3.84E-01	3.88E-03	0.07%	0.10%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	2.38E-06	NA	NA	7.88E-06	1.88E-06	0.00E+00	0.00E+00	1.21E-05	8	6.15E-01	7.69E-02	1.58E-04	3.07E+00	3.84E-01	3.17E-05	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	1.35E-06	NA	NA	1.26E-06	1.88E-05	3.13E-05	6.74E-06	5.95E-05	8	1.50E-01	1.88E-02	3.17E-03	7.50E-01	9.38E-02	6.35E-04	0.01%	0.02%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	1.77E-06	NA	NA	1.33E-05	7.35E-06	4.12E-05	8.87E-06	7.25E-05	8	9.20E-02	1.15E-02	6.31E-03	9.20E-01	1.15E-01	6.31E-04	0.02%	0.02%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	3.54E-05	NA	NA	1.54E-04	1.08E-04	0.00E+00	0.00E+00	2.97E-04	8	6.15E-01	7.69E-02	3.87E-03	3.07E+00	3.84E-01	7.75E-04	0.01%	0.02%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	3.54E-06	NA	NA	4.85E-05	1.80E-07	0.00E+00	0.00E+00	5.23E-05	8	6.56E+01	8.20E+00	6.37E-06	1.10E+02	1.38E+01	3.80E-06	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	9.34E-06	NA	NA	3.82E-05	6.25E-06	0.00E+00	0.00E+00	5.38E-05	8	6.15E-01	7.69E-02	7.00E-04	3.07E+00	3.84E-01	1.40E-04	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	8.69E-04	NA	NA	2.14E-03	7.36E-03	0.00E+00	0.00E+00	1.04E-02	8	6.56E+01	8.20E+00	1.27E-03	1.10E+02	1.38E+01	7.54E-04	0.00%	0.02%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	3.06E-05	NA	NA	7.66E-05	1.34E-04	0.00E+00	0.00E+00	2.41E-04	8	6.15E-01	7.69E-02	3.14E-03	3.07E+00	3.84E-01	6.29E-04	0.01%	0.02%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	1.10E-02	NA	NA	2.65E-03	2.51E-03	1.61E-03	3.47E-04	1.81E-02	8	1.26E-01	1.58E-02	1.15E+00	1.26E+00	1.58E-01	1.15E-01	4.25%	2.96%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	9.89E-02	NA	NA	4.33E-02	2.47E-02	2.15E-01	4.62E-02	4.28E-01	8	2.74E+03	3.42E+02	1.25E-03	1.37E+04	1.71E+03	2.50E-04	0.00%	0.01%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	2.12E-02	NA	NA	1.56E-02	8.03E-02	7.57E-01	1.63E-01	1.04E+00	8	1.17E+01	1.46E+00	7.10E-01	1.51E+01	1.89E+00	5.50E-01	2.62%	14.11%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	6.02E-02	NA	NA	3.94E-02	2.68E-02	2.95E-01	6.36E-02	4.85E-01	8	8.00E+00	1.00E+00	4.85E-01	8.00E+01	1.00E+01	4.85E-02	1.79%	1.25%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	3.30E+01	3.51E-01	1.05E+00	1.05E+00	NA	NA	3.57E-03	NA	NA	1.69E-01	7.63E-03	8.70E-02	1.87E-02	2.86E-01	8	1.00E+00	1.25E-01	2.29E+00	5.00E+00	6.25E-01	4.57E-01	8.44%	11.74%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	7.80E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	2.88E-02	NA	NA	3.21E-01	1.09E-02	1.62E-01	3.50E-02	5.58E-01	8	4.00E+01	5.00E+00	1.12E-01	8.00E+01	1.00E+01	5.58E-02	0.41%	1.43%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	7.89E-05	NA	NA	2.32E-04	6.72E-06	7.34E-06	1.58E-06	3.26E-04	8	2.22E+01	2.78E+00	1.18E-04	2.22E+02	2.78E+01	1.18E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	7.86E-02	NA	NA	1.12E+00	5.56E-01	7.37E+00	1.59E+00	1.07E+01	8	1.60E+02	2.00E+01	5.36E-01	3.20E+02	4.00E+01	2.68E-01	1.98%	6.88%
																					Hazard Index (Total EEQ):				2.71E+01			3.90E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.17	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.04	unitless
Mammal diet fraction =	0.65	unitless
Bird diet fraction =	0.14	unitless
Soil ingestion rate =	0.0095	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.34	kg/d
Body weight =	2.95	kg
Home range =	2204	acres
Water intake rate =	0.57	L/d
Site Area =	1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-11
Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 48

Hazard Estimate - Tier 2
Red Fox

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL		LOAEL	Adjusted LOAEL		Percent Contribution to	Percent Contribution to
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	6.17E-06	mg/kg	NA	NA	3.94E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	4.14E-12	NA	NA	2.34E-11	2.42E-12	2.12E-10	4.57E-11	2.88E-10	8	1.00E-06	1.25E-07	2.30E-03	1.00E-05	1.25E-06	2.30E-04	74.15%	48.06%
4,4-DDD	NA	mg/L	NA	mg/kg	3.89E-04	mg/kg	NA	NA	3.43E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	2.61E-10	NA	NA	1.28E-08	3.88E-10	3.04E-09	6.55E-10	1.72E-08	8	8.00E-01	1.00E-01	1.72E-07	4.00E+00	5.00E-01	3.44E-08	0.01%	0.01%
4,4-DDT	NA	mg/L	NA	mg/kg	2.31E-03	mg/kg	NA	NA	1.86E+01	1.05E-01	1.43E+02	1.43E+02	NA	NA	1.55E-09	NA	NA	4.12E-08	9.91E-10	5.17E-06	1.11E-06	6.33E-06	8	8.00E-01	1.00E-01	6.33E-05	4.00E+00	5.00E-01	1.27E-05	2.04%	2.64%
Anthracene	NA	mg/L	NA	mg/kg	7.10E-04	mg/kg	NA	NA	2.42E+00	1.86E+00	0.00E+00	0.00E+00	NA	NA	4.76E-10	NA	NA	1.65E-09	5.38E-09	0.00E+00	0.00E+00	7.51E-09	8	6.56E+01	8.20E+00	9.16E-10	1.10E+02	1.38E+01	5.46E-10	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	7.69E-02	mg/kg	NA	NA	2.87E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	5.16E-08	NA	NA	2.12E-07	2.73E-08	6.01E-07	1.29E-07	1.02E-06	8	1.40E-01	1.75E-02	5.83E-05	6.80E-01	8.50E-02	1.20E-05	1.88%	2.51%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	4.40E-03	mg/kg	NA	NA	1.59E+00	6.02E-01	0.00E+00	0.00E+00	NA	NA	2.95E-09	NA	NA	6.73E-09	1.08E-08	0.00E+00	0.00E+00	2.05E-08	8	6.15E-01	7.69E-02	2.67E-07	3.07E+00	3.84E-01	5.34E-08	0.01%	0.01%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	3.60E-03	mg/kg	NA	NA	1.33E+00	1.46E-01	0.00E+00	0.00E+00	NA	NA	2.42E-09	NA	NA	4.60E-09	2.15E-09	0.00E+00	0.00E+00	9.17E-09	8	6.15E-01	7.69E-02	1.19E-07	3.07E+00	3.84E-01	2.39E-08	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	7.90E-03	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	5.30E-09	NA	NA	1.97E-08	1.00E-08	0.00E+00	0.00E+00	3.51E-08	8	6.15E-01	7.69E-02	4.56E-07	3.07E+00	3.84E-01	9.14E-08	0.01%	0.02%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.40E-03	mg/kg	NA	NA	2.94E+00	1.31E-01	0.00E+00	0.00E+00	NA	NA	1.61E-09	NA	NA	6.78E-09	1.28E-09	0.00E+00	0.00E+00	9.68E-09	8	6.15E-01	7.69E-02	1.26E-07	3.07E+00	3.84E-01	2.52E-08	0.00%	0.01%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	2.00E-03	mg/kg	NA	NA	2.60E+00	2.77E-01	0.00E+00	0.00E+00	NA	NA	1.34E-09	NA	NA	5.00E-09	2.26E-09	0.00E+00	0.00E+00	8.60E-09	8	6.15E-01	7.69E-02	1.12E-07	3.07E+00	3.84E-01	2.24E-08	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	8.60E-02	mg/kg	NA	NA	2.29E+00	1.80E-01	0.00E+00	0.00E+00	NA	NA	5.77E-08	NA	NA	1.89E-07	6.34E-08	0.00E+00	0.00E+00	3.10E-07	8	6.15E-01	7.69E-02	4.04E-06	3.07E+00	3.84E-01	8.09E-07	0.13%	0.17%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	7.40E-04	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	4.97E-10	NA	NA	1.64E-09	3.93E-10	0.00E+00	0.00E+00	2.53E-09	8	6.15E-01	7.69E-02	3.30E-08	3.07E+00	3.84E-01	6.60E-09	0.00%	0.00%
Endosulfan II	NA	mg/L	NA	mg/kg	4.18E-04	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	2.81E-10	NA	NA	2.60E-10	3.93E-09	3.27E-09	7.03E-10	8.44E-09	8	1.50E-01	1.88E-02	4.50E-07	7.50E-01	9.38E-02	9.00E-08	0.01%	0.02%
Endrin aldehyde	NA	mg/L	NA	mg/kg	5.50E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	3.69E-10	NA	NA	2.74E-09	1.53E-09	4.30E-09	9.25E-10	9.87E-09	8	9.20E-02	1.15E-02	8.58E-07	9.20E-01	1.15E-01	8.58E-08	0.03%	0.02%
Fluoranthene	NA	mg/L	NA	mg/kg	1.10E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	7.38E-09	NA	NA	3.22E-08	2.25E-08	0.00E+00	0.00E+00	6.20E-08	8	6.15E-01	7.69E-02	8.07E-07	3.07E+00	3.84E-01	1.62E-07	0.03%	0.03%
Fluorene	NA	mg/L	NA	mg/kg	1.10E-03	mg/kg	NA	NA	9.57E+00	8.37E-03	0.00E+00	0.00E+00	NA	NA	7.38E-10	NA	NA	1.01E-08	3.76E-11	0.00E+00	0.00E+00	1.09E-08	8	6.56E+01	8.20E+00	1.33E-09	1.10E+02	1.38E+01	7.93E-10	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	1.95E-09	NA	NA	7.97E-09	1.30E-09	0.00E+00	0.00E+00	1.12E-08	8	6.15E-01	7.69E-02	1.46E-07	3.07E+00	3.84E-01	2.92E-08	0.00%	0.01%
Phenanthrene	NA	mg/L	NA	mg/kg	2.70E-01	mg/kg	NA	NA	1.72E+00	1.39E+00	0.00E+00	0.00E+00	NA	NA	1.81E-07	NA	NA	4.47E-07	1.54E-06	0.00E+00	0.00E+00	2.16E-06	8	6.56E+01	8.20E+00	2.64E-07	1.10E+02	1.38E+01	1.57E-07	0.01%	0.03%
Pyrene	NA	mg/L	NA	mg/kg	9.50E-03	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	6.38E-09	NA	NA	1.60E-08	2.80E-08	0.00E+00	0.00E+00	5.03E-08	8	6.15E-01	7.69E-02	6.54E-07	3.07E+00	3.84E-01	1.31E-07	0.02%	0.03%
Arsenic	NA	mg/L	NA	mg/kg	3.42E+00	mg/kg	NA	NA	1.68E-01	3.75E-02	6.28E-03	6.28E-03	NA	NA	2.30E-06	NA	NA	5.53E-07	5.24E-07	3.36E-07	7.23E-08	3.78E-06	8	1.26E-01	1.58E-02	2.40E-04	1.26E+00	1.58E-01	2.40E-05	7.73%	5.01%
Chromium	NA	mg/L	NA	mg/kg	3.07E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.33E-02	9.33E-02	NA	NA	2.06E-05	NA	NA	9.03E-06	5.14E-06	4.48E-05	9.64E-06	8.92E-05	8	2.74E+03	3.42E+02	2.61E-07	1.37E+04	1.71E+03	5.21E-08	0.01%	0.01%
Copper	NA	mg/L	NA	mg/kg	6.59E+00	mg/kg	NA	NA	5.15E-01	6.22E-01	1.53E+00	1.53E+00	NA	NA	4.42E-06	NA	NA	3.26E-06	1.68E-05	1.58E-04	3.40E-05	2.16E-04	8	1.17E+01	1.46E+00	1.48E-04	1.51E+01	1.89E+00	1.15E-04	4.77%	23.93%
Lead	NA	mg/L	NA	mg/kg	1.87E+01	mg/kg	NA	NA	4.57E-01	7.33E-02	2.11E-01	2.11E-01	NA	NA	1.25E-05	NA	NA	8.22E-06	5.60E-06	6.16E-05	1.33E-05	1.01E-04	8	8.00E+00	1.00E+00	1.01E-04	8.00E+01	1.00E+01	1.01E-05	3.26%	2.11%
Mercury	NA	mg/L	NA	mg/kg	1.11E+00	mg/kg	NA	NA	1.01E+00	3.51E-01	1.92E-01	1.92E-01	NA	NA	7.45E-07	NA	NA	1.08E-06	1.59E-06	3.33E-06	7.17E-07	7.46E-06	8	1.00E+00	1.25E-01	5.97E-05	5.00E+00	6.25E-01	1.19E-05	1.92%	2.49%
Nickel	NA	mg/L	NA	mg/kg	8.93E+00	mg/kg	NA	NA	1.06E+00	6.24E-02	2.43E-01	2.43E-01	NA	NA	5.99E-06	NA	NA	9.09E-06	2.28E-06	3.39E-05	7.29E-06	5.85E-05	8	4.00E+01	5.00E+00	1.17E-05	8.00E+01	1.00E+01	5.85E-06	0.38%	1.22%
Silver	NA	mg/L	NA	mg/kg	2.45E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	1.64E-08	NA	NA	4.83E-08	1.40E-09	1.53E-09	3.30E-10	6.80E-08	8	2.22E+01	2.78E+00	2.45E-08	2.22E+02	2.78E+01	2.45E-09	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	2.44E+01	mg/kg	NA	NA	1.00E+01	1.16E+00	4.03E+00	4.03E+00	NA	NA	1.64E-05	NA	NA	2.35E-04	1.16E-04	1.54E-03	3.31E-04	2.23E-03	8	1.60E+02	2.00E+01	1.12E-04	3.20E+02	4.00E+01	5.59E-05	3.60%	11.66%
																									Hazard Index (Total EEQ):		3.1E-03			4.8E-04	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.17	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.04	unitless
Mammal diet fraction =	0.65	unitless
Bird diet fraction =	0.14	unitless
Soil ingestion rate =	0.0067	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.24	kg/d
Body weight =	4.53	kg
Home range =	2204	acres
Water intake rate =	0.39	L/d
Site Area =	1	acres
Frac. home range (FHR) =	4.54E-04	unitless

Table 7-###
Wildlife EEQ Hazard Summary for SWMU 49

Receptor	Tier 1[a]		Tier 2[b]	
	NOAEL-Based EEQ	LOAEL-Based EEQ	NOAEL-Based EEQ	LOAEL-Based EEQ
Meadow vole	99	50	25	13
Hazard Driver(s)[c]:	Selenium - plant ingestion		Selenium - plant ingestion	
Short-tailed shrew	2,888	358	22	4
Hazard Driver(s)[c]:	TCDD - terrestrial invertebrate ingestion		Selenium and TCDD - terrestrial invertebrate ingestion	
American robin	313	65	5	1.3
Hazard Driver(s)[c]:	Mercury, Selenium, TCDD, and Zinc - plant and terrestrial invertebrate ingestion		Selenium and Zinc - plant and terrestrial invertebrate ingestion	
Red-tailed hawk	108	50	0.004	0.002
Hazard Driver(s)[c]:	Selenium - small mammal ingestion		--	
Red fox	454	220	0.008	0.004
Hazard Driver(s)[c]:	Selenium - small mammal ingestion		--	

[a] Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.

[b] Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR less than or equal to 1.

[c] Hazard drivers are those chemicals contributing the most to the total estimated EEQ, and the primary route of exposure associated with this driver.

Notes:

EEQ = Ecological Effects Quotient.

LOAEL = Lowest Observed Adverse Effect Level

NOAEL = No Observed Adverse Effect Level

Table F-12
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Meadow Voles at SWMU 49

Hazard Estimate - Tier 1
Meadow Vole

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	3.07E-05	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	4.33E-07	NA	NA	0.00E+00	1.73E-06	0.00E+00	0.00E+00	2.17E-06	4	1.00E-06	2.50E-07	8.67E+00	1.00E-05	2.50E-06	8.67E-01	8.73%	1.74%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	1.43E-05	NA	NA	0.00E+00	1.45E-04	0.00E+00	0.00E+00	1.59E-04	4	8.00E-01	2.00E-01	7.96E-04	4.00E+00	1.00E+00	1.59E-04	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	4	8.00E-01	2.00E-01	0.00E+00	4.00E+00	1.00E+00	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	1.41E-05	NA	NA	0.00E+00	1.01E-03	0.00E+00	0.00E+00	1.03E-03	4	6.56E+01	1.64E+01	6.25E-05	1.10E+02	2.75E+01	3.73E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	1.24E-01	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	1.75E-03	NA	NA	0.00E+00	6.35E-03	0.00E+00	0.00E+00	8.10E-03	4	1.40E-01	3.50E-02	2.31E-01	6.80E-01	1.70E-01	4.76E-02	0.23%	0.10%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	6.52E+01	2.60E-02	1.00E+00	1.00E+00	NA	NA	2.15E-03	NA	NA	0.00E+00	2.32E-03	0.00E+00	0.00E+00	4.47E-03	4	1.40E-01	3.50E-02	1.28E-01	6.80E-01	1.70E-01	2.63E-02	0.13%	0.05%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	8.61E-05	NA	NA	0.00E+00	1.89E-03	0.00E+00	0.00E+00	1.98E-03	4	6.15E-01	1.54E-01	1.29E-02	3.07E+00	7.68E-01	2.58E-03	0.01%	0.01%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	6.92E-05	NA	NA	0.00E+00	4.19E-04	0.00E+00	0.00E+00	4.88E-04	4	6.15E-01	1.54E-01	3.18E-03	3.07E+00	7.68E-01	6.36E-04	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	2.98E-04	NA	NA	0.00E+00	3.85E-03	0.00E+00	0.00E+00	4.15E-03	4	6.15E-01	1.54E-01	2.70E-02	3.07E+00	7.68E-01	5.40E-03	0.03%	0.01%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	4.09E-05	NA	NA	0.00E+00	2.31E-04	0.00E+00	0.00E+00	2.72E-04	4	6.15E-01	1.54E-01	1.77E-03	3.07E+00	7.68E-01	3.54E-04	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	5.93E-05	NA	NA	0.00E+00	6.16E-04	0.00E+00	0.00E+00	6.75E-04	4	6.15E-01	1.54E-01	4.39E-03	3.07E+00	7.68E-01	8.80E-04	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	7.90E-02	mg/kg	NA	NA	2.29E+00	1.87E-01	0.00E+00	0.00E+00	NA	NA	1.12E-03	NA	NA	0.00E+00	8.68E-03	0.00E+00	0.00E+00	9.79E-03	4	6.15E-01	1.54E-01	6.37E-02	3.07E+00	7.68E-01	1.28E-02	0.06%	0.03%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	3.25E-05	NA	NA	0.00E+00	1.76E-04	0.00E+00	0.00E+00	2.08E-04	4	6.15E-01	1.54E-01	1.36E-03	3.07E+00	7.68E-01	2.71E-04	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	9.45E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	1.33E-04	NA	NA	0.00E+00	2.28E-03	0.00E+00	0.00E+00	2.41E-03	4	1.50E-02	3.75E-03	6.43E-01	3.00E-02	7.50E-03	3.22E-01	0.65%	0.65%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	1.02E-04	NA	NA	0.00E+00	9.77E-03	0.00E+00	0.00E+00	9.87E-03	4	1.50E-01	3.75E-02	2.63E-01	7.50E-01	1.88E-01	5.26E-02	0.27%	0.11%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.69E-01	2.09E+00	1.00E+00	1.00E+00	NA	NA	9.37E-05	NA	NA	0.00E+00	8.16E-03	0.00E+00	0.00E+00	8.26E-03	4	1.50E-01	3.75E-02	2.20E-01	7.50E-01	1.88E-01	4.40E-02	0.22%	0.09%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.93E+01	3.55E-01	1.00E+00	1.00E+00	NA	NA	1.07E-05	NA	NA	0.00E+00	1.58E-04	0.00E+00	0.00E+00	1.69E-04	4	9.20E-02	2.30E-02	7.34E-03	9.20E-01	2.30E-01	7.34E-04	0.01%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	1.02E-05	NA	NA	0.00E+00	2.90E-04	0.00E+00	0.00E+00	3.00E-04	4	9.20E-02	2.30E-02	1.31E-02	9.20E-01	2.30E-01	1.31E-03	0.01%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	1.98E-04	NA	NA	0.00E+00	4.12E-03	0.00E+00	0.00E+00	4.32E-03	4	6.15E-01	1.54E-01	2.81E-02	3.07E+00	7.68E-01	5.62E-03	0.03%	0.01%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	2.12E-05	NA	NA	0.00E+00	7.13E-06	0.00E+00	0.00E+00	2.83E-05	4	6.56E+01	1.64E+01	1.73E-06	1.10E+02	2.75E+01	1.03E-06	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	4.80E-05	NA	NA	0.00E+00	2.20E-04	0.00E+00	0.00E+00	2.68E-04	4	6.15E-01	1.54E-01	1.74E-03	3.07E+00	7.68E-01	3.49E-04	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	3.10E-01	mg/kg	NA	NA	1.72E+00	1.32E+00	0.00E+00	0.00E+00	NA	NA	4.38E-03	NA	NA	0.00E+00	2.41E-01	0.00E+00	0.00E+00	2.45E-01	4	6.56E+01	1.64E+01	1.50E-02	1.10E+02	2.75E+01	8.92E-03	0.02%	0.02%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	1.41E-04	NA	NA	0.00E+00	4.24E-03	0.00E+00	0.00E+00	4.38E-03	4	6.15E-01	1.54E-01	2.85E-02	3.07E+00	7.68E-01	5.70E-03	0.03%	0.01%
Arsenic	NA	mg/L	NA	mg/kg	8.20E+00	mg/kg	NA	NA	1.30E-01	3.75E-02	5.36E-03	5.36E-03	NA	NA	1.16E-01	NA	NA	0.00E+00	1.81E-01	0.00E+00	0.00E+00	2.97E-01	4	1.26E-01	3.15E-02	9.42E+00	1.26E+00	3.15E-01	9.42E-01	9.49%	1.89%
Chromium	NA	mg/L	NA	mg/kg	3.03E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.37E-02	9.37E-02	NA	NA	4.28E-01	NA	NA	0.00E+00	7.31E-01	0.00E+00	0.00E+00	1.16E+00	4	2.74E+03	6.84E+02	1.69E-03	1.37E+04	3.42E+03	3.39E-04	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	1.76E+01	mg/kg	NA	NA	5.15E-01	3.43E-01	6.62E-01	6.62E-01	NA	NA	2.48E-01	NA	NA	0.00E+00	3.55E+00	0.00E+00	0.00E+00	3.80E+00	8	1.17E+01	1.46E+00	2.60E+00	1.51E+01	1.89E+00	2.01E+00	2.62%	4.05%
Lead	NA	mg/L	NA	mg/kg	7.16E+01	mg/kg	NA	NA	3.53E-01	4.06E-02	9.96E-02	9.96E-02	NA	NA	1.01E+00	NA	NA	0.00E+00	1.71E+00	0.00E+00	0.00E+00	2.72E+00	4	8.00E+00	2.00E+00	1.36E+00	8.00E+01	2.00E+01	1.36E-01	1.37%	0.27%
Mercury	NA	mg/L	NA	mg/kg	4.97E-01	mg/kg	NA	NA	3.30E+01	5.07E-01	1.05E+00	1.05E+00	NA	NA	7.02E-03	NA	NA	0.00E+00	1.48E-01	0.00E+00	0.00E+00	1.55E-01	8	1.00E+00	1.25E-01	1.24E+00	5.00E+00	6.25E-01	2.49E-01	1.25%	0.50%
Nickel	NA	mg/L	NA	mg/kg	1.07E+01	mg/kg	NA	NA	7.80E+00	5.96E-02	2.20E-01	2.20E-01	NA	NA	1.51E-01	NA	NA	0.00E+00	3.75E-01	0.00E+00	0.00E+00	5.26E-01	4	4.00E+01	1.00E+01	5.26E-02	8.00E+01	2.00E+01	2.63E-02	0.05%	0.05%
Selenium	NA	mg/L	NA	mg/kg	9.40E+00	mg/kg	NA	NA	5.10E-01	6.41E-01	1.63E-01	1.63E-01	NA	NA	1.33E-01	NA	NA	0.00E+00	3.55E+00	0.00E+00	0.00E+00	3.68E+00	4	2.00E-01	5.00E-02	7.36E+01	3.30E-01	8.25E-02	4.46E+01	74.10%	89.72%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	3.70E-04	NA	NA	0.00E+00	2.16E-04	0.00E+00	0.00E+00	5.86E-04	4	2.22E+01	5.55E+00	1.06E-04	2.22E+02	5.55E+01	1.06E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	5.69E+00	7.99E-01	1.85E+00	1.85E+00	NA	NA	7.98E-01	NA	NA	0.00E+00	2.66E+01	0.00E+00	0.00E+00	2.74E+01	4	1.60E+02	4.00E+01	6.84E-01	3.20E+02	8.00E+01	3.42E-01	0.69%	0.69%
																					Hazard Index (Total EEQ):			9.93E+01			4.97E+01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	1	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00024	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.01	kg/d
Body weight =	0.017	kg
Home range =	0.089	acres
Water intake rate =	0.007	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-13
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for Meadow Voles at SWMU 49

Hazard Estimate - Tier 2
Meadow Vole

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	2.45E-05	mg/kg	NA	NA	5.05E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	1.26E-07	NA	NA	0.00E+00	5.09E-07	0.00E+00	0.00E+00	6.34E-07	4	1.00E-06	2.50E-07	2.54E+00	1.00E-05	2.50E-06	2.54E-01	9.95%	1.99%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	5.19E-06	NA	NA	0.00E+00	5.33E-05	0.00E+00	0.00E+00	5.85E-05	4	8.00E-01	2.00E-01	2.92E-04	4.00E+00	1.00E+00	5.85E-05	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	4	8.00E-01	2.00E-01	0.00E+00	4.00E+00	1.00E+00	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	5.14E-06	NA	NA	0.00E+00	3.72E-04	0.00E+00	0.00E+00	3.77E-04	4	6.56E+01	1.64E+01	2.30E-05	1.10E+02	2.75E+01	1.37E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	8.03E-02	mg/kg	NA	NA	2.90E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	4.12E-04	NA	NA	0.00E+00	1.51E-03	0.00E+00	0.00E+00	1.92E-03	4	1.40E-01	3.50E-02	5.49E-02	6.80E-01	1.70E-01	1.13E-02	0.22%	0.09%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	3.49E+00	2.60E-02	5.00E-01	5.00E-01	NA	NA	7.81E-04	NA	NA	0.00E+00	8.54E-04	0.00E+00	0.00E+00	1.64E-03	4	1.40E-01	3.50E-02	4.67E-02	6.80E-01	1.70E-01	9.62E-03	0.18%	0.08%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	3.13E-05	NA	NA	0.00E+00	6.96E-04	0.00E+00	0.00E+00	7.27E-04	4	6.15E-01	1.54E-01	4.73E-03	3.07E+00	7.68E-01	9.47E-04	0.02%	0.01%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	2.52E-05	NA	NA	0.00E+00	1.54E-04	0.00E+00	0.00E+00	1.79E-04	4	6.15E-01	1.54E-01	1.17E-03	3.07E+00	7.68E-01	2.33E-04	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	1.08E-04	NA	NA	0.00E+00	1.41E-03	0.00E+00	0.00E+00	1.52E-03	4	6.15E-01	1.54E-01	9.90E-03	3.07E+00	7.68E-01	1.98E-03	0.04%	0.02%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	1.49E-05	NA	NA	0.00E+00	8.49E-05	0.00E+00	0.00E+00	9.98E-05	4	6.15E-01	1.54E-01	6.49E-04	3.07E+00	7.68E-01	1.30E-04	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	2.16E-05	NA	NA	0.00E+00	2.26E-04	0.00E+00	0.00E+00	2.48E-04	4	6.15E-01	1.54E-01	1.61E-03	3.07E+00	7.68E-01	3.23E-04	0.01%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	4.48E-02	mg/kg	NA	NA	2.29E+00	2.35E-01	0.00E+00	0.00E+00	NA	NA	2.30E-04	NA	NA	0.00E+00	2.28E-03	0.00E+00	0.00E+00	2.51E-03	4	6.15E-01	1.54E-01	1.63E-02	3.07E+00	7.68E-01	3.27E-03	0.06%	0.03%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	1.18E-05	NA	NA	0.00E+00	6.46E-05	0.00E+00	0.00E+00	7.65E-05	4	6.15E-01	1.54E-01	4.97E-04	3.07E+00	7.68E-01	9.96E-05	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	6.88E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	3.53E-05	NA	NA	0.00E+00	6.10E-04	0.00E+00	0.00E+00	6.45E-04	4	1.50E-02	3.75E-03	1.72E-01	3.00E-02	7.50E-03	8.60E-02	0.67%	0.68%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	3.71E-05	NA	NA	0.00E+00	3.59E-03	0.00E+00	0.00E+00	3.63E-03	4	1.50E-01	3.75E-02	9.67E-02	7.50E-01	1.88E-01	1.93E-02	0.38%	0.15%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.58E-01	2.09E+00	5.00E-01	5.00E-01	NA	NA	3.41E-05	NA	NA	0.00E+00	3.00E-03	0.00E+00	0.00E+00	3.03E-03	4	1.50E-01	3.75E-02	8.09E-02	7.50E-01	1.88E-01	1.62E-02	0.32%	0.13%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.91E+01	3.55E-01	5.00E-01	5.00E-01	NA	NA	3.89E-06	NA	NA	0.00E+00	5.81E-05	0.00E+00	0.00E+00	6.20E-05	4	9.20E-02	2.30E-02	2.70E-03	9.20E-01	2.30E-01	2.70E-04	0.01%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	3.71E-06	NA	NA	0.00E+00	1.07E-04	0.00E+00	0.00E+00	1.10E-04	4	9.20E-02	2.30E-02	4.80E-03	9.20E-01	2.30E-01	4.80E-04	0.02%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	7.19E-05	NA	NA	0.00E+00	1.51E-03	0.00E+00	0.00E+00	1.59E-03	4	6.15E-01	1.54E-01	1.03E-02	3.07E+00	7.68E-01	2.07E-03	0.04%	0.02%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	7.70E-06	NA	NA	0.00E+00	2.62E-06	0.00E+00	0.00E+00	1.03E-05	4	6.56E+01	1.64E+01	6.30E-07	1.10E+02	2.75E+01	3.75E-07	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	1.75E-05	NA	NA	0.00E+00	8.09E-05	0.00E+00	0.00E+00	9.83E-05	4	6.15E-01	1.54E-01	6.40E-04	3.07E+00	7.68E-01	1.28E-04	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	1.87E-01	mg/kg	NA	NA	1.72E+00	1.60E+00	0.00E+00	0.00E+00	NA	NA	9.60E-04	NA	NA	0.00E+00	6.47E-02	0.00E+00	0.00E+00	6.57E-02	4	6.56E+01	1.64E+01	4.00E-03	1.10E+02	2.75E+01	2.39E-03	0.02%	0.02%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	5.14E-05	NA	NA	0.00E+00	1.56E-03	0.00E+00	0.00E+00	1.61E-03	4	6.15E-01	1.54E-01	1.05E-02	3.07E+00	7.68E-01	2.10E-03	0.04%	0.02%
Arsenic	NA	mg/L	NA	mg/kg	4.95E+00	mg/kg	NA	NA	1.51E-01	3.75E-02	5.87E-03	5.87E-03	NA	NA	2.54E-02	NA	NA	0.00E+00	4.02E-02	0.00E+00	0.00E+00	6.56E-02	4	1.26E-01	3.15E-02	2.08E+00	1.26E+00	3.15E-01	2.08E-01	8.17%	1.64%
Chromium	NA	mg/L	NA	mg/kg	2.18E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	1.02E-01	1.02E-01	NA	NA	1.12E-01	NA	NA	0.00E+00	1.93E-01	0.00E+00	0.00E+00	3.05E-01	4	2.74E+03	6.84E+02	4.45E-04	1.37E+04	3.42E+03	8.90E-05	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	1.68E+01	mg/kg	NA	NA	5.15E-01	3.53E-01	6.88E-01	6.88E-01	NA	NA	8.64E-02	NA	NA	0.00E+00	1.28E+00	0.00E+00	0.00E+00	1.37E+00	8	1.17E+01	1.46E+00	9.36E-01	1.51E+01	1.89E+00	7.25E-01	3.67%	5.70%
Lead	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	3.69E-01	4.51E-02	1.14E-01	1.14E-01	NA	NA	2.90E-01	NA	NA	0.00E+00	5.51E-01	0.00E+00	0.00E+00	8.41E-01	4	8.00E+00	2.00E+00	4.20E-01	8.00E+01	2.00E+01	4.20E-02	1.65%	0.33%
Mercury	NA	mg/L	NA	mg/kg	3.03E-01	mg/kg	NA	NA	2.41E+00	6.37E-01	1.92E-01	1.92E-01	NA	NA	1.56E-03	NA	NA	0.00E+00	4.17E-02	0.00E+00	0.00E+00	4.33E-02	8	1.00E+00	1.25E-01	3.46E-01	5.00E+00	6.25E-01	6.93E-02	1.36%	0.54%
Nickel	NA	mg/L	NA	mg/kg	9.12E+00	mg/kg	NA	NA	1.06E+00	6.20E-02	2.40E-01	2.40E-01	NA	NA	4.68E-02	NA	NA	0.00E+00	1.22E-01	0.00E+00	0.00E+00	1.69E-01	4	4.00E+01	1.00E+01	1.69E-02	8.00E+01	2.00E+01	8.46E-03	0.07%	0.07%
Selenium	NA	mg/L	NA	mg/kg	6.62E+00	mg/kg	NA	NA	5.60E-01	6.19E-01	1.35E+01	1.35E+01	NA	NA	3.40E-02	NA	NA	0.00E+00	8.86E-01	0.00E+00	0.00E+00	9.20E-01	4	2.00E-01	5.00E-02	1.84E+01	3.30E-01	8.25E-02	1.11E+01	72.14%	87.55%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	1.35E-04	NA	NA	0.00E+00	7.93E-05	0.00E+00	0.00E+00	2.14E-04	4	2.22E+01	5.55E+00	3.85E-05	2.22E+02	5.55E+01	3.85E-06	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.25E+01	mg/kg	NA	NA	5.97E+00	8.25E-01	1.98E+00	1.98E+00	NA	NA	2.70E-01	NA	NA	0.00E+00	9.38E+00	0.00E+00	0.00E+00	9.65E+00	4	1.60E+02	4.00E+01	2.41E-01	3.20E+02	8.00E+01	1.21E-01	0.95%	0.95%
																					Hazard Index (Total EEQ):				2.5E+01			1.3E+01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	1	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00019	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.008	kg/d
Body weight =	0.037	kg
Home range =	0.089	acres
Water intake rate =	0.0051	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-14
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Short-Tailed Shrews at SWMU 49

Hazard Estimate - Tier 1
Short-tailed Shrew

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	3.07E-05	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	7.61E-07	NA	NA	3.10E-04	0.00E+00	0.00E+00	0.00E+00	3.11E-04	8	1.00E-06	1.25E-07	2.49E+03	1.00E-05	1.25E-06	2.49E+02	86.13%	69.51%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	2.50E-05	NA	NA	6.24E-03	0.00E+00	0.00E+00	0.00E+00	6.26E-03	8	8.00E-01	1.00E-01	6.26E-02	4.00E+00	5.00E-01	1.25E-02	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	8	8.00E-01	1.00E-01	0.00E+00	4.00E+00	5.00E-01	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	2.48E-05	NA	NA	5.81E-04	0.00E+00	0.00E+00	0.00E+00	6.06E-04	8	6.56E+01	8.20E+00	7.39E-05	1.10E+02	1.38E+01	4.40E-05	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	1.24E-01	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	3.08E-03	NA	NA	1.94E+00	0.00E+00	0.00E+00	0.00E+00	1.94E+00	8	1.40E-01	1.75E-02	1.11E+02	6.80E-01	8.50E-02	2.29E+01	3.85%	6.39%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	6.52E+01	2.60E-02	1.00E+00	1.00E+00	NA	NA	3.77E-03	NA	NA	2.38E+00	0.00E+00	0.00E+00	0.00E+00	2.38E+00	8	1.40E-01	1.75E-02	1.36E+02	6.80E-01	8.50E-02	2.80E+01	4.71%	7.83%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	1.51E-04	NA	NA	2.33E-03	0.00E+00	0.00E+00	0.00E+00	2.48E-03	8	6.15E-01	7.69E-02	3.22E-02	3.07E+00	3.84E-01	6.46E-03	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	1.22E-04	NA	NA	1.56E-03	0.00E+00	0.00E+00	0.00E+00	1.69E-03	8	6.15E-01	7.69E-02	2.19E-02	3.07E+00	3.84E-01	4.39E-03	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	5.23E-04	NA	NA	1.32E-02	0.00E+00	0.00E+00	0.00E+00	1.37E-02	8	6.15E-01	7.69E-02	1.78E-01	3.07E+00	3.84E-01	3.57E-02	0.01%	0.01%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	7.19E-05	NA	NA	2.05E-03	0.00E+00	0.00E+00	0.00E+00	2.12E-03	8	6.15E-01	7.69E-02	2.76E-02	3.07E+00	3.84E-01	5.52E-03	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	1.04E-04	NA	NA	2.62E-03	0.00E+00	0.00E+00	0.00E+00	2.72E-03	8	6.15E-01	7.69E-02	3.54E-02	3.07E+00	3.84E-01	7.10E-03	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	7.90E-02	mg/kg	NA	NA	2.29E+00	1.87E-01	0.00E+00	0.00E+00	NA	NA	1.96E-03	NA	NA	4.34E-02	0.00E+00	0.00E+00	0.00E+00	4.54E-02	8	6.15E-01	7.69E-02	5.90E-01	3.07E+00	3.84E-01	1.18E-01	0.02%	0.03%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	5.70E-05	NA	NA	1.28E-03	0.00E+00	0.00E+00	0.00E+00	1.33E-03	8	6.15E-01	7.69E-02	1.73E-02	3.07E+00	3.84E-01	3.47E-03	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	9.45E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	2.34E-04	NA	NA	3.33E-02	0.00E+00	0.00E+00	0.00E+00	3.36E-02	8	1.50E-02	1.88E-03	1.79E+01	3.00E-02	3.75E-03	8.95E+00	0.62%	2.50%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	1.79E-04	NA	NA	1.14E-03	0.00E+00	0.00E+00	0.00E+00	1.32E-03	8	1.50E-01	1.88E-02	7.02E-02	7.50E-01	9.38E-02	1.40E-02	0.00%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.69E-01	2.09E+00	1.00E+00	1.00E+00	NA	NA	1.65E-04	NA	NA	1.38E-03	0.00E+00	0.00E+00	0.00E+00	1.55E-03	8	1.50E-01	1.88E-02	8.26E-02	7.50E-01	9.38E-02	1.65E-02	0.00%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.93E+01	3.55E-01	1.00E+00	1.00E+00	NA	NA	1.88E-05	NA	NA	3.51E-03	0.00E+00	0.00E+00	0.00E+00	3.53E-03	8	9.20E-02	1.15E-02	3.07E-01	9.20E-01	1.15E-01	3.07E-02	0.01%	0.01%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	1.79E-05	NA	NA	9.13E-04	0.00E+00	0.00E+00	0.00E+00	9.31E-04	8	9.20E-02	1.15E-02	8.09E-02	9.20E-01	1.15E-01	8.09E-03	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	3.47E-04	NA	NA	1.02E-02	0.00E+00	0.00E+00	0.00E+00	1.06E-02	8	6.15E-01	7.69E-02	1.37E-01	3.07E+00	3.84E-01	2.75E-02	0.00%	0.01%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	3.72E-05	NA	NA	3.45E-03	0.00E+00	0.00E+00	0.00E+00	3.48E-03	8	6.56E+01	8.20E+00	4.25E-04	1.10E+02	1.38E+01	2.53E-04	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	8.43E-05	NA	NA	2.33E-03	0.00E+00	0.00E+00	0.00E+00	2.42E-03	8	6.15E-01	7.69E-02	3.15E-02	3.07E+00	3.84E-01	6.30E-03	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	3.10E-01	mg/kg	NA	NA	1.72E+00	1.32E+00	0.00E+00	0.00E+00	NA	NA	7.69E-03	NA	NA	1.28E-01	0.00E+00	0.00E+00	0.00E+00	1.36E-01	8	6.56E+01	8.20E+00	1.65E-02	1.10E+02	1.38E+01	9.87E-03	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	2.48E-04	NA	NA	4.20E-03	0.00E+00	0.00E+00	0.00E+00	4.45E-03	8	6.15E-01	7.69E-02	5.79E-02	3.07E+00	3.84E-01	1.16E-02	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	8.20E+00	mg/kg	NA	NA	1.30E-01	3.75E-02	5.36E-03	5.36E-03	NA	NA	2.03E-01	NA	NA	2.56E-01	0.00E+00	0.00E+00	0.00E+00	4.59E-01	8	1.26E-01	1.58E-02	2.92E+01	1.26E+00	1.58E-01	2.92E+00	1.01%	0.81%
Chromium	NA	mg/L	NA	mg/kg	3.03E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.37E-02	9.37E-02	NA	NA	7.51E-01	NA	NA	2.23E+00	0.00E+00	0.00E+00	0.00E+00	2.98E+00	8	2.74E+03	3.42E+02	8.70E-03	1.37E+04	1.71E+03	1.74E-03	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	1.76E+01	mg/kg	NA	NA	5.15E-01	3.43E-01	6.62E-01	6.62E-01	NA	NA	4.36E-01	NA	NA	2.18E+00	0.00E+00	0.00E+00	0.00E+00	2.61E+00	8	1.17E+01	1.46E+00	1.79E+00	1.51E+01	1.89E+00	1.38E+00	0.06%	0.39%
Lead	NA	mg/L	NA	mg/kg	7.16E+01	mg/kg	NA	NA	3.53E-01	4.06E-02	9.96E-02	9.96E-02	NA	NA	1.78E+00	NA	NA	6.06E+00	0.00E+00	0.00E+00	0.00E+00	7.84E+00	8	8.00E+00	1.00E+00	7.84E+00	8.00E+01	1.00E+01	7.84E-01	0.27%	0.22%
Mercury	NA	mg/L	NA	mg/kg	4.97E-01	mg/kg	NA	NA	3.30E+01	5.07E-01	1.05E+00	1.05E+00	NA	NA	1.23E-02	NA	NA	3.94E+00	0.00E+00	0.00E+00	0.00E+00	3.95E+00	8	1.00E+00	1.25E-01	3.16E+01	5.00E+00	6.25E-01	6.32E+00	1.09%	1.77%
Nickel	NA	mg/L	NA	mg/kg	1.07E+01	mg/kg	NA	NA	7.80E+00	5.96E-02	2.20E-01	2.20E-01	NA	NA	2.65E-01	NA	NA	2.00E+01	0.00E+00	0.00E+00	0.00E+00	2.03E+01	8	4.00E+01	5.00E+00	4.06E+00	8.00E+01	1.00E+01	2.03E+00	0.14%	0.57%
Selenium	NA	mg/L	NA	mg/kg	9.40E+00	mg/kg	NA	NA	5.10E-01	6.41E-01	9.78E+00	9.78E+00	NA	NA	2.33E-01	NA	NA	1.15E+00	0.00E+00	0.00E+00	0.00E+00	1.38E+00	8	2.00E-01	2.50E-02	5.54E+01	3.30E-01	4.13E-02	3.35E+01	1.92%	9.37%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	6.50E-04	NA	NA	1.29E-02	0.00E+00	0.00E+00	0.00E+00	1.35E-02	8	2.22E+01	2.78E+00	4.88E-03	2.22E+02	2.78E+01	4.88E-04	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	5.69E+00	7.99E-01	1.85E+00	1.85E+00	NA	NA	1.40E+00	NA	NA	7.71E+01	0.00E+00	0.00E+00	0.00E+00	7.85E+01	8	1.60E+02	2.00E+01	3.93E+00	3.20E+02	4.00E+01	1.96E+00	0.14%	0.55%
																					Hazard Index (Total EEQ):				2.89E+03			3.6E+02	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	1	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00031	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.003	kg/d
Body weight =	0.0125	kg
Home range =	0.96	acres
Water intake rate =	0.0033	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-15
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for Short-Tailed Shrews at SWMU 49

Hazard Estimate - Tier 2
Short-tailed Shrew

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	2.45E-05	mg/kg	NA	NA	5.05E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	3.91E-08	NA	NA	1.89E-06	0.00E+00	0.00E+00	0.00E+00	1.93E-06	8	1.00E-06	1.25E-07	1.54E+01	1.00E-05	1.25E-06	1.54E+00	70.63%	37.17%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	1.61E-06	NA	NA	3.97E-04	0.00E+00	0.00E+00	0.00E+00	3.99E-04	8	8.00E-01	1.00E-01	3.99E-03	4.00E+00	5.00E-01	7.97E-04	0.02%	0.02%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	8.00E-01	1.00E-01	0.00E+00	4.00E+00	5.00E-01	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	1.60E-06	NA	NA	3.70E-05	0.00E+00	0.00E+00	0.00E+00	3.86E-05	8	6.56E+01	8.20E+00	4.70E-06	1.10E+02	1.38E+01	2.81E-06	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	8.03E-02	mg/kg	NA	NA	2.90E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	1.28E-04	NA	NA	3.56E-03	0.00E+00	0.00E+00	0.00E+00	3.69E-03	8	1.40E-01	1.75E-02	2.11E-01	6.80E-01	8.50E-02	4.34E-02	0.97%	1.05%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	3.49E+00	2.60E-02	5.00E-01	5.00E-01	NA	NA	2.43E-04	NA	NA	8.11E-03	0.00E+00	0.00E+00	0.00E+00	8.35E-03	8	1.40E-01	1.75E-02	4.77E-01	6.80E-01	8.50E-02	9.83E-02	2.19%	2.37%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	9.74E-06	NA	NA	1.48E-04	0.00E+00	0.00E+00	0.00E+00	1.58E-04	8	6.15E-01	7.69E-02	2.05E-03	3.07E+00	3.84E-01	4.12E-04	0.01%	0.01%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	7.83E-06	NA	NA	9.96E-05	0.00E+00	0.00E+00	0.00E+00	1.07E-04	8	6.15E-01	7.69E-02	1.40E-03	3.07E+00	3.84E-01	2.80E-04	0.01%	0.01%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	3.37E-05	NA	NA	8.38E-04	0.00E+00	0.00E+00	0.00E+00	8.72E-04	8	6.15E-01	7.69E-02	1.13E-02	3.07E+00	3.84E-01	2.27E-03	0.05%	0.05%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	4.63E-06	NA	NA	1.30E-04	0.00E+00	0.00E+00	0.00E+00	1.35E-04	8	6.15E-01	7.69E-02	1.75E-03	3.07E+00	3.84E-01	3.52E-04	0.01%	0.01%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	6.71E-06	NA	NA	1.67E-04	0.00E+00	0.00E+00	0.00E+00	1.74E-04	8	6.15E-01	7.69E-02	2.26E-03	3.07E+00	3.84E-01	4.52E-04	0.01%	0.01%
Chrysene	NA	mg/L	NA	mg/kg	4.48E-02	mg/kg	NA	NA	2.29E+00	2.35E-01	0.00E+00	0.00E+00	NA	NA	7.16E-05	NA	NA	1.57E-03	0.00E+00	0.00E+00	0.00E+00	1.64E-03	8	6.15E-01	7.69E-02	2.13E-02	3.07E+00	3.84E-01	4.27E-03	0.10%	0.10%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	3.67E-06	NA	NA	8.12E-05	0.00E+00	0.00E+00	0.00E+00	8.48E-05	8	6.15E-01	7.69E-02	1.10E-03	3.07E+00	3.84E-01	2.21E-04	0.01%	0.01%
Dieldrin	NA	mg/L	NA	mg/kg	6.88E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	1.10E-05	NA	NA	1.54E-03	0.00E+00	0.00E+00	0.00E+00	1.56E-03	8	1.50E-02	1.88E-03	8.30E-01	3.00E-02	3.75E-03	4.15E-01	3.80%	9.99%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	1.15E-05	NA	NA	7.15E-05	0.00E+00	0.00E+00	0.00E+00	8.30E-05	8	1.50E-01	1.88E-02	4.43E-03	7.50E-01	9.38E-02	8.85E-04	0.02%	0.02%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.58E-01	2.09E+00	5.00E-01	5.00E-01	NA	NA	1.06E-05	NA	NA	8.70E-05	0.00E+00	0.00E+00	0.00E+00	9.76E-05	8	1.50E-01	1.88E-02	5.21E-03	7.50E-01	9.38E-02	1.04E-03	0.02%	0.03%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.91E+01	3.55E-01	5.00E-01	5.00E-01	NA	NA	1.21E-06	NA	NA	2.21E-04	0.00E+00	0.00E+00	0.00E+00	2.22E-04	8	9.20E-02	1.15E-02	1.93E-02	9.20E-01	1.15E-01	1.93E-03	0.09%	0.05%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	1.15E-06	NA	NA	5.73E-05	0.00E+00	0.00E+00	0.00E+00	5.85E-05	8	9.20E-02	1.15E-02	5.09E-03	9.20E-01	1.15E-01	5.09E-04	0.02%	0.01%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	2.24E-05	NA	NA	6.50E-04	0.00E+00	0.00E+00	0.00E+00	6.73E-04	8	6.15E-01	7.69E-02	8.75E-03	3.07E+00	3.84E-01	1.75E-03	0.04%	0.04%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	2.40E-06	NA	NA	2.19E-04	0.00E+00	0.00E+00	0.00E+00	2.22E-04	8	6.56E+01	8.20E+00	2.70E-05	1.10E+02	1.38E+01	1.61E-05	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	5.43E-06	NA	NA	1.49E-04	0.00E+00	0.00E+00	0.00E+00	1.54E-04	8	6.15E-01	7.69E-02	2.00E-03	3.07E+00	3.84E-01	4.01E-04	0.01%	0.01%
Phenanthrene	NA	mg/L	NA	mg/kg	1.87E-01	mg/kg	NA	NA	1.72E+00	1.60E+00	0.00E+00	0.00E+00	NA	NA	2.99E-04	NA	NA	4.91E-03	0.00E+00	0.00E+00	0.00E+00	5.21E-03	8	6.56E+01	8.20E+00	6.36E-04	1.10E+02	1.38E+01	3.79E-04	0.00%	0.01%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	1.60E-05	NA	NA	2.67E-04	0.00E+00	0.00E+00	0.00E+00	2.83E-04	8	6.15E-01	7.69E-02	3.69E-03	3.07E+00	3.84E-01	7.38E-04	0.02%	0.02%
Arsenic	NA	mg/L	NA	mg/kg	4.95E+00	mg/kg	NA	NA	1.51E-01	3.75E-02	5.87E-03	5.87E-03	NA	NA	7.91E-03	NA	NA	1.14E-02	0.00E+00	0.00E+00	0.00E+00	1.93E-02	8	1.26E-01	1.58E-02	1.23E+00	1.26E+00	1.58E-01	1.23E-01	5.62%	2.96%
Chromium	NA	mg/L	NA	mg/kg	2.18E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	1.02E-01	1.02E-01	NA	NA	3.47E-02	NA	NA	1.02E-01	0.00E+00	0.00E+00	0.00E+00	1.36E-01	8	2.74E+03	3.42E+02	3.99E-04	1.37E+04	1.71E+03	7.97E-05	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	1.68E+01	mg/kg	NA	NA	5.15E-01	3.53E-01	6.88E-01	6.88E-01	NA	NA	2.69E-02	NA	NA	1.32E-01	0.00E+00	0.00E+00	0.00E+00	1.59E-01	8	1.17E+01	1.46E+00	1.09E-01	1.51E+01	1.89E+00	8.43E-02	0.50%	2.03%
Lead	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	3.69E-01	4.51E-02	1.14E-01	1.14E-01	NA	NA	9.02E-02	NA	NA	3.18E-01	0.00E+00	0.00E+00	0.00E+00	4.09E-01	8	8.00E+00	1.00E+00	4.09E-01	8.00E+01	1.00E+01	4.09E-02	1.87%	0.98%
Mercury	NA	mg/L	NA	mg/kg	3.03E-01	mg/kg	NA	NA	2.41E+00	6.37E-01	1.92E-01	1.92E-01	NA	NA	4.84E-04	NA	NA	1.11E-02	0.00E+00	0.00E+00	0.00E+00	1.16E-02	8	1.00E+00	1.25E-01	9.30E-02	5.00E+00	6.25E-01	1.86E-02	0.43%	0.45%
Nickel	NA	mg/L	NA	mg/kg	9.12E+00	mg/kg	NA	NA	1.06E+00	6.20E-02	2.40E-01	2.40E-01	NA	NA	1.46E-02	NA	NA	1.48E-01	0.00E+00	0.00E+00	0.00E+00	1.62E-01	8	4.00E+01	5.00E+00	3.24E-02	8.00E+01	1.00E+01	1.62E-02	0.15%	0.39%
Selenium	NA	mg/L	NA	mg/kg	6.62E+00	mg/kg	NA	NA	5.60E-01	6.19E-01	1.35E+01	1.35E+01	NA	NA	1.06E-02	NA	NA	5.67E-02	0.00E+00	0.00E+00	0.00E+00	6.72E-02	8	2.00E-01	2.50E-02	2.69E+00	3.30E-01	4.13E-02	1.63E+00	12.31%	39.27%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	4.18E-05	NA	NA	8.21E-04	0.00E+00	0.00E+00	0.00E+00	8.62E-04	8	2.22E+01	2.78E+00	3.11E-04	2.22E+02	2.78E+01	3.11E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.25E+01	mg/kg	NA	NA	5.97E+00	8.25E-01	1.98E+00	1.98E+00	NA	NA	8.39E-02	NA	NA	4.79E+00	0.00E+00	0.00E+00	0.00E+00	4.88E+00	8	1.60E+02	2.00E+01	2.44E-01	3.20E+02	4.00E+01	1.22E-01	1.12%	2.94%
																									Hazard Index (Total EEQ):						2.2E+01	4.2E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x \, Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	1	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00023	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.0022	kg/d
Body weight =	0.015	kg
Home range =	0.96	acres
Water intake rate =	0.0023	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.04E-01	unitless

Table F-16
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for American Robins at SWMU 49

Hazard Estimate - Tier 1
American Robin

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	3.07E-05	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	3.87E-07	NA	NA	1.55E-04	5.76E-07	0.00E+00	0.00E+00	1.56E-04	8	1.40E-05	1.75E-06	8.89E+01	1.40E-04	1.75E-05	8.89E+00	28.37%	13.79%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	1.27E-05	NA	NA	3.11E-03	4.81E-05	0.00E+00	0.00E+00	3.17E-03	8	2.80E-03	3.50E-04	9.06E+00	2.80E-02	3.50E-03	9.06E-01	2.89%	1.40%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	8	2.80E-03	3.50E-04	0.00E+00	2.80E-02	3.50E-03	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	1.26E-05	NA	NA	2.90E-04	3.36E-04	0.00E+00	0.00E+00	6.38E-04	8	5.53E+02	6.91E+01	9.23E-06	2.77E+03	3.46E+02	1.85E-06	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	1.24E-01	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	1.56E-03	NA	NA	9.68E-01	2.11E-03	0.00E+00	0.00E+00	9.71E-01	8	1.80E-01	2.25E-02	4.32E+01	1.80E+00	2.25E-01	4.32E+00	13.77%	6.69%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	6.52E+01	2.60E-02	1.00E+00	1.00E+00	NA	NA	1.91E-03	NA	NA	1.19E+00	7.72E-04	0.00E+00	0.00E+00	1.19E+00	8	1.80E-01	2.25E-02	5.28E+01	1.80E+00	2.25E-01	5.28E+00	16.86%	8.19%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	7.69E-05	NA	NA	1.16E-03	6.28E-04	0.00E+00	0.00E+00	1.87E-03	8	5.53E+02	6.91E+01	2.70E-05	2.77E+03	3.46E+02	5.40E-06	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	6.17E-05	NA	NA	7.80E-04	1.39E-04	0.00E+00	0.00E+00	9.81E-04	8	5.53E+02	6.91E+01	1.42E-05	2.77E+03	3.46E+02	2.84E-06	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	2.66E-04	NA	NA	6.57E-03	1.28E-03	0.00E+00	0.00E+00	8.11E-03	8	5.53E+02	6.91E+01	1.17E-04	2.77E+03	3.46E+02	2.35E-05	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	3.65E-05	NA	NA	1.02E-03	7.66E-05	0.00E+00	0.00E+00	1.13E-03	8	5.53E+02	6.91E+01	1.64E-05	2.77E+03	3.46E+02	3.28E-06	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	5.29E-05	NA	NA	1.31E-03	2.04E-04	0.00E+00	0.00E+00	1.56E-03	8	5.53E+02	6.91E+01	2.26E-05	2.77E+03	3.46E+02	4.53E-06	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	7.90E-02	mg/kg	NA	NA	2.29E+00	1.87E-01	0.00E+00	0.00E+00	NA	NA	9.95E-04	NA	NA	2.17E-02	2.88E-03	0.00E+00	0.00E+00	2.55E-02	8	5.53E+02	6.91E+01	3.69E-04	2.77E+03	3.46E+02	7.39E-05	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	2.90E-05	NA	NA	6.36E-04	5.84E-05	0.00E+00	0.00E+00	7.23E-04	8	5.53E+02	6.91E+01	1.05E-05	2.77E+03	3.46E+02	2.09E-06	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	9.45E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	1.19E-04	NA	NA	1.66E-02	7.57E-04	0.00E+00	0.00E+00	1.75E-02	8	7.09E-02	8.86E-03	1.97E+00	1.22E-01	1.53E-02	1.15E+00	0.63%	1.78%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	9.10E-05	NA	NA	5.67E-04	3.24E-03	0.00E+00	0.00E+00	3.90E-03	8	1.00E+01	1.25E+00	3.12E-03	5.00E+01	6.25E+00	6.24E-04	0.00%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.69E-01	2.09E+00	1.00E+00	1.00E+00	NA	NA	8.37E-05	NA	NA	6.91E-04	2.71E-03	0.00E+00	0.00E+00	3.48E-03	8	1.00E+01	1.25E+00	2.79E-03	5.00E+01	6.25E+00	5.57E-04	0.00%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.93E+01	3.55E-01	1.00E+00	1.00E+00	NA	NA	9.54E-06	NA	NA	1.75E-03	5.25E-05	0.00E+00	0.00E+00	1.81E-03	8	3.00E-01	3.75E-02	4.83E-02	1.50E+00	1.88E-01	9.66E-03	0.02%	0.01%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	9.11E-06	NA	NA	4.55E-04	9.63E-05	0.00E+00	0.00E+00	5.61E-04	8	3.00E-01	3.75E-02	1.49E-02	1.50E+00	1.88E-01	2.99E-03	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	1.76E-04	NA	NA	5.09E-03	1.37E-03	0.00E+00	0.00E+00	6.64E-03	8	5.53E+02	6.91E+01	9.60E-05	2.77E+03	3.46E+02	1.92E-05	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	1.89E-05	NA	NA	1.72E-03	2.37E-06	0.00E+00	0.00E+00	1.74E-03	8	5.53E+02	6.91E+01	2.52E-05	2.77E+03	3.46E+02	5.03E-06	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	4.28E-05	NA	NA	1.16E-03	7.30E-05	0.00E+00	0.00E+00	1.28E-03	8	5.53E+02	6.91E+01	1.85E-05	2.77E+03	3.46E+02	3.70E-06	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	3.10E-01	mg/kg	NA	NA	1.72E+00	1.32E+00	0.00E+00	0.00E+00	NA	NA	3.91E-03	NA	NA	6.38E-02	8.00E-02	0.00E+00	0.00E+00	1.48E-01	8	5.53E+02	6.91E+01	2.14E-03	2.77E+03	3.46E+02	4.27E-04	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	1.26E-04	NA	NA	2.09E-03	1.41E-03	0.00E+00	0.00E+00	3.63E-03	8	5.53E+02	6.91E+01	5.25E-05	2.77E+03	3.46E+02	1.05E-05	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	8.20E+00	mg/kg	NA	NA	1.30E-01	3.75E-02	5.36E-03	5.36E-03	NA	NA	1.03E-01	NA	NA	1.28E-01	6.01E-02	0.00E+00	0.00E+00	2.91E-01	8	5.14E+00	6.43E-01	4.53E-01	1.28E+01	1.61E+00	1.81E-01	0.14%	0.28%
Chromium	NA	mg/L	NA	mg/kg	3.03E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.37E-02	9.37E-02	NA	NA	3.82E-01	NA	NA	1.11E+00	2.43E-01	0.00E+00	0.00E+00	1.73E+00	8	1.00E+00	1.25E-01	1.39E+01	2.78E+00	3.48E-01	4.99E+00	4.43%	7.73%
Copper	NA	mg/L	NA	mg/kg	1.76E+01	mg/kg	NA	NA	5.15E-01	3.43E-01	6.62E-01	6.62E-01	NA	NA	2.22E-01	NA	NA	1.08E+00	1.18E+00	0.00E+00	0.00E+00	2.49E+00	8	4.70E+01	5.88E+00	4.23E-01	6.20E+01	7.75E+00	3.21E-01	0.13%	0.50%
Lead	NA	mg/L	NA	mg/kg	7.16E+01	mg/kg	NA	NA	3.53E-01	4.06E-02	9.96E-02	9.96E-02	NA	NA	9.02E-01	NA	NA	3.02E+00	5.68E-01	0.00E+00	0.00E+00	4.49E+00	8	3.85E+00	4.81E-01	9.33E+00	1.93E+01	2.41E+00	1.87E+00	2.98%	2.89%
Mercury	NA	mg/L	NA	mg/kg	4.97E-01	mg/kg	NA	NA	3.30E+01	5.07E-01	1.05E+00	1.05E+00	NA	NA	6.26E-03	NA	NA	1.96E+00	4.92E-02	0.00E+00	0.00E+00	2.02E+00	8	4.50E-01	5.63E-02	3.59E+01	9.00E-01	1.13E-01	1.79E+01	11.45%	27.81%
Nickel	NA	mg/L	NA	mg/kg	1.07E+01	mg/kg	NA	NA	7.80E+00	5.96E-02	2.20E-01	2.20E-01	NA	NA	1.35E-01	NA	NA	9.99E+00	1.25E-01	0.00E+00	0.00E+00	1.02E+01	8	7.74E+01	9.68E+00	1.06E+00	1.07E+02	1.34E+01	7.66E-01	0.34%	1.19%
Selenium	NA	mg/L	NA	mg/kg	9.40E+00	mg/kg	NA	NA	5.10E-01	6.41E-01	9.78E+00	9.78E+00	NA	NA	1.18E-01	NA	NA	5.74E-01	1.18E+00	0.00E+00	0.00E+00	1.87E+00	8	5.00E-01	6.25E-02	2.99E+01	1.00E+00	1.25E-01	1.50E+01	9.54%	23.18%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	3.30E-04	NA	NA	6.43E-03	7.16E-05	0.00E+00	0.00E+00	6.83E-03	8	1.78E+02	2.23E+01	3.07E-04	8.90E+02	1.11E+02	6.14E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	5.69E+00	7.99E-01	1.85E+00	1.85E+00	NA	NA	7.12E-01	NA	NA	3.84E+01	8.82E+00	0.00E+00	0.00E+00	4.80E+01	8	1.45E+01	1.81E+00	2.65E+01	1.31E+02	1.64E+01	2.93E+00	8.44%	4.54%
																					Hazard Index (Total EEQ):				3.1E+02			6.5E+01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.62	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.38	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.0008	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.02	kg/d
Body weight =	0.0635	kg
Home range =	1.2	acres
Water intake rate =	0.013	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-17
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for American Robins at SWMU 49

Hazard Estimate - Tier 2
American Robin

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	2.45E-05	mg/kg	NA	NA	5.05E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	1.69E-08	NA	NA	8.11E-07	2.52E-08	0.00E+00	0.00E+00	8.53E-07	8	1.40E-05	1.75E-06	4.87E-01	1.40E-04	1.75E-05	4.87E-02	9.72%	3.81%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	6.97E-07	NA	NA	1.70E-04	2.64E-06	0.00E+00	0.00E+00	1.74E-04	8	2.80E-03	3.50E-04	4.96E-01	2.80E-02	3.50E-03	4.96E-02	9.90%	3.88%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	2.80E-03	3.50E-04	0.00E+00	2.80E-02	3.50E-03	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	6.90E-07	NA	NA	1.59E-05	1.84E-05	0.00E+00	0.00E+00	3.49E-05	8	5.53E+02	6.91E+01	5.05E-07	2.77E+03	3.46E+02	1.01E-07	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	8.03E-02	mg/kg	NA	NA	2.90E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	5.54E-05	NA	NA	1.53E-03	7.47E-05	0.00E+00	0.00E+00	1.66E-03	8	1.80E-01	2.25E-02	7.37E-02	1.80E+00	2.25E-01	7.37E-03	1.47%	0.58%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	3.49E+00	2.60E-02	5.00E-01	5.00E-01	NA	NA	1.05E-04	NA	NA	3.48E-03	4.23E-05	0.00E+00	0.00E+00	3.63E-03	8	1.80E-01	2.25E-02	1.61E-01	1.80E+00	2.25E-01	1.61E-02	3.22%	1.26%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	4.21E-06	NA	NA	6.36E-05	3.44E-05	0.00E+00	0.00E+00	1.02E-04	8	5.53E+02	6.91E+01	1.48E-06	2.77E+03	3.46E+02	2.96E-07	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	3.38E-06	NA	NA	4.27E-05	7.62E-06	0.00E+00	0.00E+00	5.37E-05	8	5.53E+02	6.91E+01	7.77E-07	2.77E+03	3.46E+02	1.55E-07	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	1.46E-05	NA	NA	3.60E-04	7.00E-05	0.00E+00	0.00E+00	4.44E-04	8	5.53E+02	6.91E+01	6.42E-06	2.77E+03	3.46E+02	1.28E-06	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	2.00E-06	NA	NA	5.59E-05	4.20E-06	0.00E+00	0.00E+00	6.21E-05	8	5.53E+02	6.91E+01	8.98E-07	2.77E+03	3.46E+02	1.80E-07	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	2.90E-06	NA	NA	7.16E-05	1.12E-05	0.00E+00	0.00E+00	8.57E-05	8	5.53E+02	6.91E+01	1.24E-06	2.77E+03	3.46E+02	2.48E-07	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	4.48E-02	mg/kg	NA	NA	2.29E+00	2.35E-01	0.00E+00	0.00E+00	NA	NA	3.09E-05	NA	NA	6.72E-04	1.13E-04	0.00E+00	0.00E+00	8.16E-04	8	5.53E+02	6.91E+01	1.18E-05	2.77E+03	3.46E+02	2.36E-06	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	1.59E-06	NA	NA	3.48E-05	3.20E-06	0.00E+00	0.00E+00	3.96E-05	8	5.53E+02	6.91E+01	5.73E-07	2.77E+03	3.46E+02	1.15E-07	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	6.88E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	4.75E-06	NA	NA	6.63E-04	3.02E-05	0.00E+00	0.00E+00	6.98E-04	8	7.09E-02	8.86E-03	7.87E-02	1.22E-01	1.53E-02	4.57E-02	1.57%	3.58%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	4.98E-06	NA	NA	3.07E-05	1.78E-04	0.00E+00	0.00E+00	2.13E-04	8	1.00E+01	1.25E+00	1.71E-04	5.00E+01	6.25E+00	3.41E-05	0.00%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.58E-01	2.09E+00	5.00E-01	5.00E-01	NA	NA	4.58E-06	NA	NA	3.73E-05	1.48E-04	0.00E+00	0.00E+00	1.90E-04	8	1.00E+01	1.25E+00	1.52E-04	5.00E+01	6.25E+00	3.05E-05	0.00%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.91E+01	3.55E-01	5.00E-01	5.00E-01	NA	NA	5.22E-07	NA	NA	9.48E-05	2.87E-06	0.00E+00	0.00E+00	9.82E-05	8	3.00E-01	3.75E-02	2.62E-03	1.50E+00	1.88E-01	5.24E-04	0.05%	0.04%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	4.99E-07	NA	NA	2.46E-05	5.27E-06	0.00E+00	0.00E+00	3.04E-05	8	3.00E-01	3.75E-02	8.10E-04	1.50E+00	1.88E-01	1.62E-04	0.02%	0.01%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	9.66E-06	NA	NA	2.79E-04	7.49E-05	0.00E+00	0.00E+00	3.63E-04	8	5.53E+02	6.91E+01	5.26E-06	2.77E+03	3.46E+02	1.05E-06	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	1.03E-06	NA	NA	9.41E-05	1.30E-07	0.00E+00	0.00E+00	9.53E-05	8	5.53E+02	6.91E+01	1.38E-06	2.77E+03	3.46E+02	2.76E-07	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	2.35E-06	NA	NA	6.37E-05	4.00E-06	0.00E+00	0.00E+00	7.01E-05	8	5.53E+02	6.91E+01	1.01E-06	2.77E+03	3.46E+02	2.03E-07	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	1.87E-01	mg/kg	NA	NA	1.72E+00	1.60E+00	0.00E+00	0.00E+00	NA	NA	1.29E-04	NA	NA	2.11E-03	3.20E-03	0.00E+00	0.00E+00	5.44E-03	8	5.53E+02	6.91E+01	7.87E-05	2.77E+03	3.46E+02	1.57E-05	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	6.90E-06	NA	NA	1.15E-04	7.70E-05	0.00E+00	0.00E+00	1.99E-04	8	5.53E+02	6.91E+01	2.87E-06	2.77E+03	3.46E+02	5.75E-07	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	4.95E+00	mg/kg	NA	NA	1.51E-01	3.75E-02	5.87E-03	5.87E-03	NA	NA	3.42E-03	NA	NA	4.90E-03	1.99E-03	0.00E+00	0.00E+00	1.03E-02	8	5.14E+00	6.43E-01	1.60E-02	1.28E+01	1.61E+00	6.42E-03	0.32%	0.50%
Chromium	NA	mg/L	NA	mg/kg	2.18E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	1.02E-01	1.02E-01	NA	NA	1.50E-02	NA	NA	4.36E-02	9.54E-03	0.00E+00	0.00E+00	6.82E-02	8	1.00E+00	1.25E-01	5.45E-01	2.78E+00	3.48E-01	1.96E-01	10.88%	15.35%
Copper	NA	mg/L	NA	mg/kg	1.68E+01	mg/kg	NA	NA	5.15E-01	3.53E-01	6.88E-01	6.88E-01	NA	NA	1.16E-02	NA	NA	5.68E-02	6.34E-02	0.00E+00	0.00E+00	1.32E-01	8	4.70E+01	5.88E+00	2.24E-02	6.20E+01	7.75E+00	1.70E-02	0.45%	1.33%
Lead	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	3.69E-01	4.51E-02	1.14E-01	1.14E-01	NA	NA	3.90E-02	NA	NA	1.37E-01	2.72E-02	0.00E+00	0.00E+00	2.03E-01	8	3.85E+00	4.81E-01	4.21E-01	1.93E+01	2.41E+00	8.43E-02	8.41%	6.59%
Mercury	NA	mg/L	NA	mg/kg	3.03E-01	mg/kg	NA	NA	2.41E+00	6.37E-01	1.92E-01	1.92E-01	NA	NA	2.09E-04	NA	NA	4.78E-03	2.06E-03	0.00E+00	0.00E+00	7.05E-03	8	4.50E-01	5.63E-02	1.25E-01	9.00E-01	1.13E-01	6.27E-02	2.50%	4.90%
Nickel	NA	mg/L	NA	mg/kg	9.12E+00	mg/kg	NA	NA	1.06E+00	6.20E-02	2.40E-01	2.40E-01	NA	NA	6.29E-03	NA	NA	6.33E-02	6.05E-03	0.00E+00	0.00E+00	7.57E-02	8	7.74E+01	9.68E+00	7.82E-03	1.07E+02	1.34E+01	5.66E-03	0.16%	0.44%
Selenium	NA	mg/L	NA	mg/kg	6.62E+00	mg/kg	NA	NA	5.60E-01	6.19E-01	1.35E+01	1.35E+01	NA	NA	4.57E-03	NA	NA	2.43E-02	4.38E-02	0.00E+00	0.00E+00	7.27E-02	8	5.00E-01	6.25E-02	1.16E+00	1.00E+00	1.25E-01	5.81E-01	23.20%	45.49%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	1.81E-05	NA	NA	3.52E-04	3.92E-06	0.00E+00	0.00E+00	3.74E-04	8	1.78E+02	2.23E+01	1.68E-05	8.90E+02	1.11E+02	3.36E-06	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.25E+01	mg/kg	NA	NA	5.97E+00	8.25E-01	1.98E+00	1.98E+00	NA	NA	3.63E-02	NA	NA	2.06E+00	4.64E-01	0.00E+00	0.00E+00	2.56E+00	8	1.45E+01	1.81E+00	1.41E+00	1.31E+02	1.64E+01	1.56E-01	28.13%	12.21%
																						Hazard Index (Total EEQ):			5.0E+00			1.3E+00	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.62	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.38	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.00064	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.016	kg/d
Body weight =	0.0773	kg
Home range =	1.2	acres
Water intake rate =	0.011	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	8.33E-02	unitless

Table F-18
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Red-Tailed Hawks at SWMU 49

Hazard Estimate - Tier 1
Red-tailed Hawk

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	3.07E-05	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.38E-06	1.07E-06	4.45E-06	8	1.40E-05	1.75E-06	2.54E+00	1.40E-04	1.75E-05	2.54E-01	2.36%	0.50%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.05E-05	1.60E-05	6.65E-05	8	2.80E-03	3.50E-04	1.90E-01	2.80E-02	3.50E-03	1.90E-02	0.18%	0.04%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	2.80E-03	3.50E-04	0.00E+00	2.80E-02	3.50E-03	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	1.24E-01	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	6.20E-03	1.96E-03	8.16E-03	8	1.80E-01	2.25E-02	3.63E-01	1.80E+00	2.25E-01	3.63E-02	0.34%	0.07%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	6.52E+01	2.60E-02	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	7.60E-03	2.40E-03	1.00E-02	8	1.80E-01	2.25E-02	4.45E-01	1.80E+00	2.25E-01	4.45E-02	0.41%	0.09%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	7.90E-02	mg/kg	NA	NA	2.29E+00	1.87E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	9.45E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.67E-04	1.79E-04	7.47E-04	8	7.09E-02	8.86E-03	8.42E-02	1.22E-01	1.53E-02	4.90E-02	0.08%	0.10%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.61E-04	1.14E-04	4.75E-04	8	1.00E+01	1.25E+00	3.80E-04	5.00E+01	6.25E+00	7.60E-05	0.00%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.69E-01	2.09E+00	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.32E-04	1.05E-04	4.37E-04	8	1.00E+01	1.25E+00	3.50E-04	5.00E+01	6.25E+00	6.99E-05	0.00%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.93E+01	3.55E-01	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.79E-05	1.20E-05	4.98E-05	8	3.00E-01	3.75E-02	1.33E-03	1.50E+00	1.88E-01	2.66E-04	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.62E-05	1.14E-05	4.76E-05	8	3.00E-01	3.75E-02	1.27E-03	1.50E+00	1.88E-01	2.54E-04	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	3.10E-01	mg/kg	NA	NA	1.72E+00	1.32E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	8.20E+00	mg/kg	NA	NA	1.30E-01	3.75E-02	5.36E-03	5.36E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.20E-03	6.95E-04	2.89E-03	8	5.14E+00	6.43E-01	4.51E-03	1.28E+01	1.61E+00	1.80E-03	0.00%	0.00%
Chromium	NA	mg/L	NA	mg/kg	3.03E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.37E-02	9.37E-02	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.42E-01	4.48E-02	1.87E-01	8	1.00E+00	1.25E-01	1.49E+00	2.78E+00	3.48E-01	5.38E-01	1.39%	1.07%
Copper	NA	mg/L	NA	mg/kg	1.76E+01	mg/kg	NA	NA	5.15E-01	3.43E-01	6.62E-01	6.62E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.83E-01	1.84E-01	7.67E-01	8	4.70E+01	5.88E+00	1.30E-01	6.20E+01	7.75E+00	9.89E-02	0.12%	0.20%
Lead	NA	mg/L	NA	mg/kg	7.16E+01	mg/kg	NA	NA	3.53E-01	4.06E-02	9.96E-02	9.96E-02	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	3.57E-01	1.13E-01	4.70E-01	8	3.85E+00	4.81E-01	9.76E-01	1.93E+01	2.41E+00	1.95E-01	0.91%	0.39%
Mercury	NA	mg/L	NA	mg/kg	4.97E-01	mg/kg	NA	NA	3.30E+01	5.07E-01	1.05E+00	1.05E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.60E-02	8.21E-03	3.42E-02	8	4.50E-01	5.63E-02	6.08E-01	9.00E-01	1.13E-01	3.04E-01	0.57%	0.60%
Nickel	NA	mg/L	NA	mg/kg	1.07E+01	mg/kg	NA	NA	7.80E+00	5.96E-02	2.20E-01	2.20E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.18E-01	3.73E-02	1.55E-01	8	7.74E+01	9.68E+00	1.60E-02	1.07E+02	1.34E+01	1.16E-02	0.01%	0.02%
Selenium	NA	mg/L	NA	mg/kg	9.40E+00	mg/kg	NA	NA	5.10E-01	6.41E-01	9.78E+00	9.78E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.60E+00	1.45E+00	6.05E+00	8	5.00E-01	6.25E-02	9.69E+01	1.00E+00	1.25E-01	4.84E+01	90.10%	96.09%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.24E-06	1.66E-06	6.90E-06	8	1.78E+02	2.23E+01	3.10E-07	8.90E+02	1.11E+02	6.20E-08	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	5.69E+00	7.99E-01	1.85E+00	1.85E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.22E+00	1.65E+00	6.87E+00	8	1.45E+01	1.81E+00	3.79E+00	1.31E+02	1.64E+01	4.20E-01	3.53%	0.83%
																						Hazard Index (Total EEQ):			1.1E+02			5.0E+01	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0.76	unitless
Bird diet fraction =	0.24	unitless
Soil ingestion rate =	0	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.063	kg/d
Body weight =	0.957	kg
Home range =	2081	acres
Water intake rate =	0.068	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-19
Tier 2 Chemicals of Potential Ecological Concern EEQs and Hazard Indices for Red-Tailed Hawks at SWMU 49

Hazard Estimate - Tier 2
Red-tailed Hawk

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL		LOAEL	Adjusted LOAEL		Percent Contribution to	Percent Contribution to
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	2.45E-05	mg/kg	NA	NA	5.05E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.02E-10	3.23E-11	1.35E-10	8	1.40E-05	1.75E-06	7.70E-05	1.40E-04	1.75E-05	7.70E-06	1.97%	0.42%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	9.60E-10	3.03E-10	1.26E-09	8	2.80E-03	3.50E-04	3.61E-06	2.80E-02	3.50E-03	3.61E-07	0.09%	0.02%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	2.80E-03	3.50E-04	0.00E+00	2.80E-02	3.50E-03	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	8.03E-02	mg/kg	NA	NA	2.90E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	7.63E-08	2.41E-08	1.00E-07	8	1.80E-01	2.25E-02	4.46E-06	1.80E+00	2.25E-01	4.46E-07	0.11%	0.02%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	3.49E+00	2.60E-02	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.44E-07	4.56E-08	1.90E-07	8	1.80E-01	2.25E-02	8.44E-06	1.80E+00	2.25E-01	8.44E-07	0.22%	0.05%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	4.48E-02	mg/kg	NA	NA	2.29E+00	2.35E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	6.88E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.57E-08	4.95E-09	2.06E-08	8	7.09E-02	8.86E-03	2.33E-06	1.22E-01	1.53E-02	1.35E-06	0.06%	0.07%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	6.86E-09	2.17E-09	9.03E-09	8	1.00E+01	1.25E+00	7.22E-09	5.00E+01	6.25E+00	1.44E-09	0.00%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.58E-01	2.09E+00	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	6.31E-09	1.99E-09	8.30E-09	8	1.00E+01	1.25E+00	6.64E-09	5.00E+01	6.25E+00	1.33E-09	0.00%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.91E+01	3.55E-01	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	7.19E-10	2.27E-10	9.46E-10	8	3.00E-01	3.75E-02	2.52E-08	1.50E+00	1.88E-01	5.05E-09	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	6.87E-10	2.17E-10	9.04E-10	8	3.00E-01	3.75E-02	2.41E-08	1.50E+00	1.88E-01	4.82E-09	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	1.87E-01	mg/kg	NA	NA	1.72E+00	1.60E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	4.95E+00	mg/kg	NA	NA	1.51E-01	3.75E-02	5.87E-03	5.87E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	5.53E-08	1.75E-08	7.28E-08	8	5.14E+00	6.43E-01	1.13E-07	1.28E+01	1.61E+00	4.53E-08	0.00%	0.00%
Chromium	NA	mg/L	NA	mg/kg	2.18E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	1.02E-01	1.02E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.23E-06	1.34E-06	5.56E-06	8	1.00E+00	1.25E-01	4.45E-05	2.78E+00	3.48E-01	1.60E-05	1.14%	0.87%
Copper	NA	mg/L	NA	mg/kg	1.68E+01	mg/kg	NA	NA	5.15E-01	3.53E-01	6.88E-01	6.88E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.20E-05	6.94E-06	2.89E-05	8	4.70E+01	5.88E+00	4.92E-06	6.20E+01	7.75E+00	3.73E-06	0.13%	0.20%
Lead	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	3.69E-01	4.51E-02	1.14E-01	1.14E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.22E-05	3.85E-06	1.61E-05	8	3.85E+00	4.81E-01	3.34E-05	1.93E+01	2.41E+00	6.67E-06	0.85%	0.36%
Mercury	NA	mg/L	NA	mg/kg	3.03E-01	mg/kg	NA	NA	2.41E+00	6.37E-01	1.92E-01	1.92E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.11E-07	3.49E-08	1.45E-07	8	4.50E-01	5.63E-02	2.59E-06	9.00E-01	1.13E-01	1.29E-06	0.07%	0.07%
Nickel	NA	mg/L	NA	mg/kg	9.12E+00	mg/kg	NA	NA	1.06E+00	6.20E-02	2.40E-01	2.40E-01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.16E-06	1.31E-06	5.47E-06	8	7.74E+01	9.68E+00	5.66E-07	1.07E+02	1.34E+01	4.09E-07	0.01%	0.02%
Selenium	NA	mg/L	NA	mg/kg	6.62E+00	mg/kg	NA	NA	5.60E-01	6.19E-01	1.35E+01	1.35E+01	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.70E-04	5.38E-05	2.24E-04	8	5.00E-01	6.25E-02	3.59E-03	1.00E+00	1.25E-01	1.79E-03	91.69%	97.04%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.99E-10	6.29E-11	2.62E-10	8	1.78E+02	2.23E+01	1.18E-11	8.90E+02	1.11E+02	2.36E-12	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.25E+01	mg/kg	NA	NA	5.97E+00	8.25E-01	1.98E+00	1.98E+00	NA	NA	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.97E-04	6.23E-05	2.60E-04	8	1.45E+01	1.81E+00	1.43E-04	1.31E+02	1.64E+01	1.59E-05	3.66%	0.86%
																					Hazard Index (Total EEQ):				3.9E-03			1.8E-03	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0.76	unitless
Bird diet fraction =	0.24	unitless
Soil ingestion rate =	0	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.059	kg/d
Body weight =	1.134	kg
Home range =	2081	acres
Water intake rate =	0.064	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	4.81E-05	unitless

Table F-20
Tier 1 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

Hazard Estimate - Tier 1
Red Fox

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	3.07E-05	mg/kg	NA	NA	4.21E+01	9.60E-02	2.20E+00	2.20E+00	NA	NA	9.89E-08	NA	NA	5.96E-06	5.77E-08	5.06E-06	1.09E-06	1.23E-05	8	1.00E-06	1.25E-07	9.81E+01	1.00E-05	1.25E-06	9.81E+00	21.63%	4.45%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	1.00E+00	1.00E+00	NA	NA	3.25E-06	NA	NA	1.20E-04	4.83E-06	7.57E-05	1.63E-05	2.20E-04	8	8.00E-01	1.00E-01	2.20E-03	4.00E+00	5.00E-01	4.40E-04	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	8	8.00E-01	1.00E-01	0.00E+00	4.00E+00	5.00E-01	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	3.22E-06	NA	NA	1.12E-05	3.37E-05	0.00E+00	0.00E+00	4.81E-05	8	6.56E+01	8.20E+00	5.86E-06	1.10E+02	1.38E+01	3.50E-06	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	1.24E-01	mg/kg	NA	NA	6.52E+01	8.70E-02	1.00E+00	1.00E+00	NA	NA	3.99E-04	NA	NA	3.73E-02	2.11E-04	9.29E-03	2.00E-03	4.92E-02	8	1.40E-01	1.75E-02	2.81E+00	6.80E-01	8.50E-02	5.79E-01	0.62%	0.26%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	6.52E+01	2.60E-02	1.00E+00	1.00E+00	NA	NA	4.89E-04	NA	NA	4.57E-02	7.74E-05	1.14E-02	2.45E-03	6.01E-02	8	1.40E-01	1.75E-02	3.43E+00	6.80E-01	8.50E-02	7.07E-01	0.76%	0.32%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	1.96E-05	NA	NA	4.47E-05	6.31E-05	0.00E+00	0.00E+00	1.27E-04	8	6.15E-01	7.69E-02	1.66E-03	3.07E+00	3.84E-01	3.32E-04	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	1.58E-05	NA	NA	3.00E-05	1.40E-05	0.00E+00	0.00E+00	5.98E-05	8	6.15E-01	7.69E-02	7.78E-04	3.07E+00	3.84E-01	1.56E-04	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	6.79E-05	NA	NA	2.53E-04	1.28E-04	0.00E+00	0.00E+00	4.49E-04	8	6.15E-01	7.69E-02	5.84E-03	3.07E+00	3.84E-01	1.17E-03	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	9.34E-06	NA	NA	3.93E-05	7.69E-06	0.00E+00	0.00E+00	5.63E-05	8	6.15E-01	7.69E-02	7.33E-04	3.07E+00	3.84E-01	1.47E-04	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	1.35E-05	NA	NA	5.03E-05	2.05E-05	0.00E+00	0.00E+00	8.44E-05	8	6.15E-01	7.69E-02	1.10E-03	3.07E+00	3.84E-01	2.20E-04	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	7.90E-02	mg/kg	NA	NA	2.29E+00	1.87E-01	0.00E+00	0.00E+00	NA	NA	2.54E-04	NA	NA	8.34E-04	2.89E-04	0.00E+00	0.00E+00	1.38E-03	8	6.15E-01	7.69E-02	1.79E-02	3.07E+00	3.84E-01	3.59E-03	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	7.41E-06	NA	NA	2.45E-05	5.86E-06	0.00E+00	0.00E+00	3.78E-05	8	6.15E-01	7.69E-02	4.91E-04	3.07E+00	3.84E-01	9.84E-05	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	9.45E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	3.04E-05	NA	NA	6.40E-04	7.59E-05	8.50E-04	1.83E-04	1.78E-03	8	1.50E-02	1.88E-03	9.49E-01	3.00E-02	3.75E-03	4.74E-01	0.21%	0.22%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.56E-01	2.30E+00	1.00E+00	1.00E+00	NA	NA	2.33E-05	NA	NA	2.18E-05	3.25E-04	5.41E-04	1.16E-04	1.03E-03	8	1.50E-01	1.88E-02	5.48E-02	7.50E-01	9.38E-02	1.10E-02	0.01%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.69E-01	2.09E+00	1.00E+00	1.00E+00	NA	NA	2.14E-05	NA	NA	2.66E-05	2.72E-04	4.97E-04	1.07E-04	9.24E-04	8	1.50E-01	1.88E-02	4.93E-02	7.50E-01	9.38E-02	9.86E-03	0.01%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.93E+01	3.55E-01	1.00E+00	1.00E+00	NA	NA	2.44E-06	NA	NA	6.74E-05	5.27E-06	5.67E-05	1.22E-05	1.44E-04	8	9.20E-02	1.15E-02	1.25E-02	9.20E-01	1.15E-01	1.25E-03	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.26E+00	6.82E-01	1.00E+00	1.00E+00	NA	NA	2.33E-06	NA	NA	1.75E-05	9.66E-06	5.42E-05	1.17E-05	9.54E-05	8	9.20E-02	1.15E-02	8.29E-03	9.20E-01	1.15E-01	8.29E-04	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	4.51E-05	NA	NA	1.96E-04	1.37E-04	0.00E+00	0.00E+00	3.78E-04	8	6.15E-01	7.69E-02	4.92E-03	3.07E+00	3.84E-01	9.86E-04	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	4.83E-06	NA	NA	6.62E-05	2.38E-07	0.00E+00	0.00E+00	7.12E-05	8	6.56E+01	8.20E+00	8.69E-06	1.10E+02	1.38E+01	5.18E-06	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	1.09E-05	NA	NA	4.48E-05	7.33E-06	0.00E+00	0.00E+00	6.31E-05	8	6.15E-01	7.69E-02	8.21E-04	3.07E+00	3.84E-01	1.64E-04	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	3.10E-01	mg/kg	NA	NA	1.72E+00	1.32E+00	0.00E+00	0.00E+00	NA	NA	9.98E-04	NA	NA	2.46E-03	8.02E-03	0.00E+00	0.00E+00	1.15E-02	8	6.56E+01	8.20E+00	1.40E-03	1.10E+02	1.38E+01	8.35E-04	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	3.22E-05	NA	NA	8.07E-05	1.41E-04	0.00E+00	0.00E+00	2.54E-04	8	6.15E-01	7.69E-02	3.30E-03	3.07E+00	3.84E-01	6.62E-04	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	8.20E+00	mg/kg	NA	NA	1.30E-01	3.75E-02	5.36E-03	5.36E-03	NA	NA	2.64E-02	NA	NA	4.92E-03	6.03E-03	3.29E-03	7.09E-04	4.14E-02	8	1.26E-01	1.58E-02	2.63E+00	1.26E+00	1.58E-01	2.63E-01	0.58%	0.12%
Chromium	NA	mg/L	NA	mg/kg	3.03E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	9.37E-02	9.37E-02	NA	NA	9.76E-02	NA	NA	4.27E-02	2.43E-02	2.13E-01	4.58E-02	4.23E-01	8	2.74E+03	3.42E+02	1.24E-03	1.37E+04	1.71E+03	2.47E-04	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	1.76E+01	mg/kg	NA	NA	5.15E-01	3.43E-01	6.62E-01	6.62E-01	NA	NA	5.67E-02	NA	NA	4.18E-02	1.18E-01	8.72E-01	1.88E-01	1.28E+00	8	1.17E+01	1.46E+00	8.73E-01	1.51E+01	1.89E+00	6.77E-01	0.19%	0.31%
Lead	NA	mg/L	NA	mg/kg	7.16E+01	mg/kg	NA	NA	3.53E-01	4.06E-02	9.96E-02	9.96E-02	NA	NA	2.31E-01	NA	NA	1.16E-01	5.70E-02	5.34E-01	1.15E-01	1.05E+00	8	8.00E+00	1.00E+00	1.05E+00	8.00E+01	1.00E+01	1.05E-01	0.23%	0.05%
Mercury	NA	mg/L	NA	mg/kg	4.97E-01	mg/kg	NA	NA	3.30E+01	5.07E-01	1.05E+00	1.05E+00	NA	NA	1.60E-03	NA	NA	7.56E-02	4.94E-03	3.89E-02	8.39E-03	1.29E-01	8	1.00E+00	1.25E-01	1.04E+00	5.00E+00	6.25E-01	2.07E-01	0.23%	0.09%
Nickel	NA	mg/L	NA	mg/kg	1.07E+01	mg/kg	NA	NA	7.80E+00	5.96E-02	2.20E-01	2.20E-01	NA	NA	3.45E-02	NA	NA	3.85E-01	1.25E-02	1.77E-01	3.80E-02	6.46E-01	8	4.00E+01	5.00E+00	1.29E-01	8.00E+01	1.00E+01	6.46E-02	0.03%	0.03%
Selenium	NA	mg/L	NA	mg/kg	9.40E+00	mg/kg	NA	NA	5.10E-01	6.41E-01	9.78E+00	9.78E+00	NA	NA	3.03E-02	NA	NA	2.21E-02	1.18E-01	6.89E+00	1.48E+00	8.54E+00	8	2.00E-01	2.50E-02	3.42E+02	3.30E-01	4.13E-02	2.07E+02	75.35%	94.00%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	8.44E-05	NA	NA	2.48E-04	7.19E-06	7.85E-06	1.69E-06	3.49E-04	8	2.22E+01	2.78E+00	1.26E-04	2.22E+02	2.78E+01	1.26E-05	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	5.69E+00	7.99E-01	1.85E+00	1.85E+00	NA	NA	1.82E-01	NA	NA	1.48E+00	8.85E-01	7.82E+00	1.68E+00	1.21E+01	8	1.60E+02	2.00E+01	6.03E-01	3.20E+02	4.00E+01	3.01E-01	0.13%	0.14%
																					Hazard Index (Total EEQ):				4.54E+02			2.20E+02	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used a default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.17	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.04	unitless
Mammal diet fraction =	0.65	unitless
Bird diet fraction =	0.14	unitless
Soil ingestion rate =	0.0095	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.34	kg/d
Body weight =	2.95	kg
Home range =	2204	acres
Water intake rate =	0.57	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	1.00E+00	unitless

Table F-21
Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

Hazard Estimate - Tier 2
Red Fox

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Soil Exposure Point Concentration	Units	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	EEQ N	LOAEL	Adjusted LOAEL	EEQ L	Percent Contribution to EEQ N	Percent Contribution to EEQ L
							---------- unitless ----------						mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d			
2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	2.45E-05	mg/kg	NA	NA	5.05E+00	9.60E-02	2.20E+00	2.20E+00	NA	NA	1.64E-12	NA	NA	1.19E-11	9.61E-13	8.42E-11	1.81E-11	1.17E-10	8	1.00E-06	1.25E-07	9.35E-04	1.00E-05	1.25E-06	9.35E-05	11.73%	2.16%
4,4-DDD	NA	mg/L	NA	mg/kg	1.01E-03	mg/kg	NA	NA	2.57E+01	2.44E-01	5.00E-01	5.00E-01	NA	NA	6.78E-11	NA	NA	2.50E-09	1.01E-10	7.89E-10	1.70E-10	3.63E-09	8	8.00E-01	1.00E-01	3.63E-08	4.00E+00	5.00E-01	7.25E-09	0.00%	0.00%
4,4-DDT	NA	mg/L	NA	mg/kg	0.00E+00	mg/kg	NA	NA	NA	NA	NA	NA	0.00E+00	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00	8	8.00E-01	1.00E-01	0.00E+00	4.00E+00	5.00E-01	0.00E+00	0.00%	0.00%
Anthracene	NA	mg/L	NA	mg/kg	1.00E-03	mg/kg	NA	NA	2.42E+00	1.72E+00	0.00E+00	0.00E+00	NA	NA	6.71E-11	NA	NA	2.33E-10	7.03E-10	0.00E+00	0.00E+00	1.00E-09	8	6.56E+01	8.20E+00	1.22E-10	1.10E+02	1.38E+01	7.29E-11	0.00%	0.00%
Aroclor 1254	NA	mg/L	NA	mg/kg	8.03E-02	mg/kg	NA	NA	2.90E+00	8.70E-02	5.00E-01	5.00E-01	NA	NA	5.39E-09	NA	NA	2.24E-08	2.85E-09	6.27E-08	1.35E-08	1.07E-07	8	1.40E-01	1.75E-02	6.11E-06	6.80E-01	8.50E-02	1.26E-06	0.08%	0.03%
Aroclor - 1260	NA	mg/L	NA	mg/kg	1.52E-01	mg/kg	NA	NA	3.49E+00	2.60E-02	5.00E-01	5.00E-01	NA	NA	1.02E-08	NA	NA	5.10E-08	1.61E-09	1.19E-07	2.56E-08	2.07E-07	8	1.40E-01	1.75E-02	1.18E-05	6.80E-01	8.50E-02	2.44E-06	0.15%	0.06%
Benzo(a)anthracene	NA	mg/L	NA	mg/kg	6.10E-03	mg/kg	NA	NA	1.59E+00	5.28E-01	0.00E+00	0.00E+00	NA	NA	4.09E-10	NA	NA	9.33E-10	1.32E-09	0.00E+00	0.00E+00	2.66E-09	8	6.15E-01	7.69E-02	3.46E-08	3.07E+00	3.84E-01	6.92E-09	0.00%	0.00%
Benzo(a)pyrene	NA	mg/L	NA	mg/kg	4.90E-03	mg/kg	NA	NA	1.33E+00	1.45E-01	0.00E+00	0.00E+00	NA	NA	3.29E-10	NA	NA	6.27E-10	2.91E-10	0.00E+00	0.00E+00	1.25E-09	8	6.15E-01	7.69E-02	1.62E-08	3.07E+00	3.84E-01	3.25E-09	0.00%	0.00%
Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	2.11E-02	mg/kg	NA	NA	2.60E+00	3.10E-01	0.00E+00	0.00E+00	NA	NA	1.42E-09	NA	NA	5.27E-09	2.67E-09	0.00E+00	0.00E+00	9.36E-09	8	6.15E-01	7.69E-02	1.22E-07	3.07E+00	3.84E-01	2.44E-08	0.00%	0.00%
Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	2.90E-03	mg/kg	NA	NA	2.94E+00	1.35E-01	0.00E+00	0.00E+00	NA	NA	1.95E-10	NA	NA	8.20E-10	1.60E-10	0.00E+00	0.00E+00	1.17E-09	8	6.15E-01	7.69E-02	1.53E-08	3.07E+00	3.84E-01	3.06E-09	0.00%	0.00%
Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	4.20E-03	mg/kg	NA	NA	2.60E+00	2.49E-01	0.00E+00	0.00E+00	NA	NA	2.82E-10	NA	NA	1.05E-09	4.28E-10	0.00E+00	0.00E+00	1.76E-09	8	6.15E-01	7.69E-02	2.29E-08	3.07E+00	3.84E-01	4.59E-09	0.00%	0.00%
Chrysene	NA	mg/L	NA	mg/kg	4.48E-02	mg/kg	NA	NA	2.29E+00	2.35E-01	0.00E+00	0.00E+00	NA	NA	3.01E-09	NA	NA	9.86E-09	4.30E-09	0.00E+00	0.00E+00	1.72E-08	8	6.15E-01	7.69E-02	2.23E-07	3.07E+00	3.84E-01	4.48E-08	0.00%	0.00%
Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	2.30E-03	mg/kg	NA	NA	2.31E+00	1.30E-01	0.00E+00	0.00E+00	NA	NA	1.54E-10	NA	NA	5.11E-10	1.22E-10	0.00E+00	0.00E+00	7.87E-10	8	6.15E-01	7.69E-02	1.02E-08	3.07E+00	3.84E-01	2.05E-09	0.00%	0.00%
Dieldrin	NA	mg/L	NA	mg/kg	6.88E-03	mg/kg	NA	NA	1.47E+01	4.10E-01	1.20E+00	1.20E+00	NA	NA	4.62E-10	NA	NA	9.72E-09	1.15E-09	1.29E-08	2.78E-09	2.70E-08	8	1.50E-02	1.88E-03	1.44E-05	3.00E-02	3.75E-03	7.20E-06	0.18%	0.17%
Endosulfan II	NA	mg/L	NA	mg/kg	7.22E-03	mg/kg	NA	NA	6.48E-01	2.30E+00	5.00E-01	5.00E-01	NA	NA	4.85E-10	NA	NA	4.50E-10	6.79E-09	5.64E-09	1.21E-09	1.46E-08	8	1.50E-01	1.88E-02	7.77E-07	7.50E-01	9.38E-02	1.55E-07	0.01%	0.00%
Endosulfan sulfate	NA	mg/L	NA	mg/kg	6.64E-03	mg/kg	NA	NA	8.58E-01	2.09E+00	5.00E-01	5.00E-01	NA	NA	4.46E-10	NA	NA	5.48E-10	5.67E-09	5.19E-09	1.12E-09	1.30E-08	8	1.50E-01	1.88E-02	6.92E-07	7.50E-01	9.38E-02	1.38E-07	0.01%	0.00%
Endrin	NA	mg/L	NA	mg/kg	7.57E-04	mg/kg	NA	NA	1.91E+01	3.55E-01	5.00E-01	5.00E-01	NA	NA	5.08E-11	NA	NA	1.39E-09	1.10E-10	5.91E-10	1.27E-10	2.27E-09	8	9.20E-02	1.15E-02	1.97E-07	9.20E-01	1.15E-01	1.97E-08	0.00%	0.00%
Endrin aldehyde	NA	mg/L	NA	mg/kg	7.23E-04	mg/kg	NA	NA	5.19E+00	6.82E-01	5.00E-01	5.00E-01	NA	NA	4.85E-11	NA	NA	3.61E-10	2.01E-10	5.65E-10	1.22E-10	1.30E-09	8	9.20E-02	1.15E-02	1.13E-07	9.20E-01	1.15E-01	1.13E-08	0.00%	0.00%
Fluoranthene	NA	mg/L	NA	mg/kg	1.40E-02	mg/kg	NA	NA	3.04E+00	5.00E-01	0.00E+00	0.00E+00	NA	NA	9.39E-10	NA	NA	4.09E-09	2.86E-09	0.00E+00	0.00E+00	7.89E-09	8	6.15E-01	7.69E-02	1.03E-07	3.07E+00	3.84E-01	2.06E-08	0.00%	0.00%
Fluorene	NA	mg/L	NA	mg/kg	1.50E-03	mg/kg	NA	NA	9.57E+00	8.08E-03	0.00E+00	0.00E+00	NA	NA	1.01E-10	NA	NA	1.38E-09	4.95E-12	0.00E+00	0.00E+00	1.49E-09	8	6.56E+01	8.20E+00	1.81E-10	1.10E+02	1.38E+01	1.08E-10	0.00%	0.00%
Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	3.40E-03	mg/kg	NA	NA	2.86E+00	1.10E-01	0.00E+00	0.00E+00	NA	NA	2.28E-10	NA	NA	9.35E-10	1.53E-10	0.00E+00	0.00E+00	1.32E-09	8	6.15E-01	7.69E-02	1.71E-08	3.07E+00	3.84E-01	3.43E-09	0.00%	0.00%
Phenanthrene	NA	mg/L	NA	mg/kg	1.87E-01	mg/kg	NA	NA	1.72E+00	1.60E+00	0.00E+00	0.00E+00	NA	NA	1.25E-08	NA	NA	3.09E-08	1.22E-07	0.00E+00	0.00E+00	1.66E-07	8	6.56E+01	8.20E+00	2.02E-08	1.10E+02	1.38E+01	1.21E-08	0.00%	0.00%
Pyrene	NA	mg/L	NA	mg/kg	1.00E-02	mg/kg	NA	NA	1.75E+00	7.20E-01	0.00E+00	0.00E+00	NA	NA	6.71E-10	NA	NA	1.68E-09	2.94E-09	0.00E+00	0.00E+00	5.30E-09	8	6.15E-01	7.69E-02	6.89E-08	3.07E+00	3.84E-01	1.38E-08	0.00%	0.00%
Arsenic	NA	mg/L	NA	mg/kg	4.95E+00	mg/kg	NA	NA	1.51E-01	3.75E-02	5.87E-03	5.87E-03	NA	NA	3.32E-07	NA	NA	7.19E-08	7.60E-08	4.55E-08	9.79E-09	5.36E-07	8	1.26E-01	1.58E-02	3.40E-05	1.26E+00	1.58E-01	3.40E-06	0.43%	0.08%
Chromium	NA	mg/L	NA	mg/kg	2.18E+01	mg/kg	NA	NA	3.06E-01	4.10E-02	1.02E-01	1.02E-01	NA	NA	1.46E-06	NA	NA	6.40E-07	3.64E-07	3.48E-06	7.49E-07	6.69E-06	8	2.74E+03	3.42E+02	1.96E-08	1.37E+04	1.71E+03	3.91E-09	0.00%	0.00%
Copper	NA	mg/L	NA	mg/kg	1.68E+01	mg/kg	NA	NA	5.15E-01	3.53E-01	6.88E-01	6.88E-01	NA	NA	1.13E-06	NA	NA	8.33E-07	2.42E-06	1.81E-05	3.89E-06	2.64E-05	8	1.17E+01	1.46E+00	1.80E-05	1.51E+01	1.89E+00	1.40E-05	0.23%	0.32%
Lead	NA	mg/L	NA	mg/kg	5.65E+01	mg/kg	NA	NA	3.69E-01	4.51E-02	1.14E-01	1.14E-01	NA	NA	3.79E-06	NA	NA	2.00E-06	1.04E-06	1.00E-05	2.16E-06	1.90E-05	8	8.00E+00	1.00E+00	1.90E-05	8.00E+01	1.00E+01	1.90E-06	0.24%	0.04%
Mercury	NA	mg/L	NA	mg/kg	3.03E-01	mg/kg	NA	NA	2.41E+00	6.37E-01	1.92E-01	1.92E-01	NA	NA	2.03E-08	NA	NA	7.01E-08	7.89E-08	9.09E-08	1.96E-08	2.80E-07	8	1.00E+00	1.25E-01	2.24E-06	5.00E+00	6.25E-01	4.48E-07	0.03%	0.01%
Nickel	NA	mg/L	NA	mg/kg	9.12E+00	mg/kg	NA	NA	1.06E+00	6.20E-02	2.40E-01	2.40E-01	NA	NA	6.12E-07	NA	NA	9.29E-07	2.31E-07	3.42E-06	7.37E-07	5.93E-06	8	4.00E+01	5.00E+00	1.19E-06	8.00E+01	1.00E+01	5.93E-07	0.01%	0.01%
Selenium	NA	mg/L	NA	mg/kg	6.62E+00	mg/kg	NA	NA	5.60E-01	6.19E-01	1.35E+01	1.35E+01	NA	NA	4.44E-07	NA	NA	3.57E-07	1.67E-06	1.40E-04	3.02E-05	1.73E-04	8	2.00E-01	2.50E-02	6.91E-03	3.30E-01	4.13E-02	4.19E-03	86.74%	96.96%
Silver	NA	mg/L	NA	mg/kg	2.62E-02	mg/kg	NA	NA	2.05E+00	1.40E-02	4.00E-03	4.00E-03	NA	NA	1.76E-09	NA	NA	5.16E-09	1.50E-10	1.64E-10	3.53E-11	7.27E-09	8	2.22E+01	2.78E+00	2.62E-09	2.22E+02	2.78E+01	2.62E-10	0.00%	0.00%
Zinc	NA	mg/L	NA	mg/kg	5.25E+01	mg/kg	NA	NA	5.97E+00	8.25E-01	1.98E+00	1.98E+00	NA	NA	3.53E-06	NA	NA	3.02E-05	1.77E-05	1.62E-04	3.49E-05	2.49E-04	8	1.60E+02	2.00E+01	1.24E-05	3.20E+02	4.00E+01	6.22E-06	0.16%	0.14%
																					Hazard Index (Total EEQ):				8.0E-03			4.3E-03	100.00%	100.00%

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.
Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
PDE = Predicted Daily Exposure
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box): n See appropriate text tables for equations.
If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Plant diet fraction =	0.17	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.04	unitless
Mammal diet fraction =	0.65	unitless
Bird diet fraction =	0.14	unitless
Soil ingestion rate =	0.0067	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.24	kg/d
Body weight =	4.53	kg
Home range =	2204	acres
Water intake rate =	0.39	L/d
Site Area =	0.1	acres
Frac. home range (FHR) =	4.54E-05	unitless

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	A	B	C	D	E	F	G	H	I	J
1	**Hazard Estimate - Tier 2**									
2	**Red Fox**									
3										
4										
5		**Surface Water Exposure**		**Sediment Exposure**		**Soil Exposure**		**Fish BAF**	**Aq. Invert. BAF**	**Terr. Invert. BAF**
6	**Chemical**	**Point Concentration**	**Units**	**Point Concentration**	**Units**	**Point Concentration**	**Units**			
7										
8	2,3,7,8-TCDD TE	NA	mg/L	NA	mg/kg	0.0000245	mg/kg	NA	NA	=IF(F8=0,"NA",(EXP(1.18*LN(F8)+3.53)/F8))
9	4,4-DDD	NA	mg/L	NA	mg/kg	0.00101	mg/kg	NA	NA	=IF(F9=0,"NA",(EXP(0.6975*LN(F9)+1.1613)/F9))
10	4,4-DDT	NA	mg/L	NA	mg/kg	0	mg/kg	NA	NA	=IF(F10=0,"NA",(EXP(0.8689*LN(F10)+2.1247)/F10))
11	Anthracene	NA	mg/L	NA	mg/kg	0.001	mg/kg	NA	NA	=IF(F11=0,"NA", (2.42))
12	Aroclor 1254	NA	mg/L	NA	mg/kg	0.0803	mg/kg	NA	NA	=IF(F12=0,"NA",(EXP(1.29*LN(F12)+1.797)/F12))
13	Aroclor - 1260	NA	mg/L	NA	mg/kg	0.152	mg/kg	NA	NA	=IF(F13=0,"NA",(EXP(1.29*LN(F13)+1.797)/F13))
14	Benzo(a)anthracene	NA	mg/L	NA	mg/kg	0.0061	mg/kg	NA	NA	=IF(F14=0,"NA", (1.59))
15	Benzo(a)pyrene	NA	mg/L	NA	mg/kg	0.0049	mg/kg	NA	NA	=IF(F15=0,"NA", (1.33))
16	Benzo(b)fluoranthene	NA	mg/L	NA	mg/kg	0.0211	mg/kg	NA	NA	=IF(F16=0,"NA", (2.6))
17	Benzo(g,h,i)perylene	NA	mg/L	NA	mg/kg	0.0029	mg/kg	NA	NA	=IF(F17=0,"NA", (2.94))
18	Benzo(k)fluoranthene	NA	mg/L	NA	mg/kg	0.0042	mg/kg	NA	NA	=IF(F18=0,"NA", (2.6))
19	Chrysene	NA	mg/L	NA	mg/kg	0.0448	mg/kg	NA	NA	=IF(F19=0,"NA", (2.29))
20	Dibenz(a,h)anthracene	NA	mg/L	NA	mg/kg	0.0023	mg/kg	NA	NA	=IF(F20=0,"NA", (2.31))
21	Dieldrin	NA	mg/L	NA	mg/kg	0.00687826100958516	mg/kg	NA	NA	=IF(F21=0,"NA", (14.7))
22	Endosulfan II	NA	mg/L	NA	mg/kg	0.00722	mg/kg	NA	NA	=IF(F22=0,"NA", (0.648))
23	Endosulfan sulfate	NA	mg/L	NA	mg/kg	0.00664	mg/kg	NA	NA	=IF(F23=0,"NA", (0.858))
24	Endrin	NA	mg/L	NA	mg/kg	0.000757	mg/kg	NA	NA	=IF(F24=0,"NA", (19.1))
25	Endrin aldehyde	NA	mg/L	NA	mg/kg	0.000723	mg/kg	NA	NA	=IF(F25=0,"NA", (5.19))
26	Fluoranthene	NA	mg/L	NA	mg/kg	0.014	mg/kg	NA	NA	=IF(F26=0,"NA", (3.04))
27	Fluorene	NA	mg/L	NA	mg/kg	0.0015	mg/kg	NA	NA	=IF(F27=0,"NA", (9.57))
28	Indeno(1,2,3-cd)pyrene	NA	mg/L	NA	mg/kg	0.0034	mg/kg	NA	NA	=IF(F28=0,"NA", (2.86))
29	Phenanthrene	NA	mg/L	NA	mg/kg	0.187	mg/kg	NA	NA	=IF(F29=0,"NA", (1.72))
30	Pyrene	NA	mg/L	NA	mg/kg	0.01	mg/kg	NA	NA	=IF(F30=0,"NA", (1.75))
31	Arsenic	NA	mg/L	NA	mg/kg	4.954	mg/kg	NA	NA	=IF(F31=0,"NA",(EXP(0.706*LN(F31)-1.421)/F31))
32	Chromium	NA	mg/L	NA	mg/kg	21.75	mg/kg	NA	NA	=IF(F32=0,"NA",0.306)
33	Copper	NA	mg/L	NA	mg/kg	16.82	mg/kg	NA	NA	=IF(F33=0,"NA",0.515)
34	Lead	NA	mg/L	NA	mg/kg	56.46	mg/kg	NA	NA	=IF(F34=0,"NA", (EXP(0.807*LN(F34)-0.218)/F34))
35	Mercury	NA	mg/L	NA	mg/kg	0.303	mg/kg	NA	NA	=IF(F35=0,"NA", (EXP(0.33*LN(F35)+0.078)/F35))
36	Nickel	NA	mg/L	NA	mg/kg	9.122	mg/kg	NA	NA	=IF(F36=0,"NA", (1.059))
37	Selenium	NA	mg/L	NA	mg/kg	6.622	mg/kg	NA	NA	=IF(F37=0,"NA", (EXP(0.733*LN(F37)-0.075)/F37))
38	Silver	NA	mg/L	NA	mg/kg	0.0262	mg/kg	NA	NA	=IF(F38=0,"NA", (2.05))
39	Zinc	NA	mg/L	NA	mg/kg	52.54	mg/kg	NA	NA	=IF(F39=0,"NA", (EXP(0.328*LN(F39)+4.449)/F39))
40										
41										
42										
43										
44										
45	***Intake Equation:***									
46										
47	$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi \, x Cij}{BW} \right) \right] \right)$$									
48										
49										
50	Where:									
51	Ej = Total Exposure to Chemical									
52	A = Site Area									
53	HR = Home Range									
54	m = Total number of ingested media									
55	i = counter									
56	IRi = Consumption Rate for Medium									
57	Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)									
58	BW = Body Weight									
59										
60										
61										

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	A	B	C	D	E	F	G	H	I	J
62										

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	K	L	M	N
1				
2				
3				
4				
5	**Plant BAF**	**Mammal BAF**	**Bird BAF**	**PDE Surface Water**
6	---------- **unitless** ----------			**mg/kg-d**
7				
8	=IF(F8=0,"NA",0.096)	=IF(F8=0,"NA",2.2)	=IF(F8=0,"NA",2.2)	=IF(B8="NA","NA",$AA$57*B8*$AA$59/$AA$55)
9	=IF(F9=0,"NA", (0.244))	=IF(F9=0,"NA",0.5)	=IF(F9=0,"NA",0.5)	=IF(B9="NA","NA",$AA$57*B9*$AA$59/$AA$55)
10	=IF(F10=0,"NA", (0.105))	=IF(F10=0,"NA", (EXP(0.7254*LN(F10*J10)+1.1788)/F10))	=IF(F10=0,"NA", (EXP(0.7254*LN(F10*J10)+1.1788)/F10))	=IF(B10="NA","NA",$AA$57*B10*$AA$59/$AA$55)
11	=IF(F11=0,"NA", (EXP(0.7784*LN(F11)-0.9887)/F11))	=IF(F11=0,"NA",0)	=IF(F11=0,"NA",0)	=IF(B11="NA","NA",$AA$57*B11*$AA$59/$AA$55)
12	=IF(F12=0,"NA", (0.087))	=IF(F12=0,"NA",0.5)	=IF(F12=0,"NA",0.5)	=IF(B12="NA","NA",$AA$57*B12*$AA$59/$AA$55)
13	=IF(F13=0,"NA", (0.026))	=IF(F13=0,"NA",0.5)	=IF(F13=0,"NA",0.5)	=IF(B13="NA","NA",$AA$57*B13*$AA$59/$AA$55)
14	=IF(F14=0,"NA", (EXP(0.5944*LN(F14)-2.7078)/F14))	=IF(F14=0,"NA",0)	=IF(F14=0,"NA",0)	=IF(B14="NA","NA",$AA$57*B14*$AA$59/$AA$55)
15	=IF(F15=0,"NA", (EXP(0.975*LN(F15)-2.0615)/F15))	=IF(F15=0,"NA",0)	=IF(F15=0,"NA",0)	=IF(B15="NA","NA",$AA$57*B15*$AA$59/$AA$55)
16	=IF(F16=0,"NA", (0.31))	=IF(F16=0,"NA",0)	=IF(F16=0,"NA",0)	=IF(B16="NA","NA",$AA$57*B16*$AA$59/$AA$55)
17	=IF(F17=0,"NA", (EXP(1.1829*LN(F17)-0.9313)/F17))	=IF(F17=0,"NA",0)	=IF(F17=0,"NA",0)	=IF(B17="NA","NA",$AA$57*B17*$AA$59/$AA$55)
18	=IF(F18=0,"NA", (EXP(0.8595*LN(F18)-2.1579)/F18))	=IF(F18=0,"NA",0)	=IF(F18=0,"NA",0)	=IF(B18="NA","NA",$AA$57*B18*$AA$59/$AA$55)
19	=IF(F19=0,"NA", (EXP(0.5944*LN(F19)-2.7078)/F19))	=IF(F19=0,"NA",0)	=IF(F19=0,"NA",0)	=IF(B19="NA","NA",$AA$57*B19*$AA$59/$AA$55)
20	=IF(F20=0,"NA", (0.13))	=IF(F20=0,"NA",0)	=IF(F20=0,"NA",0)	=IF(B20="NA","NA",$AA$57*B20*$AA$59/$AA$55)
21	=IF(F21=0,"NA",0.41)	=IF(F21=0,"NA",1.2)	=IF(F21=0,"NA",1.2)	=IF(B21="NA","NA",$AA$57*B21*$AA$59/$AA$55)
22	=IF(F22=0,"NA", (2.3))	=IF(F22=0,"NA",0.5)	=IF(F22=0,"NA",0.5)	=IF(B22="NA","NA",$AA$57*B22*$AA$59/$AA$55)
23	=IF(F23=0,"NA", (2.09))	=IF(F23=0,"NA",0.5)	=IF(F23=0,"NA",0.5)	=IF(B23="NA","NA",$AA$57*B23*$AA$59/$AA$55)
24	=IF(F24=0,"NA", (0.355))	=IF(F24=0,"NA",0.5)	=IF(F24=0,"NA",0.5)	=IF(B24="NA","NA",$AA$57*B24*$AA$59/$AA$55)
25	=IF(F25=0,"NA", (0.682))	=IF(F25=0,"NA",0.5)	=IF(F25=0,"NA",0.5)	=IF(B25="NA","NA",$AA$57*B25*$AA$59/$AA$55)
26	=IF(F26=0,"NA", (0.5))	=IF(F26=0,"NA",0)	=IF(F26=0,"NA",0)	=IF(B26="NA","NA",$AA$57*B26*$AA$59/$AA$55)
27	=IF(F27=0,"NA", (EXP(0.8856*LN(F27)-5.562)/F27))	=IF(F27=0,"NA",0)	=IF(F27=0,"NA",0)	=IF(B27="NA","NA",$AA$57*B27*$AA$59/$AA$55)
28	=IF(F28=0,"NA", (0.11))	=IF(F28=0,"NA",0)	=IF(F28=0,"NA",0)	=IF(B28="NA","NA",$AA$57*B28*$AA$59/$AA$55)
29	=IF(F29=0,"NA", (EXP(0.6203*LN(F29)-0.1665)/F29))	=IF(F29=0,"NA",0)	=IF(F29=0,"NA",0)	=IF(B29="NA","NA",$AA$57*B29*$AA$59/$AA$55)
30	=IF(F30=0,"NA", (0.72))	=IF(F30=0,"NA",0)	=IF(F30=0,"NA",0)	=IF(B30="NA","NA",$AA$57*B30*$AA$59/$AA$55)
31	=IF(F31=0,"NA", (0.03752))	=IF(F31=0,"NA", (EXP(0.8188*LN(F31)-4.8471)/F31))	=IF(F31=0,"NA", (EXP(0.8188*LN(F31)-4.8471)/F31))	=IF(B31="NA","NA",$AA$57*B31*$AA$59/$AA$55)
32	=IF(F32=0,"NA", (0.041))	=IF(F32=0,"NA", (EXP(0.7338*LN(F32)-1.4599)/F32))	=IF(F32=0,"NA", (EXP(0.7338*LN(F32)-1.4599)/F32))	=IF(B32="NA","NA",$AA$57*B32*$AA$59/$AA$55)
33	=IF(F33=0,"NA", (EXP(0.394*LN(F33)+0.668)/F33))	=IF(F33=0,"NA", (EXP(0.144*LN(F33)+2.042)/F33))	=IF(F33=0,"NA", (EXP(0.144*LN(F33)+2.042)/F33))	=IF(B33="NA","NA",$AA$57*B33*$AA$59/$AA$55)
34	=IF(F34=0,"NA", (EXP(0.561*LN(F34)-1.328)/F34))	=IF(F34=0,"NA", (EXP(0.4422*LN(F34)+0.0761)/F34))	=IF(F34=0,"NA", (EXP(0.4422*LN(F34)+0.0761)/F34))	=IF(B34="NA","NA",$AA$57*B34*$AA$59/$AA$55)
35	=IF(F35=0,"NA", (EXP(0.54*LN(F35)-1)/F35))	=IF(F35=0,"NA", (0.192))	=IF(F35=0,"NA", (0.192))	=IF(B35="NA","NA",$AA$57*B35*$AA$59/$AA$55)
36	=IF(F36=0,"NA", (EXP(0.748*LN(F36)-2.223)/F36))	=IF(F36=0,"NA", (EXP(0.4658*LN(F36)-0.2462)/F36))	=IF(F36=0,"NA", (EXP(0.4658*LN(F36)-0.2462)/F36))	=IF(B36="NA","NA",$AA$57*B36*$AA$59/$AA$55)
37	=IF(F37=0,"NA", (EXP(1.104*LN(F37)-0.677)/F37))	=IF(F37=0,"NA", (EXP(0.0706*LN(F37)+4.3632)/F37))	=IF(F37=0,"NA", (EXP(0.0706*LN(F37)+4.3632)/F37))	=IF(B37="NA","NA",$AA$57*B37*$AA$59/$AA$55)
38	=IF(F38=0,"NA",0.014)	=IF(F38=0,"NA",0.004)	=IF(F38=0,"NA",0.004)	=IF(B38="NA","NA",$AA$57*B38*$AA$59/$AA$55)
39	=IF(F39=0,"NA", (EXP(0.554*LN(F39)+1.575)/F39))	=IF(F39=0,"NA", (EXP(0.0706*LN(F39)+4.3632)/F39))	=IF(F39=0,"NA", (EXP(0.0706*LN(F39)+4.3632)/F39))	=IF(B39="NA","NA",$AA$57*B39*$AA$59/$AA$55)
40				
41				
42				
43				
44				

45 **Notes:**

46 Tier 1 = Max EEQ using max EPC, max BAF/BCF, max Intake Rates, min BW, and FHR =1.

47 Tier 2 = EEQ using 95% EPC, non-max BAF/BCF, avg Intake Rates, avg BW and calculated FHR.

48 BAF = Bioaccumulation Factor (may be BCF if this is the only value available)

49 EEQ = Ecological Effects Quotient.

50 L = LOAEL based; N = NOAEL based

51 LOAEL = Lowest Observed Adverse Effect Level

52 NOAEL = No Observed Adverse Effect Level

53 NA = Not applicable/Not available

54 PDE = Predicted Daily Exposure

55 BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)

56 Some BAF (or BCF) values based on media regression equations (value in box):

57 If BAF/BCF regression equation produced Tier 2 value exceeding maximum Tier 1 BAF/BCF value, Tier 1 value used as default.

58 LOAEL and NOAEL values from appropriate toxicity summary tables in the text.

59 UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or NOAEL = LOAEL/UF or NOAEL/UF

60 A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.

61 Receptor diet data and home range data from appropriate text table.

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	K	L	M	N
62	Exposure point concentrations (EPCs) from appropriate text tables.			

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	O	P	Q	R	S
1					
2					
3					
4					
5	**PDE Sediment**	**PDE Soil**	**PDE Fish**	**PDE Aq. Invert.**	**PDE Terr. Invert.**
6	**mg/kg-d**	**mg/kg-d**	**mg/kg-d**	**mg/kg-d**	**mg/kg-d**
7					
8	=IF(D8="NA","NA",$AA$53*D8*$AA$59/$AA$55)	=$AA$52*F8*$AA$59/$AA$55	=IF(H8="NA","NA",$AA$47*B8*H8*$AA$54*$AA$59/$AA$55)	=IF(I8="NA","NA",$AA$48*D8*I8*$AA$54*$AA$59/$AA$55)	=IF(J8="NA","NA",$AA$49*F8*J8*$AA$54*$AA$59/$AA$55)
9	=IF(D9="NA","NA",$AA$53*D9*$AA$59/$AA$55)	=$AA$52*F9*$AA$59/$AA$55	=IF(H9="NA","NA",$AA$47*B9*H9*$AA$54*$AA$59/$AA$55)	=IF(I9="NA","NA",$AA$48*D9*I9*$AA$54*$AA$59/$AA$55)	=IF(J9="NA","NA",$AA$49*F9*J9*$AA$54*$AA$59/$AA$55)
10	=IF(D10="NA","NA",$AA$53*D10*$AA$59/$AA$55)	=$AA$52*F10*$AA$59/$AA$55	=IF(H10="NA","NA",$AA$47*B10*H10*$AA$54*$AA$59/$AA$55)	=IF(I10="NA","NA",$AA$48*D10*I10*$AA$54*$AA$59/$AA$55)	=IF(J10="NA","NA",$AA$49*F10*J10*$AA$54*$AA$59/$AA$55)
11	=IF(D11="NA","NA",$AA$53*D11*$AA$59/$AA$55)	=$AA$52*F11*$AA$59/$AA$55	=IF(H11="NA","NA",$AA$47*B11*H11*$AA$54*$AA$59/$AA$55)	=IF(I11="NA","NA",$AA$48*D11*I11*$AA$54*$AA$59/$AA$55)	=IF(J11="NA","NA",$AA$49*F11*J11*$AA$54*$AA$59/$AA$55)
12	=IF(D12="NA","NA",$AA$53*D12*$AA$59/$AA$55)	=$AA$52*F12*$AA$59/$AA$55	=IF(H12="NA","NA",$AA$47*B12*H12*$AA$54*$AA$59/$AA$55)	=IF(I12="NA","NA",$AA$48*D12*I12*$AA$54*$AA$59/$AA$55)	=IF(J12="NA","NA",$AA$49*F12*J12*$AA$54*$AA$59/$AA$55)
13	=IF(D13="NA","NA",$AA$53*D13*$AA$59/$AA$55)	=$AA$52*F13*$AA$59/$AA$55	=IF(H13="NA","NA",$AA$47*B13*H13*$AA$54*$AA$59/$AA$55)	=IF(I13="NA","NA",$AA$48*D13*I13*$AA$54*$AA$59/$AA$55)	=IF(J13="NA","NA",$AA$49*F13*J13*$AA$54*$AA$59/$AA$55)
14	=IF(D14="NA","NA",$AA$53*D14*$AA$59/$AA$55)	=$AA$52*F14*$AA$59/$AA$55	=IF(H14="NA","NA",$AA$47*B14*H14*$AA$54*$AA$59/$AA$55)	=IF(I14="NA","NA",$AA$48*D14*I14*$AA$54*$AA$59/$AA$55)	=IF(J14="NA","NA",$AA$49*F14*J14*$AA$54*$AA$59/$AA$55)
15	=IF(D15="NA","NA",$AA$53*D15*$AA$59/$AA$55)	=$AA$52*F15*$AA$59/$AA$55	=IF(H15="NA","NA",$AA$47*B15*H15*$AA$54*$AA$59/$AA$55)	=IF(I15="NA","NA",$AA$48*D15*I15*$AA$54*$AA$59/$AA$55)	=IF(J15="NA","NA",$AA$49*F15*J15*$AA$54*$AA$59/$AA$55)
16	=IF(D16="NA","NA",$AA$53*D16*$AA$59/$AA$55)	=$AA$52*F16*$AA$59/$AA$55	=IF(H16="NA","NA",$AA$47*B16*H16*$AA$54*$AA$59/$AA$55)	=IF(I16="NA","NA",$AA$48*D16*I16*$AA$54*$AA$59/$AA$55)	=IF(J16="NA","NA",$AA$49*F16*J16*$AA$54*$AA$59/$AA$55)
17	=IF(D17="NA","NA",$AA$53*D17*$AA$59/$AA$55)	=$AA$52*F17*$AA$59/$AA$55	=IF(H17="NA","NA",$AA$47*B17*H17*$AA$54*$AA$59/$AA$55)	=IF(I17="NA","NA",$AA$48*D17*I17*$AA$54*$AA$59/$AA$55)	=IF(J17="NA","NA",$AA$49*F17*J17*$AA$54*$AA$59/$AA$55)
18	=IF(D18="NA","NA",$AA$53*D18*$AA$59/$AA$55)	=$AA$52*F18*$AA$59/$AA$55	=IF(H18="NA","NA",$AA$47*B18*H18*$AA$54*$AA$59/$AA$55)	=IF(I18="NA","NA",$AA$48*D18*I18*$AA$54*$AA$59/$AA$55)	=IF(J18="NA","NA",$AA$49*F18*J18*$AA$54*$AA$59/$AA$55)
19	=IF(D19="NA","NA",$AA$53*D19*$AA$59/$AA$55)	=$AA$52*F19*$AA$59/$AA$55	=IF(H19="NA","NA",$AA$47*B19*H19*$AA$54*$AA$59/$AA$55)	=IF(I19="NA","NA",$AA$48*D19*I19*$AA$54*$AA$59/$AA$55)	=IF(J19="NA","NA",$AA$49*F19*J19*$AA$54*$AA$59/$AA$55)
20	=IF(D20="NA","NA",$AA$53*D20*$AA$59/$AA$55)	=$AA$52*F20*$AA$59/$AA$55	=IF(H20="NA","NA",$AA$47*B20*H20*$AA$54*$AA$59/$AA$55)	=IF(I20="NA","NA",$AA$48*D20*I20*$AA$54*$AA$59/$AA$55)	=IF(J20="NA","NA",$AA$49*F20*J20*$AA$54*$AA$59/$AA$55)
21	=IF(D21="NA","NA",$AA$53*D21*$AA$59/$AA$55)	=$AA$52*F21*$AA$59/$AA$55	=IF(H21="NA","NA",$AA$47*B21*H21*$AA$54*$AA$59/$AA$55)	=IF(I21="NA","NA",$AA$48*D21*I21*$AA$54*$AA$59/$AA$55)	=IF(J21="NA","NA",$AA$49*F21*J21*$AA$54*$AA$59/$AA$55)
22	=IF(D22="NA","NA",$AA$53*D22*$AA$59/$AA$55)	=$AA$52*F22*$AA$59/$AA$55	=IF(H22="NA","NA",$AA$47*B22*H22*$AA$54*$AA$59/$AA$55)	=IF(I22="NA","NA",$AA$48*D22*I22*$AA$54*$AA$59/$AA$55)	=IF(J22="NA","NA",$AA$49*F22*J22*$AA$54*$AA$59/$AA$55)
23	=IF(D23="NA","NA",$AA$53*D23*$AA$59/$AA$55)	=$AA$52*F23*$AA$59/$AA$55	=IF(H23="NA","NA",$AA$47*B23*H23*$AA$54*$AA$59/$AA$55)	=IF(I23="NA","NA",$AA$48*D23*I23*$AA$54*$AA$59/$AA$55)	=IF(J23="NA","NA",$AA$49*F23*J23*$AA$54*$AA$59/$AA$55)
24	=IF(D24="NA","NA",$AA$53*D24*$AA$59/$AA$55)	=$AA$52*F24*$AA$59/$AA$55	=IF(H24="NA","NA",$AA$47*B24*H24*$AA$54*$AA$59/$AA$55)	=IF(I24="NA","NA",$AA$48*D24*I24*$AA$54*$AA$59/$AA$55)	=IF(J24="NA","NA",$AA$49*F24*J24*$AA$54*$AA$59/$AA$55)
25	=IF(D25="NA","NA",$AA$53*D25*$AA$59/$AA$55)	=$AA$52*F25*$AA$59/$AA$55	=IF(H25="NA","NA",$AA$47*B25*H25*$AA$54*$AA$59/$AA$55)	=IF(I25="NA","NA",$AA$48*D25*I25*$AA$54*$AA$59/$AA$55)	=IF(J25="NA","NA",$AA$49*F25*J25*$AA$54*$AA$59/$AA$55)
26	=IF(D26="NA","NA",$AA$53*D26*$AA$59/$AA$55)	=$AA$52*F26*$AA$59/$AA$55	=IF(H26="NA","NA",$AA$47*B26*H26*$AA$54*$AA$59/$AA$55)	=IF(I26="NA","NA",$AA$48*D26*I26*$AA$54*$AA$59/$AA$55)	=IF(J26="NA","NA",$AA$49*F26*J26*$AA$54*$AA$59/$AA$55)
27	=IF(D27="NA","NA",$AA$53*D27*$AA$59/$AA$55)	=$AA$52*F27*$AA$59/$AA$55	=IF(H27="NA","NA",$AA$47*B27*H27*$AA$54*$AA$59/$AA$55)	=IF(I27="NA","NA",$AA$48*D27*I27*$AA$54*$AA$59/$AA$55)	=IF(J27="NA","NA",$AA$49*F27*J27*$AA$54*$AA$59/$AA$55)
28	=IF(D28="NA","NA",$AA$53*D28*$AA$59/$AA$55)	=$AA$52*F28*$AA$59/$AA$55	=IF(H28="NA","NA",$AA$47*B28*H28*$AA$54*$AA$59/$AA$55)	=IF(I28="NA","NA",$AA$48*D28*I28*$AA$54*$AA$59/$AA$55)	=IF(J28="NA","NA",$AA$49*F28*J28*$AA$54*$AA$59/$AA$55)
29	=IF(D29="NA","NA",$AA$53*D29*$AA$59/$AA$55)	=$AA$52*F29*$AA$59/$AA$55	=IF(H29="NA","NA",$AA$47*B29*H29*$AA$54*$AA$59/$AA$55)	=IF(I29="NA","NA",$AA$48*D29*I29*$AA$54*$AA$59/$AA$55)	=IF(J29="NA","NA",$AA$49*F29*J29*$AA$54*$AA$59/$AA$55)
30	=IF(D30="NA","NA",$AA$53*D30*$AA$59/$AA$55)	=$AA$52*F30*$AA$59/$AA$55	=IF(H30="NA","NA",$AA$47*B30*H30*$AA$54*$AA$59/$AA$55)	=IF(I30="NA","NA",$AA$48*D30*I30*$AA$54*$AA$59/$AA$55)	=IF(J30="NA","NA",$AA$49*F30*J30*$AA$54*$AA$59/$AA$55)
31	=IF(D31="NA","NA",$AA$53*D31*$AA$59/$AA$55)	=$AA$52*F31*$AA$59/$AA$55	=IF(H31="NA","NA",$AA$47*B31*H31*$AA$54*$AA$59/$AA$55)	=IF(I31="NA","NA",$AA$48*D31*I31*$AA$54*$AA$59/$AA$55)	=IF(J31="NA","NA",$AA$49*F31*J31*$AA$54*$AA$59/$AA$55)
32	=IF(D32="NA","NA",$AA$53*D32*$AA$59/$AA$55)	=$AA$52*F32*$AA$59/$AA$55	=IF(H32="NA","NA",$AA$47*B32*H32*$AA$54*$AA$59/$AA$55)	=IF(I32="NA","NA",$AA$48*D32*I32*$AA$54*$AA$59/$AA$55)	=IF(J32="NA","NA",$AA$49*F32*J32*$AA$54*$AA$59/$AA$55)
33	=IF(D33="NA","NA",$AA$53*D33*$AA$59/$AA$55)	=$AA$52*F33*$AA$59/$AA$55	=IF(H33="NA","NA",$AA$47*B33*H33*$AA$54*$AA$59/$AA$55)	=IF(I33="NA","NA",$AA$48*D33*I33*$AA$54*$AA$59/$AA$55)	=IF(J33="NA","NA",$AA$49*F33*J33*$AA$54*$AA$59/$AA$55)
34	=IF(D34="NA","NA",$AA$53*D34*$AA$59/$AA$55)	=$AA$52*F34*$AA$59/$AA$55	=IF(H34="NA","NA",$AA$47*B34*H34*$AA$54*$AA$59/$AA$55)	=IF(I34="NA","NA",$AA$48*D34*I34*$AA$54*$AA$59/$AA$55)	=IF(J34="NA","NA",$AA$49*F34*J34*$AA$54*$AA$59/$AA$55)
35	=IF(D35="NA","NA",$AA$53*D35*$AA$59/$AA$55)	=$AA$52*F35*$AA$59/$AA$55	=IF(H35="NA","NA",$AA$47*B35*H35*$AA$54*$AA$59/$AA$55)	=IF(I35="NA","NA",$AA$48*D35*I35*$AA$54*$AA$59/$AA$55)	=IF(J35="NA","NA",$AA$49*F35*J35*$AA$54*$AA$59/$AA$55)
36	=IF(D36="NA","NA",$AA$53*D36*$AA$59/$AA$55)	=$AA$52*F36*$AA$59/$AA$55	=IF(H36="NA","NA",$AA$47*B36*H36*$AA$54*$AA$59/$AA$55)	=IF(I36="NA","NA",$AA$48*D36*I36*$AA$54*$AA$59/$AA$55)	=IF(J36="NA","NA",$AA$49*F36*J36*$AA$54*$AA$59/$AA$55)
37	=IF(D37="NA","NA",$AA$53*D37*$AA$59/$AA$55)	=$AA$52*F37*$AA$59/$AA$55	=IF(H37="NA","NA",$AA$47*B37*H37*$AA$54*$AA$59/$AA$55)	=IF(I37="NA","NA",$AA$48*D37*I37*$AA$54*$AA$59/$AA$55)	=IF(J37="NA","NA",$AA$49*F37*J37*$AA$54*$AA$59/$AA$55)
38	=IF(D38="NA","NA",$AA$53*D38*$AA$59/$AA$55)	=$AA$52*F38*$AA$59/$AA$55	=IF(H38="NA","NA",$AA$47*B38*H38*$AA$54*$AA$59/$AA$55)	=IF(I38="NA","NA",$AA$48*D38*I38*$AA$54*$AA$59/$AA$55)	=IF(J38="NA","NA",$AA$49*F38*J38*$AA$54*$AA$59/$AA$55)
39	=IF(D39="NA","NA",$AA$53*D39*$AA$59/$AA$55)	=$AA$52*F39*$AA$59/$AA$55	=IF(H39="NA","NA",$AA$47*B39*H39*$AA$54*$AA$59/$AA$55)	=IF(I39="NA","NA",$AA$48*D39*I39*$AA$54*$AA$59/$AA$55)	=IF(J39="NA","NA",$AA$49*F39*J39*$AA$54*$AA$59/$AA$55)
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56			n		See appropriate text tables for equations.
57					
58					
59					
60					
61					

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	O	P	Q	R	S
62					

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	T	U	V	W	X	Y
5	**PDE Plants**	**PDE Mammals**	**PDE Birds**	**Total PDE**		**NOAEL**
6	**mg/kg-d**	**mg/kg-d**	**mg/kg-d**	**mg/kg-d**	**Chemical-Specific Toxicity Value UF**	**mg/kg-d**
8	=IF(K8="NA","NA",$AA$46*F8*K8*$AA$54*$AA$59/$AA$55)	=IF(L8="NA","NA",$AA$50*F8*L8*$AA$54*$AA$59/$AA$55)	=IF(M8="NA","NA",$AA$51*F8*M8*$AA$54*$AA$59/$AA$55)	=SUM(N8:V8)	8	0.000001
9	=IF(K9="NA","NA",$AA$46*F9*K9*$AA$54*$AA$59/$AA$55)	=IF(L9="NA","NA",$AA$50*F9*L9*$AA$54*$AA$59/$AA$55)	=IF(M9="NA","NA",$AA$51*F9*M9*$AA$54*$AA$59/$AA$55)	=SUM(N9:V9)	8	0.8
10	=IF(K10="NA","NA",$AA$46*F10*K10*$AA$54*$AA$59/$AA$55)	=IF(L10="NA","NA",$AA$50*F10*L10*$AA$54*$AA$59/$AA$55)	=IF(M10="NA","NA",$AA$51*F10*M10*$AA$54*$AA$59/$AA$55)	=SUM(N10:V10)	8	0.8
11	=IF(K11="NA","NA",$AA$46*F11*K11*$AA$54*$AA$59/$AA$55)	=IF(L11="NA","NA",$AA$50*F11*L11*$AA$54*$AA$59/$AA$55)	=IF(M11="NA","NA",$AA$51*F11*M11*$AA$54*$AA$59/$AA$55)	=SUM(N11:V11)	8	65.6
12	=IF(K12="NA","NA",$AA$46*F12*K12*$AA$54*$AA$59/$AA$55)	=IF(L12="NA","NA",$AA$50*F12*L12*$AA$54*$AA$59/$AA$55)	=IF(M12="NA","NA",$AA$51*F12*M12*$AA$54*$AA$59/$AA$55)	=SUM(N12:V12)	8	0.14
13	=IF(K13="NA","NA",$AA$46*F13*K13*$AA$54*$AA$59/$AA$55)	=IF(L13="NA","NA",$AA$50*F13*L13*$AA$54*$AA$59/$AA$55)	=IF(M13="NA","NA",$AA$51*F13*M13*$AA$54*$AA$59/$AA$55)	=SUM(N13:V13)	8	0.14
14	=IF(K14="NA","NA",$AA$46*F14*K14*$AA$54*$AA$59/$AA$55)	=IF(L14="NA","NA",$AA$50*F14*L14*$AA$54*$AA$59/$AA$55)	=IF(M14="NA","NA",$AA$51*F14*M14*$AA$54*$AA$59/$AA$55)	=SUM(N14:V14)	8	0.615
15	=IF(K15="NA","NA",$AA$46*F15*K15*$AA$54*$AA$59/$AA$55)	=IF(L15="NA","NA",$AA$50*F15*L15*$AA$54*$AA$59/$AA$55)	=IF(M15="NA","NA",$AA$51*F15*M15*$AA$54*$AA$59/$AA$55)	=SUM(N15:V15)	8	0.615
16	=IF(K16="NA","NA",$AA$46*F16*K16*$AA$54*$AA$59/$AA$55)	=IF(L16="NA","NA",$AA$50*F16*L16*$AA$54*$AA$59/$AA$55)	=IF(M16="NA","NA",$AA$51*F16*M16*$AA$54*$AA$59/$AA$55)	=SUM(N16:V16)	8	0.615
17	=IF(K17="NA","NA",$AA$46*F17*K17*$AA$54*$AA$59/$AA$55)	=IF(L17="NA","NA",$AA$50*F17*L17*$AA$54*$AA$59/$AA$55)	=IF(M17="NA","NA",$AA$51*F17*M17*$AA$54*$AA$59/$AA$55)	=SUM(N17:V17)	8	0.615
18	=IF(K18="NA","NA",$AA$46*F18*K18*$AA$54*$AA$59/$AA$55)	=IF(L18="NA","NA",$AA$50*F18*L18*$AA$54*$AA$59/$AA$55)	=IF(M18="NA","NA",$AA$51*F18*M18*$AA$54*$AA$59/$AA$55)	=SUM(N18:V18)	8	0.615
19	=IF(K19="NA","NA",$AA$46*F19*K19*$AA$54*$AA$59/$AA$55)	=IF(L19="NA","NA",$AA$50*F19*L19*$AA$54*$AA$59/$AA$55)	=IF(M19="NA","NA",$AA$51*F19*M19*$AA$54*$AA$59/$AA$55)	=SUM(N19:V19)	8	0.615
20	=IF(K20="NA","NA",$AA$46*F20*K20*$AA$54*$AA$59/$AA$55)	=IF(L20="NA","NA",$AA$50*F20*L20*$AA$54*$AA$59/$AA$55)	=IF(M20="NA","NA",$AA$51*F20*M20*$AA$54*$AA$59/$AA$55)	=SUM(N20:V20)	8	0.615
21	=IF(K21="NA","NA",$AA$46*F21*K21*$AA$54*$AA$59/$AA$55)	=IF(L21="NA","NA",$AA$50*F21*L21*$AA$54*$AA$59/$AA$55)	=IF(M21="NA","NA",$AA$51*F21*M21*$AA$54*$AA$59/$AA$55)	=SUM(N21:V21)	8	0.015
22	=IF(K22="NA","NA",$AA$46*F22*K22*$AA$54*$AA$59/$AA$55)	=IF(L22="NA","NA",$AA$50*F22*L22*$AA$54*$AA$59/$AA$55)	=IF(M22="NA","NA",$AA$51*F22*M22*$AA$54*$AA$59/$AA$55)	=SUM(N22:V22)	8	0.15
23	=IF(K23="NA","NA",$AA$46*F23*K23*$AA$54*$AA$59/$AA$55)	=IF(L23="NA","NA",$AA$50*F23*L23*$AA$54*$AA$59/$AA$55)	=IF(M23="NA","NA",$AA$51*F23*M23*$AA$54*$AA$59/$AA$55)	=SUM(N23:V23)	8	0.15
24	=IF(K24="NA","NA",$AA$46*F24*K24*$AA$54*$AA$59/$AA$55)	=IF(L24="NA","NA",$AA$50*F24*L24*$AA$54*$AA$59/$AA$55)	=IF(M24="NA","NA",$AA$51*F24*M24*$AA$54*$AA$59/$AA$55)	=SUM(N24:V24)	8	0.092
25	=IF(K25="NA","NA",$AA$46*F25*K25*$AA$54*$AA$59/$AA$55)	=IF(L25="NA","NA",$AA$50*F25*L25*$AA$54*$AA$59/$AA$55)	=IF(M25="NA","NA",$AA$51*F25*M25*$AA$54*$AA$59/$AA$55)	=SUM(N25:V25)	8	0.092
26	=IF(K26="NA","NA",$AA$46*F26*K26*$AA$54*$AA$59/$AA$55)	=IF(L26="NA","NA",$AA$50*F26*L26*$AA$54*$AA$59/$AA$55)	=IF(M26="NA","NA",$AA$51*F26*M26*$AA$54*$AA$59/$AA$55)	=SUM(N26:V26)	8	0.615
27	=IF(K27="NA","NA",$AA$46*F27*K27*$AA$54*$AA$59/$AA$55)	=IF(L27="NA","NA",$AA$50*F27*L27*$AA$54*$AA$59/$AA$55)	=IF(M27="NA","NA",$AA$51*F27*M27*$AA$54*$AA$59/$AA$55)	=SUM(N27:V27)	8	65.6
28	=IF(K28="NA","NA",$AA$46*F28*K28*$AA$54*$AA$59/$AA$55)	=IF(L28="NA","NA",$AA$50*F28*L28*$AA$54*$AA$59/$AA$55)	=IF(M28="NA","NA",$AA$51*F28*M28*$AA$54*$AA$59/$AA$55)	=SUM(N28:V28)	8	0.615
29	=IF(K29="NA","NA",$AA$46*F29*K29*$AA$54*$AA$59/$AA$55)	=IF(L29="NA","NA",$AA$50*F29*L29*$AA$54*$AA$59/$AA$55)	=IF(M29="NA","NA",$AA$51*F29*M29*$AA$54*$AA$59/$AA$55)	=SUM(N29:V29)	8	65.6
30	=IF(K30="NA","NA",$AA$46*F30*K30*$AA$54*$AA$59/$AA$55)	=IF(L30="NA","NA",$AA$50*F30*L30*$AA$54*$AA$59/$AA$55)	=IF(M30="NA","NA",$AA$51*F30*M30*$AA$54*$AA$59/$AA$55)	=SUM(N30:V30)	8	0.615
31	=IF(K31="NA","NA",$AA$46*F31*K31*$AA$54*$AA$59/$AA$55)	=IF(L31="NA","NA",$AA$50*F31*L31*$AA$54*$AA$59/$AA$55)	=IF(M31="NA","NA",$AA$51*F31*M31*$AA$54*$AA$59/$AA$55)	=SUM(N31:V31)	8	0.126
32	=IF(K32="NA","NA",$AA$46*F32*K32*$AA$54*$AA$59/$AA$55)	=IF(L32="NA","NA",$AA$50*F32*L32*$AA$54*$AA$59/$AA$55)	=IF(M32="NA","NA",$AA$51*F32*M32*$AA$54*$AA$59/$AA$55)	=SUM(N32:V32)	8	2737
33	=IF(K33="NA","NA",$AA$46*F33*K33*$AA$54*$AA$59/$AA$55)	=IF(L33="NA","NA",$AA$50*F33*L33*$AA$54*$AA$59/$AA$55)	=IF(M33="NA","NA",$AA$51*F33*M33*$AA$54*$AA$59/$AA$55)	=SUM(N33:V33)	8	11.7
34	=IF(K34="NA","NA",$AA$46*F34*K34*$AA$54*$AA$59/$AA$55)	=IF(L34="NA","NA",$AA$50*F34*L34*$AA$54*$AA$59/$AA$55)	=IF(M34="NA","NA",$AA$51*F34*M34*$AA$54*$AA$59/$AA$55)	=SUM(N34:V34)	8	8
35	=IF(K35="NA","NA",$AA$46*F35*K35*$AA$54*$AA$59/$AA$55)	=IF(L35="NA","NA",$AA$50*F35*L35*$AA$54*$AA$59/$AA$55)	=IF(M35="NA","NA",$AA$51*F35*M35*$AA$54*$AA$59/$AA$55)	=SUM(N35:V35)	8	1
36	=IF(K36="NA","NA",$AA$46*F36*K36*$AA$54*$AA$59/$AA$55)	=IF(L36="NA","NA",$AA$50*F36*L36*$AA$54*$AA$59/$AA$55)	=IF(M36="NA","NA",$AA$51*F36*M36*$AA$54*$AA$59/$AA$55)	=SUM(N36:V36)	8	40
37	=IF(K37="NA","NA",$AA$46*F37*K37*$AA$54*$AA$59/$AA$55)	=IF(L37="NA","NA",$AA$50*F37*L37*$AA$54*$AA$59/$AA$55)	=IF(M37="NA","NA",$AA$51*F37*M37*$AA$54*$AA$59/$AA$55)	=SUM(N37:V37)	8	0.2
38	=IF(K38="NA","NA",$AA$46*F38*K38*$AA$54*$AA$59/$AA$55)	=IF(L38="NA","NA",$AA$50*F38*L38*$AA$54*$AA$59/$AA$55)	=IF(M38="NA","NA",$AA$51*F38*M38*$AA$54*$AA$59/$AA$55)	=SUM(N38:V38)	8	22.2
39	=IF(K39="NA","NA",$AA$46*F39*K39*$AA$54*$AA$59/$AA$55)	=IF(L39="NA","NA",$AA$50*F39*L39*$AA$54*$AA$59/$AA$55)	=IF(M39="NA","NA",$AA$51*F39*M39*$AA$54*$AA$59/$AA$55)	=SUM(N39:V39)	8	160
42					**Hazard Index (Total EEQ):**	

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	T	U	V	W	X	Y
62						

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	Z	AA	AB	AC	AD	AE	AF
1							
2							
3							
4							
5	**Adjusted NOAEL**		**LOAEL**	**Adjusted LOAEL**		**Percent Contribution to**	**Percent Contribution to**
6	**mg/kg-d**	**EEQ N**	**mg/kg-d**	**mg/kg-d**	**EEQ L**	**EEQ N**	**EEQ L**
7							
8	=IF(Y8="NA","NA",Y8/X8)	=IF(Y8="NA","NA",W8/Z8)	0.00001	=IF(AB8="NA","NA",AB8/X8)	=IF(AB8="NA","NA",W8/AC8)	=IF(Y8="NA","NA",AA8/$AA$42)	=IF(AB8="NA","NA",AD8/$AD$42)
9	=IF(Y9="NA","NA",Y9/X9)	=IF(Y9="NA","NA",W9/Z9)	4	=IF(AB9="NA","NA",AB9/X9)	=IF(AB9="NA","NA",W9/AC9)	=IF(Y9="NA","NA",AA9/$AA$42)	=IF(AB9="NA","NA",AD9/$AD$42)
10	=IF(Y10="NA","NA",Y10/X10)	=IF(Y10="NA","NA",W10/Z10)	4	=IF(AB10="NA","NA",AB10/X10)	=IF(AB10="NA","NA",W10/AC10)	=IF(Y10="NA","NA",AA10/$AA$42)	=IF(AB10="NA","NA",AD10/$AD$42)
11	=IF(Y11="NA","NA",Y11/X11)	=IF(Y11="NA","NA",W11/Z11)	110	=IF(AB11="NA","NA",AB11/X11)	=IF(AB11="NA","NA",W11/AC11)	=IF(Y11="NA","NA",AA11/$AA$42)	=IF(AB11="NA","NA",AD11/$AD$42)
12	=IF(Y12="NA","NA",Y12/X12)	=IF(Y12="NA","NA",W12/Z12)	0.68	=IF(AB12="NA","NA",AB12/X12)	=IF(AB12="NA","NA",W12/AC12)	=IF(Y12="NA","NA",AA12/$AA$42)	=IF(AB12="NA","NA",AD12/$AD$42)
13	=IF(Y13="NA","NA",Y13/X13)	=IF(Y13="NA","NA",W13/Z13)	0.68	=IF(AB13="NA","NA",AB13/X13)	=IF(AB13="NA","NA",W13/AC13)	=IF(Y13="NA","NA",AA13/$AA$42)	=IF(AB13="NA","NA",AD13/$AD$42)
14	=IF(Y14="NA","NA",Y14/X14)	=IF(Y14="NA","NA",W14/Z14)	3.07	=IF(AB14="NA","NA",AB14/X14)	=IF(AB14="NA","NA",W14/AC14)	=IF(Y14="NA","NA",AA14/$AA$42)	=IF(AB14="NA","NA",AD14/$AD$42)
15	=IF(Y15="NA","NA",Y15/X15)	=IF(Y15="NA","NA",W15/Z15)	3.07	=IF(AB15="NA","NA",AB15/X15)	=IF(AB15="NA","NA",W15/AC15)	=IF(Y15="NA","NA",AA15/$AA$42)	=IF(AB15="NA","NA",AD15/$AD$42)
16	=IF(Y16="NA","NA",Y16/X16)	=IF(Y16="NA","NA",W16/Z16)	3.07	=IF(AB16="NA","NA",AB16/X16)	=IF(AB16="NA","NA",W16/AC16)	=IF(Y16="NA","NA",AA16/$AA$42)	=IF(AB16="NA","NA",AD16/$AD$42)
17	=IF(Y17="NA","NA",Y17/X17)	=IF(Y17="NA","NA",W17/Z17)	3.07	=IF(AB17="NA","NA",AB17/X17)	=IF(AB17="NA","NA",W17/AC17)	=IF(Y17="NA","NA",AA17/$AA$42)	=IF(AB17="NA","NA",AD17/$AD$42)
18	=IF(Y18="NA","NA",Y18/X18)	=IF(Y18="NA","NA",W18/Z18)	3.07	=IF(AB18="NA","NA",AB18/X18)	=IF(AB18="NA","NA",W18/AC18)	=IF(Y18="NA","NA",AA18/$AA$42)	=IF(AB18="NA","NA",AD18/$AD$42)
19	=IF(Y19="NA","NA",Y19/X19)	=IF(Y19="NA","NA",W19/Z19)	3.07	=IF(AB19="NA","NA",AB19/X19)	=IF(AB19="NA","NA",W19/AC19)	=IF(Y19="NA","NA",AA19/$AA$42)	=IF(AB19="NA","NA",AD19/$AD$42)
20	=IF(Y20="NA","NA",Y20/X20)	=IF(Y20="NA","NA",W20/Z20)	3.07	=IF(AB20="NA","NA",AB20/X20)	=IF(AB20="NA","NA",W20/AC20)	=IF(Y20="NA","NA",AA20/$AA$42)	=IF(AB20="NA","NA",AD20/$AD$42)
21	=IF(Y21="NA","NA",Y21/X21)	=IF(Y21="NA","NA",W21/Z21)	0.03	=IF(AB21="NA","NA",AB21/X21)	=IF(AB21="NA","NA",W21/AC21)	=IF(Y21="NA","NA",AA21/$AA$42)	=IF(AB21="NA","NA",AD21/$AD$42)
22	=IF(Y22="NA","NA",Y22/X22)	=IF(Y22="NA","NA",W22/Z22)	0.75	=IF(AB22="NA","NA",AB22/X22)	=IF(AB22="NA","NA",W22/AC22)	=IF(Y22="NA","NA",AA22/$AA$42)	=IF(AB22="NA","NA",AD22/$AD$42)
23	=IF(Y23="NA","NA",Y23/X23)	=IF(Y23="NA","NA",W23/Z23)	0.75	=IF(AB23="NA","NA",AB23/X23)	=IF(AB23="NA","NA",W23/AC23)	=IF(Y23="NA","NA",AA23/$AA$42)	=IF(AB23="NA","NA",AD23/$AD$42)
24	=IF(Y24="NA","NA",Y24/X24)	=IF(Y24="NA","NA",W24/Z24)	0.92	=IF(AB24="NA","NA",AB24/X24)	=IF(AB24="NA","NA",W24/AC24)	=IF(Y24="NA","NA",AA24/$AA$42)	=IF(AB24="NA","NA",AD24/$AD$42)
25	=IF(Y25="NA","NA",Y25/X25)	=IF(Y25="NA","NA",W25/Z25)	0.92	=IF(AB25="NA","NA",AB25/X25)	=IF(AB25="NA","NA",W25/AC25)	=IF(Y25="NA","NA",AA25/$AA$42)	=IF(AB25="NA","NA",AD25/$AD$42)
26	=IF(Y26="NA","NA",Y26/X26)	=IF(Y26="NA","NA",W26/Z26)	3.07	=IF(AB26="NA","NA",AB26/X26)	=IF(AB26="NA","NA",W26/AC26)	=IF(Y26="NA","NA",AA26/$AA$42)	=IF(AB26="NA","NA",AD26/$AD$42)
27	=IF(Y27="NA","NA",Y27/X27)	=IF(Y27="NA","NA",W27/Z27)	110	=IF(AB27="NA","NA",AB27/X27)	=IF(AB27="NA","NA",W27/AC27)	=IF(Y27="NA","NA",AA27/$AA$42)	=IF(AB27="NA","NA",AD27/$AD$42)
28	=IF(Y28="NA","NA",Y28/X28)	=IF(Y28="NA","NA",W28/Z28)	3.07	=IF(AB28="NA","NA",AB28/X28)	=IF(AB28="NA","NA",W28/AC28)	=IF(Y28="NA","NA",AA28/$AA$42)	=IF(AB28="NA","NA",AD28/$AD$42)
29	=IF(Y29="NA","NA",Y29/X29)	=IF(Y29="NA","NA",W29/Z29)	110	=IF(AB29="NA","NA",AB29/X29)	=IF(AB29="NA","NA",W29/AC29)	=IF(Y29="NA","NA",AA29/$AA$42)	=IF(AB29="NA","NA",AD29/$AD$42)
30	=IF(Y30="NA","NA",Y30/X30)	=IF(Y30="NA","NA",W30/Z30)	3.07	=IF(AB30="NA","NA",AB30/X30)	=IF(AB30="NA","NA",W30/AC30)	=IF(Y30="NA","NA",AA30/$AA$42)	=IF(AB30="NA","NA",AD30/$AD$42)
31	=IF(Y31="NA","NA",Y31/X31)	=IF(Y31="NA","NA",W31/Z31)	1.26	=IF(AB31="NA","NA",AB31/X31)	=IF(AB31="NA","NA",W31/AC31)	=IF(Y31="NA","NA",AA31/$AA$42)	=IF(AB31="NA","NA",AD31/$AD$42)
32	=IF(Y32="NA","NA",Y32/X32)	=IF(Y32="NA","NA",W32/Z32)	13690	=IF(AB32="NA","NA",AB32/X32)	=IF(AB32="NA","NA",W32/AC32)	=IF(Y32="NA","NA",AA32/$AA$42)	=IF(AB32="NA","NA",AD32/$AD$42)
33	=IF(Y33="NA","NA",Y33/X33)	=IF(Y33="NA","NA",W33/Z33)	15.1	=IF(AB33="NA","NA",AB33/X33)	=IF(AB33="NA","NA",W33/AC33)	=IF(Y33="NA","NA",AA33/$AA$42)	=IF(AB33="NA","NA",AD33/$AD$42)
34	=IF(Y34="NA","NA",Y34/X34)	=IF(Y34="NA","NA",W34/Z34)	80	=IF(AB34="NA","NA",AB34/X34)	=IF(AB34="NA","NA",W34/AC34)	=IF(Y34="NA","NA",AA34/$AA$42)	=IF(AB34="NA","NA",AD34/$AD$42)
35	=IF(Y35="NA","NA",Y35/X35)	=IF(Y35="NA","NA",W35/Z35)	5	=IF(AB35="NA","NA",AB35/X35)	=IF(AB35="NA","NA",W35/AC35)	=IF(Y35="NA","NA",AA35/$AA$42)	=IF(AB35="NA","NA",AD35/$AD$42)
36	=IF(Y36="NA","NA",Y36/X36)	=IF(Y36="NA","NA",W36/Z36)	80	=IF(AB36="NA","NA",AB36/X36)	=IF(AB36="NA","NA",W36/AC36)	=IF(Y36="NA","NA",AA36/$AA$42)	=IF(AB36="NA","NA",AD36/$AD$42)
37	=IF(Y37="NA","NA",Y37/X37)	=IF(Y37="NA","NA",W37/Z37)	0.33	=IF(AB37="NA","NA",AB37/X37)	=IF(AB37="NA","NA",W37/AC37)	=IF(Y37="NA","NA",AA37/$AA$42)	=IF(AB37="NA","NA",AD37/$AD$42)
38	=IF(Y38="NA","NA",Y38/X38)	=IF(Y38="NA","NA",W38/Z38)	222	=IF(AB38="NA","NA",AB38/X38)	=IF(AB38="NA","NA",W38/AC38)	=IF(Y38="NA","NA",AA38/$AA$42)	=IF(AB38="NA","NA",AD38/$AD$42)
39	=IF(Y39="NA","NA",Y39/X39)	=IF(Y39="NA","NA",W39/Z39)	320	=IF(AB39="NA","NA",AB39/X39)	=IF(AB39="NA","NA",W39/AC39)	=IF(Y39="NA","NA",AA39/$AA$42)	=IF(AB39="NA","NA",AD39/$AD$42)
40							
41							
42		=SUM(AA8:AA39)			=SUM(AD8:AD39)	=SUM(AE8:AE39)	=SUM(AF8:AF39)
43							
44							
45	***Species-Specific Factors***						
46	Plant diet fraction =	0.17	unitless				
47	Fish diet fraction =	0	unitless				
48	Aq. Invert diet fraction =	0	unitless				
49	Terr. Invert diet fraction =	0.04	unitless				
50	Mammal diet fraction =	0.65	unitless				
51	Bird diet fraction =	0.14	unitless				
52	Soil ingestion rate =	0.0067	kg/d				
53	Sediment ingestion rate =	0	kg/d				
54	Food ingestion rate =	0.24	kg/d				
55	Body weight =	4.53	kg				
56	Home range =	2204	acres				
57	Water intake rate =	0.39	L/d				
58	Site Area =	0.1	acres				
59	Frac. home range (FHR) =	=IF(((AA58/AA56)>1),1,(AA58/AA56))	unitless				
60							
61							

Table F-22
Example Calculation of Tier 2 Chemicals of Potential Concern EEQs and Hazard Indices for Red Foxes at SWMU 49

	Z	AA	AB	AC	AD	AE	AF
62							

Table F-23

Recommended Bioaccumulation/Bioconcentration Factors or Regression Equations Utilized for the Soil-to-Plant Pathway at SWMUs 48 and 49

Constituent	USEPA (2007) Eco-SSL Uptake Equation [a]	Alternate Regression Equation [c, d]	Alternate BAF/BCF	Recommended Tier 1 BAF/BCF	Rationale for Recommended Tier 1 BAF/BCF	Recommended Tier 2 BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
2,3,7,8-TCDD TE	--[b]	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.096	EcoSSL Kow Regression Eq.	0.096	EcoSSL Kow Regression Eq.
4,4'-DDD	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.244	EcoSSL Kow Regression Eq.	0.244	EcoSSL Kow Regression Eq.
4,4'-DDT	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.105	EcoSSL Kow Regression Eq.	0.105	EcoSSL Kow Regression Eq.
Anthracene	ln (Pc)= 0.7784(ln[soil])-0.9887	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Aroclor 1254	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.087	EcoSSL Kow Regression Eq.	0.087	EcoSSL Kow Regression Eq.
Aroclor 1260	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.026	EcoSSL Kow Regression Eq.	0.026	EcoSSL Kow Regression Eq.
Benzo(a)anthracene	ln (Pc)= 0.5944(ln[soil])-2.7078	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Benzo(a)pyrene	ln (Pc)= 0.9750(ln[soil])-2.0615	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Benzo(b)fluoranthene	Pc= 0.31(soil)	--	--	0.31	Recommended BAF from USEPA (2007)	0.31	Recommended BAF from USEPA (2007)
Benzo(g,h,i)perylene	ln (Pc)= 1.1829(ln[soil])-0.9313	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Benzo(k)fluoranthene	ln (Pc)= 0.8595(ln[soil])-2.1579	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Chrysene	ln (Pc)= 0.5944(ln[soil])-2.7078	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Dibenz(a,h)anthracene	Pc= 0.13(soil)	--	--	0.13	Recommended BAF from USEPA (2007)	0.13	Recommended BAF from USEPA (2007)
Dieldrin	Pc= 0.41(soil)	--	--	0.41	Recommended BAF from USEPA (2007)	0.41	Recommended BAF from USEPA (2007)
Endosulfan II	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	2.30	EcoSSL Kow Regression Eq.	2.30	EcoSSL Kow Regression Eq.
Endosulfan sulfate	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	2.09	EcoSSL Kow Regression Eq.	2.09	EcoSSL Kow Regression Eq.
Endrin	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.355	EcoSSL Kow Regression Eq.	0.355	EcoSSL Kow Regression Eq.
Endrin aldehyde	--	Log (PC)= -0.4057(Log[Kow])+1.781	--	0.682	EcoSSL Kow Regression Eq.	0.682	EcoSSL Kow Regression Eq.
Fluoranthene	Pc= 0.50(soil)	--	--	0.50	Recommended BAF from USEPA (2007)	0.50	Recommended BAF from USEPA (2007)
Fluorene	ln (Pc)= -0.8556(ln[soil])-5.562	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Indeno(1,2,3-cd)pyrene	Pc= 0.11(soil)	--	--	0.11	Recommended BAF from USEPA (2007)	0.11	Recommended BAF from USEPA (2007)
Phenanthrene	ln (Pc)= 0.6203(ln[soil])-0.1665	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Pyrene	Pc= 0.72(soil)	--	--	0.72	Recommended BAF from USEPA (2007)	0.72	Recommended BAF from USEPA (2007)
Arsenic	Pc= 0.03752(soil)	--	--	0.0375	Recommended BAF from USEPA (2007)	0.0375	Recommended BAF from USEPA (2007)
Chromium	Pc= 0.041(soil)	--	--	0.041	Recommended BAF from USEPA (2007)	0.041	Recommended BAF from USEPA (2007)
Copper	ln (Pc)= 0.394(ln[soil])+0.668	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Lead	ln (Pc)= 0.561(ln[soil])-1.328	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Mercury	--	ln (Pc)=0.54(ln[soil])-1.00	--	Regression Eq.	Efroymson et al. Regression Equation	Regression Eq.	Efroymson et al. Regression Equation
Nickel	ln (Pc)= 0.748(ln[soil])-2.223	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Selenium	ln (Pc)= 1.104(ln[soil])-0.677	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)
Silver	Pc= 0.014(soil)	--	--	0.014	Recommended BAF from USEPA (2007)	0.014	Recommended BAF from USEPA (2007)
Zinc	ln (Pc)= 0.554(ln[soil])+1.575	--	--	Regression Eq.	Recommended Equation (USEPA 2007)	Regression Eq.	Recommended Equation (USEPA 2007)

Notes: Pc (plant tissue concentration [mg/kg d.w.]); soil (concentration in soil [mg/kg d.w.]); BAF/BCF (bioaccumulation/bioconcentration factor); log K_{ow} (octanol/water partition coefficient).

[a] USEPA, 2007, Ecological Soil Screening Level Guidance, Soil to Plant Uptake Equations, OSWER Directive 9285.7-55.

[b] -- indicates that a BAF/BCF or regression equation is not available or not applicable.

[c] for organic chemicals: BAF estimated using the EcoSSL (2007) Kow regression equation, with the log Kow from USEPA, 2008, Estimation Programs Interface (EPI) Suite, v4.0.
The lowest literature value is presented in parenthesis if the Syrres value is less than the literature value. The log K_{ow} values are summarized as follows:

Constituent	Log Kow	BAF/BCF	Kow Reference
2,3,7,8-TCDD TE	6.9	0.096	EPI Suite
4,4'-DDD	5.9	0.244	EPI Suite
4,4'-DDT	6.8	0.105	EPI Suite
Aroclor 1254	7.0	0.087	EPI Suite
Aroclor 1260	8.3	0.026	EPI Suite
Endosulfan II	3.5	2.296	EPI Suite
Endosulfan sulfate	3.6	2.092	EPI Suite
Endrin	5.5	0.355	EPI Suite
Endrin aldehyde	4.8	0.682	EPI Suite

[d] for inorganic chemicals: Efroymson, R.A. et al., 2001, Uptake of Inorganic Chemicals from Soil by Plant Leaves: Regressions of Field Data, Environ. Tox. Chem., 20:2561-2571.

Table F-24

Recommended Bioaccumulation/Bioconcentration Factors or Regression Equations Utilized for the Soil-to-Earthworm Pathway at SWMUs 48 and 49

Constituent	USEPA (2008) Eco-SSL Uptake Equation [a]	Sample et al. 1998 [b]			Sample et al. 1999 [c]	Recommended	Rationale for Recommended	Recommended	Rationale for Recommended
		Median BAF/BCF	90th Percentile BAF/BCF	Maximum BAF/BCF	Regression Equation	Tier 1 BAF/BCF	Tier 1 BAF/BCF	Tier 2 BAF/BCF	Tier 2 BAF/BCF
2,3,7,8-TCDD TE	-- [d]	11.011	22.229	42.068	ln (EW)=1.18(ln[soil])+3.53	42.068	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
4,4'-DDD	ln (EW)= 0.6975(ln[soil])+1.1613	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2008)	Regression Eq.	Recommended Equation (USEPA 2008)
4,4'-DDT	ln (EW)= 0.8689(ln[soil])+2.1247	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2008)	Regression Eq.	Recommended Equation (USEPA 2008)
Anthracene	(EW)= 2.42(soil)	--	--	--	--	2.42	Recommended BAF (USEPA 2008)	2.42	Recommended BAF (USEPA 2008)
Aroclor 1254	--	10.6667	23.4945	65.227	ln (EW)=1.29(ln[soil])+1.79	65.227	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
Aroclor 1260	--	10.6667	23.4945	65.227	ln (EW)=1.29(ln[soil])+1.79	65.227	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
Benzo(a)anthracene	(EW)= 1.59(soil)	--	--	--	--	1.59	Recommended BAF (USEPA 2008)	1.59	Recommended BAF (USEPA 2008)
Benzo(a)pyrene	(EW)= 1.33(soil)	--	--	--	--	1.33	Recommended BAF (USEPA 2008)	1.33	Recommended BAF (USEPA 2008)
Benzo(b)fluoranthene	(EW)= 2.6(soil)	--	--	--	--	2.6	Recommended BAF (USEPA 2008)	2.6	Recommended BAF (USEPA 2008)
Benzo(g,h,i)perylene	(EW)= 2.94(soil)	--	--	--	--	2.94	Recommended BAF (USEPA 2008)	2.94	Recommended BAF (USEPA 2008)
Benzo(k)fluoranthene	(EW)= 2.6(soil)	--	--	--	--	2.6	Recommended BAF (USEPA 2008)	2.6	Recommended BAF (USEPA 2008)
Chrysene	(EW)= 2.29(soil)	--	--	--	--	2.29	Recommended BAF (USEPA 2008)	2.29	Recommended BAF (USEPA 2008)
Dibenz(a,h)anthracene	(EW)= 2.31(soil)	--	--	--	--	2.31	Recommended BAF (USEPA 2008)	2.31	Recommended BAF (USEPA 2008)
Dieldrin	(EW)= 14.7(soil)	--	--	--	--	14.7	Recommended BAF (USEPA 2008)	14.7	Recommended BAF (USEPA 2008)
Endosulfan II	--	--	--	--	--	0.66	K_{ow} Regression Eq., using geo-mean TOC	0.65	K_{ow} Regression Eq., using average TOC
Endosulfan sulfate	--	--	--	--	--	0.87	K_{ow} Regression Eq., using geo-mean TOC	0.86	K_{ow} Regression Eq., using average TOC
Endrin	--	--	--	--	--	19.35	K_{ow} Regression Eq., using geo-mean TOC	19.10	K_{ow} Regression Eq., using average TOC
Endrin aldehyde	--	--	--	--	--	5.26	K_{ow} Regression Eq., using geo-mean TOC	5.19	K_{ow} Regression Eq., using average TOC
Fluoranthene	(EW)= 3.04(soil)	--	--	--	--	3.04	Recommended BAF (USEPA 2008)	3.04	Recommended BAF (USEPA 2008)
Fluorene	(EW)= 9.57(soil)	--	--	--	--	9.57	Recommended BAF (USEPA 2008)	9.57	Recommended BAF (USEPA 2008)
Indeno(1,2,3-cd)pyrene	(EW)= 2.86(soil)	--	--	--	--	2.86	Recommended BAF (USEPA 2008)	2.86	Recommended BAF (USEPA 2008)
Phenanthrene	(EW)= 1.72(soil)	--	--	--	--	1.72	Recommended BAF (USEPA 2008)	1.72	Recommended BAF (USEPA 2008)
Pyrene	(EW)= 1.75(soil)	--	--	--	--	1.75	Recommended BAF (USEPA 2008)	1.75	Recommended BAF (USEPA 2008)
Arsenic	ln (EW)= 0.706(ln[soil])-1.421	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2008)	Regression Eq.	Recommended Equation (USEPA 2008)
Chromium	(EW)= 0.306(soil)	--	--	--	--	0.306	Recommended BAF (USEPA 2008)	0.306	Recommended BAF (USEPA 2008)
Copper	(EW)= 0.515(soil)	--	--	--	--	0.515	Recommended BAF (USEPA 2008)	0.515	Recommended BAF (USEPA 2008)
Lead	ln (EW)= 0.807(ln[soil])-0.218	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2008)	Regression Eq.	Recommended Equation (USEPA 2008)
Mercury	--	1.693	20.625	33	ln (EW)=0.33(ln[soil])+0.078	33	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
Nickel	--	1.059	4.73	7.8	--	7.8	Maximum value	1.059	Median Value
Selenium	ln (EW)= 0.733(ln[soil])-0.075	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2008)	Regression Eq.	Recommended Equation (USEPA 2008)
Silver	(EW)= 2.045(soil)	--	--	--	--	2.045	Recommended BAF (USEPA 2008)	2.045	Recommended BAF (USEPA 2008)
Zinc	ln (EW)= 0.328(ln[soil])+4.449	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2008)	Regression Eq.	Recommended Equation (USEPA 2008)

Notes: EW (earthworm tissue concentration [mg/kg d.w.]); soil (concentration in soil [mg/kg d.w.]); BAF/BCF (bioaccumulation/bioconcentration factor); $\log_{ow}$ (octanol/water partition coefficient).

[a] USEPA, 2008, Ecological Soil Screening Level Guidance (Eco-SSL), Soil to Earthworm Uptake Equations, OSWER Directive 9285.7-55.

[b] Sample, B.E. et al., 1998. Development and Validation of Bioaccumulation Models for Earthworms, ES/ER/TM-220.

[c] Sample, B.E. et al., 1999. Literature-Derived Bioaccumulation Models for Earthworms: Development and Validation, Environ. Toxicol. Chem., 18:2,110-2,120. (models from Table 3 of publication). EW = earthworm tissue concentration.

[d] -- indicates that a BAF/BCF or regression equation is not available or not applicable.

[e] USEPA, 2008, EcoSSL regression equation using site specific TOC values and chemical specific K_{ow} and K_{oc} values.

TOC concentrations utilized are as follows: Tier I: Lower-bound (geometric mean of two SWMU 48 and 49 samples) surface soil TOC = **1.56%**; Tier II arithmetic mean (mean of two SWMU 48 and 49 samples) surface soil TOC = **1.58%** (two surface soil samples [48SS2 and 49SS01]).

Log K_{ow} values from: http://www.syrres.com/esc/est_kowdemo.htm or http://www.syrres.com/esc/chemfate.htm

K_{oc} values from: http://www.syrres.com/esc/chemfate.htm

$$BAF = \frac{((10^{(0.87*\log Kow-2)})/0.16)}{foc* Koc}$$

Constituent	K_{ow}	Log K_{ow}	Constituent	K_{ow}	Log K_{ow}
Endosulfan II	6770	3.50	Endrin	11420	5.45
Endosulfan sulfate	6770 (Endosulfan)	3.64	Endrin aldehyde	11420	4.8

Table F-25
Recommended Bioaccumulation/Bioconcentration Factors Utilized for the Soil-to-Small Mammal and Bird Pathways at SWMUs 48 and 49

Constituent	USEPA (2008) Eco-SSL Uptake Equation [a]	Sample et al., 1998 [b]						Recommended Tier 1 BAF/BCF	Rationale for Recommended Tier 1 BAF/BCF	Recommended Tier 2 BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
		Insectivore Median BAF/BCF	Herbivore Median BAF/BCF	Omnivore Median BAF/BCF	General [c] Median BAF/BCF	General [c] Maximum BAF/BCF	General [c] 90th percentile BAF/BCF				
2,3,7,8-TCDD TE	--[d]	--	1.2857	0.7783	1.07	2.2	2.2	2.2	General maximum value	2.2	General 90th percentile value
4,4'-DDD	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
4,4'-DDT	ln(mam)= 0.7254(ln[diet])+1.1788	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Anthracene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Aroclor 1254	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
Aroclor 1260	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
Benzo(a)anthracene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Benzo(a)pyrene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Benzo(b)fluoranthene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Benzo(g,h,i)perylene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Benzo(k)fluoranthene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Chrysene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Dibenz(a,h)anthracene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Dieldrin	(mam)= 1.2(soil)	--	--	--	--	--	--	1.2	Recommended BAF (USEPA 2008)	1.2	Recommended BAF (USEPA 2008)
Endosulfan II	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
Endosulfan sulfate	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
Endrin	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
Endrin aldehyde	--	--	--	--	--	--	--	1 [f]	Conservative value for Tier 2 organics see footnote "f"	0.5 [f]	Conservative value for Tier 2 organics see footnote "f"
Fluoranthene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Fluorene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Indeno(1,2,3-cd)pyrene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Phenanthrene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Pyrene	Mam = 0	--	--	--	--	--	--	0	Uptake assumed to be negligible (USEPA 2008)	0	Uptake assumed to be negligible (USEPA 2008)
Arsenic	ln(mam)= 0.8188(ln[soil])-4.8471	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Chromium	ln(mam)= 0.7338(ln[soil])-1.4599	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Copper	ln(mam)= 0.144(ln[soil])+2.042	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Lead	ln(mam)= 0.4422(ln[soil])+0.0761	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Mercury	--	1.046 [g]	0.0239 [g]	0.0543	0.0543	1.046	0.192	1.046	General maximum value	0.192	General 90th percentile value
Nickel	ln(mam)= 0.4658(ln[soil])-0.2462	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Selenium	ln(mam)= 0.3764(ln[soil])-0.4158	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)
Silver	(mam)= 0.004(soil)	--	--	--	--	--	--	0.004	Recommended BAF (USEPA 2008)	0.004	Recommended BAF (USEPA 2008)
Zinc	ln(mam)= 0.0706(ln[soil])+4.3632	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2008)	Regression Eq.	Recommended Regression Eq. (USEPA 2008)

Notes: mam (mammal or bird tissue concentration [mg/kg d.w.]); diet (concentration in diet [mg/kg d.w.] assuming 100% earthworm consumption); soil (concentration in soil [mg/kg d.w.]); BAF/BCF (bioaccumulation/bioconcentration factor).
Bird BAF/BCF values were based on the recommended small mammal BAF/BCF values, as bird uptake values are not readily available.

[a] USEPA, 2008, Ecological Soil Screening Level Guidance, Soil to Small Mammal Uptake Equations, OSWER Directive 9285.7-55.

[b] Sample et al., 1998. Development and Validation of Bioaccumulation Models for Small Mammals, ES/ER/TM-219.

[c] General = combination dataset used for insectivore, herbivore, and omnivore receptors to estimate a "general" receptor BAF/BCF value.

[d] "--" indicates that a BAF/BCF is not available or not applicable.

[e] Uptake assumed to be negligible (USEPA, 2008).

[f] Known bioaccumulative organics (TCDD and TCDF) have BAFs/BCFs of 1.1 and 0.13 (median) and 2.2 and 0.16 (maximum) from Sample et al. (1998).
Conservative BAF/BCF default values of 1 and 0.5 were selected for other organics at the site, as they are not expected to be as bioaccumulative as TCDD/TCDF.

[g] Only one BAF/BCF value available for exposure to mercury in soil (median is also 90th percentile value and maximum value).

Table F-26
NOAEL Toxicity Reference Values Used to Derive
Wildlife Toxicity Benchmarks for COPECs at SWMUs 48 and 49

COPEC	Mammalian Data				Avian Data			
	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference
Organics								
2,3,7,8-TCDD	--	0.000001	rat	Sample et al. (1996)	--	0.000014	ring-necked pheasant	Sample et al. (1996)
4,4-DDD	--	0.8	rat	Sample et al. (1996)	--	0.0028	brown pelican	Sample et al. (1996)
4,4-DDT	--	0.8	rat	Sample et al. (1996)	--	0.0028	brown pelican	Sample et al. (1996)
Anthracene	--	65.6	rat	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Aroclor 1254	--	0.14	mink	Sample et al. (1996)	--	0.18	ring-necked pheasant	Sample et al. (1996)
Aroclor - 1260	--	0.14	mink	Based on Aroclor 1254, Sample et al. (1996)	--	0.18	ringed pheasant	Based on Aroclor 1254, Sample et al. (1996)
Benzo(a)anthracene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(a)pyrene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Eisler (1987)
Benzo(b)fluoranthene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(g,h,i)perylene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(k)fluoranthene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Chrysene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Dibenz(a,h)anthracene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Dieldrin		0.015	rat	EcoSSL (EPA, 2010)	--	0.0709	mallard duck	EcoSSL (EPA, 2010)
Endosulfan II	--	0.15	rat	Sample et al. (1996)	--	10.0	gray partridge	Sample et al. (1996)
Endosulfan sulfate	--	0.15	rat	Sample et al. (1996)	--	10.0	gray partridge	Sample et al. (1996)
Endrin	0.92 (LOAEL)	0.092	mouse	Sample et al. (1996)	--	0.3	mallard duck	Sample et al. (1996)
Endrin aldehyde	0.92 (LOAEL)	0.092	mouse	Based on Endrin, Sample et al. (1996)	--	0.3	mallard duck	Based on Endrin, Sample et al. (1996)
Fluoranthene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Fluorene	--	65.6	rat	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler, 1987
Indeno(1,2,3-cd)pyrene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553.0	mallard duck	Based on B(a)P, Eisler (1987)
Phenanthrene	--	65.6	rat	EcoSSL (EPA, 2010)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Pyrene	--	0.615	mouse	EcoSSL (EPA, 2010)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Inorganics								
Arsenic	--	0.126	mouse	Sample et al. (1996)	--	5.14	mallard duck	Sample et al. (1996)
Chromium	--	2,737	rat	Sample et al. (1996)	--	2.66	multiple species	EcoSSL (EPA, 2010)
Copper	--	11.7	mink	Sample et al. (1996)	--	47	chicks	Sample et al. (1996)
Lead	--	8	rat	Sample et al. (1996)	--	3.85	American kestrel	Sample et al. (1996)
Mercury	--	1.0	mink	Sample et al. (1996)	--	0.45	Japanese quail	Sample et al. (1996)
Nickel	--	40	rat	Sample et al. (1996)	--	77.4	mallard duck	Sample et al. (1996)
Selenium	--	0.2	rat	Sample et al. (1996)	--	0.5	mallard duck	Sample et al. (1996)
Silver	222 (LOAEL)	22.2	rat	ATSDR (1990)	--	178.0	mallard duck	Terr. Tox. Database (USACHPPM, 2002)
Zinc	--	160.0	rat	Sample et al. (1996)	--	14.5	hens	Sample et al. (1996)

N/A indicates that the information is not available.

As recommended by Wentsel et al. (1996), Tri-Service Procedural Guidelines for Ecological Risk Assessments, the following adjustments were made to toxicity data when NOAEL or LOAEL data were not available:

- Subchronic LOAELs were converted to chronic NOAELs by dividing by a factor of 20.
- Chronic NOAELs were converted to chronic LOAELs by multiplying by a factor of 5.0.
- Subchronic NOAELs/LOAELs were converted to chronic NOAELs/LOAELs by dividing by a factor of 10.
- Chronic LOAELs were converted to chronic NOAELs by dividing by a factor of 10.
- LD_{50} concentrations were converted to chronic NOAELs by dividing by a factor of 100.
- LD_{50} concentrations were converted to chronic LOAELs by dividing by a factor of 20.

ATSDR, 1990, Toxicological Profile for Silver, U.S. Public Health Service.
Eisler, 1987, PAH Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review.
Sample et al., 1996, Toxicological Benchmarks for Wildlife.
USACHPPM, 2002, Terrestrial Toxicity Database.
USEPA, 1999, SLERA Protocol for Hazardous Waste Combustion Facilities.
USEPA, 2010, Ecological Screening Levels (Eco-SSL).
USEPA, 2010, Integrated Risk Information System (IRIS).

Table F-27
LOAEL Toxicity Reference Values Used to Derive
Wildlife Toxicity Benchmarks for COPECs at SWMUs 48 and 49

COPEC	Mammalian Data				Avian Data			
	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference
Organics								
2,3,7,8-TCDD TE	--	0.00001	rat	Sample et al. (1996)	--	0.00014	ring-necked pheasant	Sample et al. (1996)
4,4-DDD	--	4.0	rat	Sample et al. (1996)	--	0.028	brown pelican	Sample et al. (1996)
4,4-DDT	--	4.0	rat	Sample et al. (1996)	--	0.028	brown pelican	Sample et al. (1996)
Anthracene	--	110	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Eisler (1987)
Aroclor - 1254	--	0.68	mouse	Sample et al. (1996)	--	1.8	ring-necked pheasant	Sample et al. (1996)
Aroclor - 1260	--	0.68	mouse	Based on Arochlor-1254, Sample et al. (1996)	--	1.8	ring-necked pheasant	Based on Arochlor-1254, Sample et. al. (1996)
Benzo(a)anthracene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(a)pyrene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Eisler (1987)
Benzo(b)fluoranthene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(g,h,i)perylene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(k)fluoranthene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Chrysene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Dibenz(a,h)anthracene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Dieldrin	--	0.03	rat	EcoSSL (EPA, 2010)	--	0.122	mallard duck	EcoSSL (EPA, 2010)
Endosulfan II	0.15 (NOAEL)	0.75	rat	Sample et al. (1996)	10 (NOAEL)	50.0	gray partridge	Sample et al. (1996)
Endosulfan sulfate	0.15 (NOAEL)	0.75	rat	Sample et al. (1996)	10 (NOAEL)	50.0	gray partridge	Sample et al. (1996)
Endrin	--	0.92	mouse	Sample et al. (1996)	0.3 (NOAEL)	1.5	mallard duck	Sample et al. (1996)
Endrin aldehyde	--	0.92	mouse	Based on Endrine, Sample et al. (1996)	0.3 (NOAEL)	1.5	mallard duck	Based on Endrine, Sample et al. (1996)
Fluoranthene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Fluorene	--	110	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on Benzo(a)pyrene, Eisler 1987
Indeno(1,2,3-cd)pyrene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Phenanthrene	--	110	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Pyrene	--	3.07	mouse	EcoSSL (EPA, 2010)	553 (NOAEL)	2765	mallard duck	Based on B(a)P, Eisler (1987)
Inorganics								
Arsenic	--	1.26	mouse	Sample et al. (1996)	--	12.84	mallard duck	Sample et al. (1996)
Chromium	2,737 (NOAEL)	13690	rat	Sample et al. (1996)	--	2.78	chicken, black duck, turkey	EcoSSL (EPA, 2010)
Copper	--	15.10	mink	Sample et al. (1996)	--	62	chicks	Sample et al. (1996)
Lead	--	80	rat	Sample et al. (1996)	3.85 (NOAEL)	19.25	American kestrel	Sample et al. (1996)
Mercury	1.0 (NOAEL)	5	mink	Sample et al. (1996)	--	0.9	Japanese quail	Sample et al. (1996)
Nickel	--	80	rat	Sample et al. (1996)	--	107	mallard duck	Sample et al. (1996)
Selenium	--	0.33	rat	Sample et al. (1996)	--	1.0	mallard duck	Sample et al. (1996)
Silver	--	222	rat	ATSDR (1990)	178 (NOAEL)	890	mallard duck	Terr. Tox. Database (USACHPPM, 2002)
Zinc	--	320	rat	Sample et al. (1996)	--	131	hens	Sample et al. (1996)

NA indicates that the information is not available.

As recommended by Wentsel et al. (1996), Tri-Service Procedural Guidelines for Ecological Risk Assessments, the following adjustments were made to toxicity data when NOAEL or LOAEL data were not available:

- Subchronic LOAELs were converted to chronic NOAELs by dividing by a factor of 20.
- Chronic NOAELs were converted to chronic LOAELs by multiplying by a factor of 5.0.
- Subchronic NOAELs/LOAELs were converted to chronic NOAELs/LOAELs by dividing by a factor of 10.
- Chronic LOAELs were converted to chronic NOAELs by dividing by a factor of 10.
- LD_{50} concentrations were converted to chronic NOAELs by dividing by a factor of 100.
- LD_{50} concentrations were converted to chronic LOAELs by dividing by a factor of 20.

ATSDR, 1990, Toxicological Profile for Silver, U.S. Public Health Service.
Eisler, 1987, PAH Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review.
Sample et al., 1996, Toxicological Benchmarks for Wildlife.
USACHPPM, 2002, Terrestrial Toxicity Database.
USEPA, 1999, SLERA Protocol for Hazardous Waste Combustion Faclilties.
USEPA, 2010, Ecological Screening Levels (Eco-SSL).
USEPA, 2010, Integrated Risk Information System (IRIS).

Table F-28
Uncertainty Factors[a] for Ecological TRV[b] Extrapolations[c] at SWMUs 48 and 49

Laboratory Animals (toxicity data base)		Selected Site Receptor Species	
Rat	G: Rattus F: Muridae O: Rodentia	Meadow vole	G: Microtus F: Muridae O: Rodentia
Mouse	G: Mus F: Muridae O: Rodentia	Short-tailed shrew	G: Blarina F: Soricidae O: Insectivora
Mink	G: Mustela F: Mustelidae O: Carnivora	American robin	G: Turdus F: Muscicapidae O: Passeriformes
Pheasant	G: Phasianus F: Phasianidae O: Galliformes	Red-tailed hawk	G: Buteo F: Accipitridae O: Ciconiiformes
American kestrel	G: Falco F: Falconidae O: Ciconiiformes	Red fox	G: Vulpes F: Canidae O: Carnivora
Chick, Hens Poultry	G: Gallus F: Phasianidae O: Galliformes		
Brown pelican	G: Pelecanus F: Pelicanidae O: Pelicaniformes		
Red-winged blackbird	G: Agelaius F: Icteridae O: Passeriformes		
Northern bobwhite	G: Colinus F: Odontophoridae O: Galliformes		
Black duck, Mallard	G: Anas F: Anatidae O: Anseriformes		
Japanese quail	G: Coturnix F: Phasianidae O: Galliformes		

Continued on next page

Table F-28
Uncertainty Factors[a] for Ecological TRV[b] Extrapolations[c] at SWMUs 48 and 49
(Page 2 of 2)

[a] From ***Tri-Service Procedural Guidelines for Ecological Risk Assessment*** (Wentsel et al. 1996)
[b] TRV = Toxicity Reference Value
[c] Interclass extrapolations not performed; only within bird class or within mammal class.

The Uncertainty Factors Used for TRV Extrapolations are Summarized Below:

- Extrapolation between two different species = uncertainty factor of 2
- Extrapolation between two different genera (G) = uncertainty factor of 4
- Extrapolation between two different families (F) or orders (O) = uncertainty factor of 8
- Thus, for all extrapolations used in the SLERA food chain model an uncertainty factor of 8 was used, except for:
    - rat or mouse toxicity values extrapolated to the meadow vole where an uncertainty factor of 4 was used; and

Table F-29
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 48

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	71-55-6	1,1,1-Trichloroethane	--	--	mg/kg	--	0/4	4.80E-03 - 2.00E-01	2.00E-01	2.98E+01	3.00E-01	No
Surface Soil	79-34-5	1,1,2,2-Tetrachloroethane	--	--	mg/kg	--	0/4	4.80E-03 - 2.00E-01	2.00E-01	1.27E-01	3.00E-01	Yes
	79-00-5	1,1,2-Trichloroethane	--	--	mg/kg	--	0/4	4.80E-03 - 3.30E-01	3.30E-01	2.86E+01	3.00E-01	Yes
	75-34-3	1,1-Dichloroethane	--	--	mg/kg	--	0/4	4.80E-03 - 4.90E-01	4.90E-01	2.01E+01	3.00E-01	Yes
	75-35-4	1,1-Dichloroethylene	--	--	mg/kg	--	0/4	4.80E-03 - 2.70E-01	2.70E-01	8.28E+00	NVA	No
	120-82-1	1,2,4-Trichlorobenzene	--	--	mg/kg	--	0/4	1.80E-01 - 2.20E-01	2.20E-01	2.00E+01	1.00E-01	Yes
	107-06-2	1,2-Dichloroethane	--	--	mg/kg	--	0/4	4.80E-03 - 3.20E-01	3.20E-01	2.12E+01	8.70E+02	No
	540-59-0	1,2-Dichloroethene (cis/trans)	--	--	mg/kg	--	0/2	3.20E-01 - 3.20E-01	3.20E-01	8.28E+00	NVA	No
	78-87-5	1,2-Dichloropropane	--	--	mg/kg	--	0/4	4.80E-03 - 5.30E-01	5.30E-01	3.27E+01	NVA	No
	99-35-4	1,3,5-Trinitrobenzene	--	--	mg/kg	--	0/3	1.00E-01 - 1.00E-01	1.00E-01	3.76E-01	NVA	No
	93-76-5	2,4,5-T	--	--	mg/kg	--	0/2	1.10E-01 - 1.06E+00	1.06E+00	5.96E-01	NVA	Yes
	95-95-4	2,4,5-Trichlorophenol	--	--	mg/kg	--	0/4	1.80E-01 - 4.90E-01	4.90E-01	9.00E+00	1.00E-01	Yes
	88-06-2	2,4,6-Trichlorophenol	--	--	mg/kg	--	0/4	6.10E-02 - 1.90E-01	1.90E-01	4.00E+00	1.00E-01	Yes
	94-75-7	2,4-D	--	--	mg/kg	--	0/2	2.12E-01 - 2.20E-01	2.20E-01	2.73E-02	NVA	Yes
	94-82-6	2,4-DB	--	--	mg/kg	--	0/2	1.06E+00 - 1.10E+00	1.10E+00	NVA	NVA	No
	120-83-2	2,4-Dichlorophenol	--	--	mg/kg	--	0/4	6.50E-02 - 1.90E-01	1.90E-01	8.75E+01	1.00E-01	Yes
	105-67-9	2,4-Dimethylphenol	--	--	mg/kg	--	0/4	1.80E-01 - 3.00E+00	3.00E+00	1.00E-02	1.00E-01	Yes
	51-28-5	2,4-Dinitrophenol	--	--	mg/kg	--	0/4	8.80E-01 - 4.70E+00	4.70E+00	2.00E+01	1.00E-01	Yes
	121-14-2	2,4-Dinitrotoluene	--	--	mg/kg	--	0/5	1.80E-01 - 1.40E+00	1.40E+00	1.28E+00	NVA	Yes
	606-20-2	2,6-Dinitrotoluene	--	--	mg/kg	--	0/5	1.80E-01 - 3.20E-01	3.20E-01	3.28E-02	NVA	Yes
	35572-78-2	2-amino-4,6-Dinitrotoluene	--	--	mg/kg	--	0/3	2.00E-01 - 2.00E-01	2.00E-01	5.30E+00	NVA	No
	91-58-7	2-Chloronaphthalene	--	--	mg/kg	--	0/4	1.80E-01 - 2.40E-01	2.40E-01	1.22E-02	NVA	Yes
	95-57-8	2-Chlorophenol	--	--	mg/kg	--	0/4	5.50E-02 - 1.90E-01	1.90E-01	2.43E-01	1.00E-01	Yes
	591-78-6	2-Hexanone	--	--	mg/kg	--	0/4	4.80E-03 - 1.00E+00	1.00E+00	1.26E+01	NVA	No
	91-94-1	3,3-Dichlorobenzidine	--	--	mg/kg	--	0/4	1.80E-01 - 1.60E+00	1.60E+00	6.46E-01	NVA	Yes
	534-52-1	4,6-Dinitro-o-cresol	--	--	mg/kg	--	0/4	8.00E-01 - 9.10E-01	9.10E-01	1.44E-01	NVA	Yes
	19406-51-0	4-amino-2,6-Dinitrotoluene	--	--	mg/kg	--	0/3	2.00E-01 - 2.00E-01	2.00E-01	3.60E+00	NVA	No
	101-55-3	4-Bromophenoxybenzene	--	--	mg/kg	--	0/4	4.10E-02 - 1.90E-01	1.90E-01	NVA	NVA	No
	7005-72-3	4-Chlorophenyl phenyl ether	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	NVA	NVA	No
	83-32-9	Acenaphthene	--	--	mg/kg	--	0/2	1.80E-03 - 1.90E-03	1.90E-03	2.00E+01	1.00E-01	No
	208-96-8	Acenaphthylene	--	--	mg/kg	--	0/2	1.80E-03 - 1.90E-03	1.90E-03	6.82E+02	1.00E-01	No
	67-64-1	Acetone	--	--	mg/kg	--	0/3	4.80E-03 - 3.30E+00	3.30E+00	2.50E+00	NVA	Yes
	107-13-1	Acrylonitrile	--	--	mg/kg	--	0/2	2.00E+00 - 2.00E+00	2.00E+00	2.39E-02	NVA	Yes
	309-00-2	Aldrin	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	3.32E-03	1.00E-01	No
	319-84-6	alpha-BHC	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	9.94E-02	NVA	No
	5103-71-9	alpha-Chlordane	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	2.24E-01	1.00E-01	No
	93-65-2	Anicon B	--	--	mg/kg	--	0/2	1.06E+02 - 1.10E+02	1.10E+02	NVA	NVA	No

Table F-29
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 48

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	12674-11-2	Aroclor 1016	--	--	mg/kg	--	0/2	3.54E-02 - 3.66E-02	3.66E-02	3.71E-01	1.00E-01	No
	11104-28-2	Aroclor 1221	--	--	mg/kg	--	0/2	7.08E-02 - 7.33E-02	7.33E-02	3.71E-01	1.00E-01	No
	11141-16-5	Aroclor 1232	--	--	mg/kg	--	0/2	3.54E-02 - 3.66E-02	3.66E-02	3.71E-01	1.00E-01	No
	53469-21-9	Aroclor 1242	--	--	mg/kg	--	0/2	3.54E-02 - 3.66E-02	3.66E-02	3.71E-01	1.00E-01	No
	12672-29-6	Aroclor 1248	--	--	mg/kg	--	0/2	3.54E-02 - 3.66E-02	3.66E-02	3.71E-01	1.00E-01	No
	11096-82-5	Aroclor 1260	--	--	mg/kg	--	0/2	3.54E-02 - 3.66E-02	3.66E-02	3.71E-01	1.00E-01	No
	71-43-2	Benzene	--	--	mg/kg	--	0/4	4.80E-03 - 1.00E-01	1.00E-01	2.55E-01	1.00E-01	No
	65-85-0	Benzoic Acid	--	--	mg/kg	--	0/2	8.80E-01 - 9.10E-01	9.10E-01	7.30E+00	NVA	No
	100-51-6	Benzyl alcohol	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	6.58E+01	NVA	No
	319-85-7	beta-BHC	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	3.98E-03	NVA	No
	108-60-1	Bis(2-chloro-1-methylethyl) ether	--	--	mg/kg	--	0/4	1.80E-01 - 4.40E-01	4.40E-01	NVA	NVA	No
	111-91-1	bis(2-Chloroethoxy)methane	--	--	mg/kg	--	0/4	1.80E-01 - 1.90E-01	1.90E-01	3.02E-01	NVA	No
	111-44-4	bis(2-Chloroethyl)ether	--	--	mg/kg	--	0/4	1.80E-01 - 3.60E-01	3.60E-01	2.37E+01	NVA	No
	75-27-4	Bromodichloromethane	--	--	mg/kg	--	0/4	4.80E-03 - 2.00E-01	2.00E-01	5.40E-01	4.50E+02	No
	75-25-2	Bromoform	--	--	mg/kg	--	0/4	4.80E-03 - 2.00E-01	2.00E-01	1.59E+01	1.47E+03	No
	85-68-7	Butyl benzyl phthalate	--	--	mg/kg	--	0/4	1.80E-01 - 1.80E+00	1.80E+00	2.39E-01	NVA	Yes
	86-74-8	Carbazole	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	NVA	NVA	No
	75-15-0	Carbon disulfide	--	--	mg/kg	--	0/4	4.80E-03 - 6.00E-01	6.00E-01	9.41E-02	NVA	Yes
	56-23-5	Carbon tetrachloride	--	--	mg/kg	--	0/4	4.80E-03 - 3.10E-01	3.10E-01	2.98E+00	3.00E-01	Yes
	108-90-7	Chlorobenzene	--	--	mg/kg	--	0/4	4.80E-03 - 1.00E-01	1.00E-01	4.00E+01	1.00E-01	No
	75-00-3	Chloroethane	--	--	mg/kg	--	0/4	4.80E-03 - 6.40E-01	6.40E-01	NVA	NVA	No
	67-66-3	Chloroform	--	--	mg/kg	--	0/4	4.80E-03 - 2.40E-01	2.40E-01	1.19E+00	3.00E-01	No
	156-59-2	cis-1,2-Dichloroethylene	--	--	mg/kg	--	0/2	4.80E-03 - 4.90E-03	4.90E-03	7.84E-01	3.00E-01	No
	10061-01-5	cis-1,3-Dichloropropylene	--	--	mg/kg	--	0/4	4.80E-03 - 6.00E-01	6.00E-01	3.98E-01	3.00E-01	Yes
	75-99-0	Dalapon	--	--	mg/kg	--	0/2	1.06E+00 - 1.10E+00	1.10E+00	NVA	NVA	No
	319-86-8	delta-BHC	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	9.94E+00	NVA	No
	132-64-9	Dibenzofuran	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	6.10E+00	NVA	No
	124-48-1	Dibromochloromethane	--	--	mg/kg	--	0/2	4.80E-03 - 4.90E-03	4.90E-03	2.05E+00	NVA	No
	1918-00-9	Dicamba	--	--	mg/kg	--	0/2	2.12E-01 - 2.20E-01	2.20E-01	NVA	NVA	No
	120-36-5	Dichlorprop	--	--	mg/kg	--	0/2	2.12E-01 - 2.20E-01	2.20E-01	NVA	NVA	No
	60-57-1	Dieldrin	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	4.90E-03	1.00E-01	No
	84-66-2	Diethyl phthalate	--	--	mg/kg	--	0/4	1.80E-01 - 2.40E-01	2.40E-01	1.00E+02	NVA	No
	131-11-3	Dimethyl phthalate	--	--	mg/kg	--	0/4	6.30E-02 - 1.90E-01	1.90E-01	7.34E+02	1.00E+01	No
	84-74-2	Di-n-butyl phthalate	--	--	mg/kg	--	0/4	1.80E-01 - 1.30E+00	1.30E+00	2.00E+02	NVA	No
	117-84-0	Di-n-octyl phthalate	--	--	mg/kg	--	0/4	1.80E-01 - 2.30E-01	2.30E-01	7.09E+02	NVA	No
	88-85-7	Dinoseb	--	--	mg/kg	--	0/2	2.12E-01 - 2.20E-01	2.20E-01	2.18E-02	NVA	Yes
	959-98-8	Endosulfan I	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	1.19E-01	NVA	No
	1031-07-8	Endosulfan sulfate	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	3.58E-02	NVA	No
	72-20-8	Endrin	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	1.01E-02	1.00E-01	No
	53494-70-5	Endrin ketone	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	NVA	NVA	No
	100-41-4	Ethylbenzene	--	--	mg/kg	--	0/4	4.80E-03 - 1.90E-01	1.90E-01	5.16E+00	1.00E-01	Yes
	5103-74-2	gamma-Chlordane	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	2.24E-01	1.00E-01	No

Table F-29
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 48

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	76-44-8	Heptachlor	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	5.98E-03	NVA	No
	1024-57-3	Heptachlor epoxide	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	1.52E-01	1.00E-01	No
	118-74-1	Hexachlorobenzene	--	--	mg/kg	--	0/4	8.00E-02 - 1.90E-01	1.90E-01	1.99E-01	NVA	No
	87-68-3	Hexachlorobutadiene	--	--	mg/kg	--	0/4	1.80E-01 - 9.70E-01	9.70E-01	3.98E-02	NVA	Yes
	77-47-4	Hexachlorocyclopentadiene	--	--	mg/kg	--	0/4	1.80E-01 - 5.20E-01	5.20E-01	1.00E+01	NVA	No
	67-72-1	Hexachloroethane	--	--	mg/kg	--	0/4	1.80E-01 - 1.80E+00	1.80E+00	5.96E-01	NVA	Yes
	2691-41-0	HMX	--	--	mg/kg	--	0/5	2.00E-01 - 2.00E+00	2.00E+00	4.30E+01	NVA	No
	78-59-1	Isophorone	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	1.39E+02	NVA	No
	58-89-9	Lindane	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	5.00E-03	1.00E-01	No
	58-89-9	Lindane	--	--	mg/kg	--	0/2	7.08E-04 - 7.33E-04	7.33E-04	5.00E-03	1.00E-01	No
	ICF87	m+p-Xylenes	--	--	mg/kg	--	0/2	9.60E-03 - 9.90E-03	9.90E-03	1.00E+01	1.00E-01	No
	94-74-6	MCPA	--	--	mg/kg	--	0/2	1.06E+02 - 1.10E+02	1.10E+02	NVA	NVA	No
	541-73-1	m-Dichlorobenzene	--	--	mg/kg	--	0/4	4.20E-02 - 1.90E-01	1.90E-01	3.77E+01	NVA	No
	99-65-0	m-Dinitrobenzene	--	--	mg/kg	--	0/3	1.00E-01 - 1.00E-01	1.00E-01	6.55E-01	NVA	No
	74-83-9	Methyl bromide	--	--	mg/kg	--	0/4	4.80E-03 - 2.60E-01	2.60E-01	2.35E-01	NVA	Yes
	74-87-3	Methyl chloride	--	--	mg/kg	--	0/4	4.80E-03 - 9.60E-01	9.60E-01	1.04E+01	NVA	No
	78-93-3	Methyl ethyl ketone	--	--	mg/kg	--	0/4	4.80E-03 - 4.30E+00	4.30E+00	8.96E+01	NVA	No
	108-10-1	Methyl isobutyl ketone (MIBK)	--	--	mg/kg	--	0/4	4.80E-03 - 6.30E-01	6.30E-01	4.43E+02	1.00E+02	No
	75-09-2	Methylene chloride	--	--	mg/kg	--	0/4	4.80E-03 - 4.40E+00	4.40E+00	4.05E+00	3.00E-01	Yes
	99-09-2	m-Nitroaniline	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	3.16E+00	NVA	No
	99-08-1	m-Nitrotoluene	--	--	mg/kg	--	0/3	4.00E-01 - 4.00E-01	4.00E-01	NVA	NVA	No
	98-95-3	Nitrobenzene	--	--	mg/kg	--	0/5	1.80E-01 - 1.80E+00	1.80E+00	1.31E+00	NVA	Yes
	86-30-6	n-Nitrosodiphenylamine	--	--	mg/kg	--	0/4	1.80E-01 - 2.90E-01	2.90E-01	5.45E-01	NVA	No
	621-64-7	N-Nitrosodipropylamine	--	--	mg/kg	--	0/4	1.80E-01 - 1.10E+00	1.10E+00	5.44E-01	NVA	Yes
	95-48-7	o-Cresol	--	--	mg/kg	--	0/4	9.80E-02 - 1.90E-01	1.90E-01	4.04E+01	1.00E-01	Yes
	95-50-1	o-Dichlorobenzene	--	--	mg/kg	--	0/4	4.20E-02 - 1.90E-01	1.90E-01	2.96E+00	1.00E-01	Yes
	88-74-4	o-Nitroaniline	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	7.41E+01	NVA	No
	88-75-5	o-Nitrophenol	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	1.60E+00	1.00E-01	Yes
	88-72-2	o-Nitrotoluene	--	--	mg/kg	--	0/3	4.00E-01 - 4.00E-01	4.00E-01	NVA	NVA	No
	95-47-6	o-Xylene	--	--	mg/kg	--	0/2	4.80E-03 - 4.90E-03	4.90E-03	1.00E+01	1.00E-01	No
	106-47-8	p-Chloroaniline	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	1.10E+00	NVA	No
	59-50-7	p-Chloro-m-cresol	--	--	mg/kg	--	0/4	1.80E-01 - 9.30E-01	9.30E-01	7.95E+00	NVA	No
	87-86-5	PCP	--	--	mg/kg	--	0/4	7.60E-01 - 9.10E-01	9.10E-01	3.00E+00	1.00E-01	Yes
	106-44-5	p-Cresol	--	--	mg/kg	--	0/4	1.80E-01 - 2.40E-01	2.40E-01	1.63E+02	1.00E-01	Yes
	106-46-7	p-Dichlorobenzene	--	--	mg/kg	--	0/4	3.40E-02 - 1.90E-01	1.90E-01	2.00E+01	1.00E-01	Yes
	78-11-5	PETN	--	--	mg/kg	--	0/3	3.18E-01 - 3.30E-01	3.30E-01	1.40E+04	NVA	No
	108-95-2	Phenol	--	--	mg/kg	--	0/4	5.20E-02 - 1.90E-01	1.90E-01	3.00E+01	1.00E-01	Yes
	100-01-6	p-Nitroaniline	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	2.19E+01	NVA	No
	100-02-7	p-Nitrophenol	--	--	mg/kg	--	0/4	8.80E-01 - 3.30E+00	3.30E+00	7.00E+00	1.00E-01	Yes
	99-99-0	p-Nitrotoluene	--	--	mg/kg	--	0/3	4.00E-01 - 4.00E-01	4.00E-01	NVA	NVA	No
	110-86-1	Pyridine	--	--	mg/kg	--	0/2	1.80E-01 - 1.90E-01	1.90E-01	1.03E+00	NVA	No
	121-82-4	RDX	--	--	mg/kg	--	0/5	2.00E-01 - 1.28E+00	1.28E+00	5.80E+00	NVA	No

Table F-29
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 48

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	93-72-1	Silvex	--	--	mg/kg	--	0/2	1.06E-01 - 1.10E-01	1.10E-01	1.09E-01	NVA	Yes
	100-42-5	Styrene	--	--	mg/kg	--	0/4	4.80E-03 - 6.00E-01	6.00E-01	3.00E+02	1.00E-01	Yes
	127-18-4	Tetrachloroethylene	--	--	mg/kg	--	0/4	4.80E-03 - 1.60E-01	1.60E-01	9.92E+00	3.00E-01	No
	479-45-8	Tetryl	--	--	mg/kg	--	0/5	2.00E-01 - 2.11E+00	2.11E+00	2.00E+00	NVA	Yes
	108-88-3	Toluene	--	--	mg/kg	--	0/3	4.80E-03 - 1.00E-01	1.00E-01	2.00E+02	1.00E-01	No
	130-010	Total Petroleum Hydrocarbons	--	--	mg/kg	--	0/2	1.00E+01 - 1.00E+01	1.00E+01	NVA	NVA	No
	8001-35-2	Toxaphene	--	--	mg/kg	--	0/2	3.54E-02 - 3.66E-02	3.66E-02	1.19E-01	NVA	No
	156-60-5	trans-1,2-Dichloroethylene	--	--	mg/kg	--	0/2	4.80E-03 - 4.90E-03	4.90E-03	7.84E-01	3.00E-01	No
	10061-02-6	trans-1,3-Dichloropropene	--	--	mg/kg	--	0/4	4.80E-03 - 6.00E-01	6.00E-01	3.98E-01	3.00E-01	Yes
	79-01-6	Trichloroethylene	--	--	mg/kg	--	0/4	4.80E-03 - 2.30E-01	2.30E-01	1.24E+01	3.00E-01	No
	75-69-4	Trichlorofluoromethane	--	--	mg/kg	--	0/2	2.30E-01 - 2.30E-01	2.30E-01	1.64E+01	NVA	No
	118-96-7	Trinitrotoluene, 2,4,6- (TNT)	--	--	mg/kg	--	0/5	2.00E-01 - 2.00E+00	2.00E+00	NVA	NVA	No
	108-05-4	Vinyl acetate	--	--	mg/kg	--	0/2	1.00E+00 - 1.00E+00	1.00E+00	1.27E+01	NVA	No
	75-01-4	Vinyl Chloride	--	--	mg/kg	--	0/4	4.80E-03 - 1.80E+00	1.80E+00	6.46E-01	3.00E-01	Yes
	1330-20-7	Xylene (total)	--	--	mg/kg	--	0/2	7.80E-01 - 7.80E-01	7.80E-01	1.00E+01	1.00E-01	Yes
	7440-36-0	Antimony	--	--	mg/kg	--	0/4	5.31E-01 - 1.96E+01	1.96E+01	2.70E-01	4.80E-01	Yes
	7440-43-9	Cadmium	--	--	mg/kg	--	0/4	1.06E-01 - 1.20E+00	1.20E+00	3.60E-01	2.50E+00	Yes
	7782-49-2	Selenium	--	--	mg/kg	--	0/4	4.49E-01 - 1.10E+00	1.10E+00	2.10E-01	1.80E+00	Yes
	7440-23-5	Sodium	--	--	mg/kg	--	0/2	1.90E+01 - 2.21E+01	2.21E+01	Nutrient	NVA	No

(1) Maximum non-detect limit value used for screening.
(2) Screening toxicity values from USEPA EcoSSLs (2010); Efroymson et al., PRGs (1997); and USEPA Region 5 ESLs (2003).
(3) Screening toxicity values from USEPA Region III BTAG Screening Table (September, 1995).

Definitions: N/A = Not Applicable or Not Available
NVA = No Value Available

Table F-30
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 49

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
Surface Soil	71-55-6	1,1,1-Trichloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.98E+01	3.00E-01	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	1.27E-01	3.00E-01	No
	79-00-5	1,1,2-Trichloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.86E+01	3.00E-01	No
	75-34-3	1,1-Dichloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.01E+01	3.00E-01	No
	75-35-4	1,1-Dichloroethene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	8.28E+00	NVA	No
	120-82-1	1,2,4-Trichlorobenzene			mg/kg		0/9	1.80E-01 - 2.20E-01	2.20E-01	2.00E+01	1.00E-01	Yes
	95-50-1	1,2-Dichlorobenzene			mg/kg		0/9	4.20E-02 - 2.00E-01	2.00E-01	2.96E+00	1.00E-01	Yes
	107-06-2	1,2-Dichloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.12E+01	8.70E+02	No
	78-87-5	1,2-Dichloropropane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	3.27E+01	NVA	No
	99-35-4	1,3,5-Trinitrobenzene			mg/kg		0/6	1.00E-01 - 2.40E-01	2.40E-01	3.76E-01	NVA	No
	541-73-1	1,3-Dichlorobenzene			mg/kg		0/9	4.20E-02 - 2.00E-01	2.00E-01	3.77E+01	NVA	No
	99-65-0	1,3-Dinitrobenzene			mg/kg		0/6	1.00E-01 - 2.40E-01	2.40E-01	6.55E-01	NVA	No
	106-46-7	1,4-Dichlorobenzene			mg/kg		0/9	3.40E-02 - 2.00E-01	2.00E-01	2.00E+01	1.00E-01	Yes
	93-76-5	2,4,5-T			mg/kg		0/6	7.20E-03 - 1.16E-01	1.16E-01	5.96E-01	NVA	No
	93-72-1	2,4,5-TP (Silvex)			mg/kg		0/6	1.40E-02 - 1.16E-01	1.16E-01	1.09E-01	NVA	Yes
	95-95-4	2,4,5-Trichlorophenol			mg/kg		0/9	1.80E-01 - 4.90E-01	4.90E-01	9.00E+00	1.00E-01	Yes
	88-06-2	2,4,6-Trichlorophenol			mg/kg		0/9	6.10E-02 - 2.00E-01	2.00E-01	4.00E+00	1.00E-01	Yes
	118-96-7	2,4,6-Trinitrotoluene			mg/kg		0/6	2.00E-01 - 2.40E-01	2.40E-01	NVA	NVA	No
	94-75-7	2,4-D			mg/kg		0/6	3.60E-02 - 2.33E-01	2.33E-01	2.73E-02	NVA	Yes
	120-83-2	2,4-Dichlorophenol			mg/kg		0/9	6.50E-02 - 2.00E-01	2.00E-01	8.75E+01	1.00E-01	Yes
	105-67-9	2,4-Dimethylphenol			mg/kg		0/9	1.80E-01 - 3.00E+00	3.00E+00	1.00E-02	1.00E-01	Yes
	51-28-5	2,4-Dinitrophenol			mg/kg		0/9	9.10E-01 - 4.70E+00	4.70E+00	2.00E+01	1.00E-01	Yes
	121-14-2	2,4-Dinitrotoluene			mg/kg		0/9	1.80E-01 - 1.40E+00	1.40E+00	1.28E+00	NVA	Yes
	606-20-2	2,6-Dinitrotoluene			mg/kg		0/9	1.80E-01 - 3.20E-01	3.20E-01	3.28E-02	NVA	Yes
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/kg		0/6	2.00E-01 - 2.40E-01	2.40E-01	5.30E+00	NVA	No
	78-93-3	2-Butanone			mg/kg		0/6	5.20E-03 - 4.60E-02	4.60E-02	8.96E+01	NVA	No
	91-58-7	2-Chloronaphthalene			mg/kg		0/9	1.80E-01 - 2.40E-01	2.40E-01	1.22E-02	NVA	Yes
	95-57-8	2-Chlorophenol			mg/kg		0/9	5.50E-02 - 2.00E-01	2.00E-01	2.43E-01	1.00E-01	Yes
	591-78-6	2-Hexanone			mg/kg		0/6	5.20E-03 - 4.60E-02	4.60E-02	1.26E+01	NVA	No
	88-74-4	2-Nitroaniline			mg/kg		0/6	1.90E-01 - 3.80E-01	3.80E-01	7.41E+01	NVA	No
	88-75-5	2-Nitrophenol			mg/kg		0/6	1.80E-01 - 2.00E-01	2.00E-01	1.60E+00	1.00E-01	Yes
	88-72-2	2-Nitrotoluene			mg/kg		0/6	2.10E-01 - 4.00E-01	4.00E-01	NVA	NVA	No
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/kg		0/6	7.20E-03 - 2.33E-01	2.33E-01	2.18E-02	NVA	Yes
	N/A	3&4-Methylphenol			mg/kg		0/4	1.80E-01 - 1.90E-01	1.90E-01	NVA	NVA	No
	91-94-1	3,3'-Dichlorobenzidine			mg/kg		0/9	1.90E-01 - 1.60E+00	1.60E+00	6.46E-01	NVA	Yes
	99-09-2	3-Nitroaniline			mg/kg		0/6	1.90E-01 - 3.80E-01	3.80E-01	3.16E+00	NVA	No
	99-08-1	3-Nitrotoluene			mg/kg		0/6	2.10E-01 - 4.00E-01	4.00E-01	NVA	NVA	No

Table F-30
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 49

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	72-55-9	4,4'-DDE			mg/kg		0/5	7.76E-04 - 1.90E-02	1.90E-02	5.96E-01	1.00E-01	No
	50-29-3	4,4'-DDT			mg/kg		0/6	7.38E-04 - 3.85E-02	3.85E-02	1.75E-02	1.00E-01	Yes
	534-52-1	4,6-Dinitro-o-cresol			mg/kg		0/9	3.60E-01 - 9.70E-01	9.70E-01	1.44E-01	NVA	Yes
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/kg		0/6	2.00E-01 - 2.40E-01	2.40E-01	3.60E+00	NVA	No
	101-55-3	4-Bromophenyl phenylether			mg/kg		0/9	4.10E-02 - 2.00E-01	2.00E-01	NVA	NVA	No
	7005-72-3	4-Chlorophenyl phenylether			mg/kg		0/6	1.80E-01 - 2.00E-01	2.00E-01	NVA	NVA	No
	108-10-1	4-Methyl-2-pentanone			mg/kg		0/6	5.20E-03 - 4.60E-02	4.60E-02	4.43E+02	1.00E+02	No
	100-01-6	4-Nitroaniline			mg/kg		0/6	1.90E-01 - 3.80E-01	3.80E-01	2.19E+01	NVA	No
	100-02-7	4-Nitrophenol			mg/kg		0/9	9.10E-01 - 3.30E+00	3.30E+00	7.00E+00	1.00E-01	Yes
	99-99-0	4-Nitrotoluene			mg/kg		0/6	2.10E-01 - 4.00E-01	4.00E-01	NVA	NVA	No
	83-32-9	Acenaphthene			mg/kg		0/6	1.90E-03 - 3.05E-01	3.05E-01	2.00E+01	1.00E-01	Yes
	208-96-8	Acenaphthylene			mg/kg		0/6	1.90E-03 - 3.05E-01	3.05E-01	6.82E+02	1.00E-01	Yes
	309-00-2	Aldrin			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	3.32E-03	1.00E-01	Yes
	319-84-6	alpha-BHC			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	9.94E-02	NVA	No
	5103-71-9	alpha-Chlordane			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	2.24E-01	1.00E-01	No
	7440-36-0	Antimony			mg/kg		0/5	5.53E-01 - 1.96E+01	1.96E+01	2.70E-01	4.80E-01	Yes
	12674-11-2	Aroclor 1016			mg/kg		0/6	1.90E-02 - 3.88E-02	3.88E-02	3.71E-01	1.00E-01	No
	11104-28-2	Aroclor 1221			mg/kg		0/6	1.90E-02 - 7.76E-02	7.76E-02	3.71E-01	1.00E-01	No
	11141-16-5	Aroclor 1232			mg/kg		0/6	1.90E-02 - 3.88E-02	3.88E-02	3.71E-01	1.00E-01	No
	53469-21-9	Aroclor 1242			mg/kg		0/6	1.90E-02 - 3.88E-02	3.88E-02	3.71E-01	1.00E-01	No
	12672-29-6	Aroclor 1248			mg/kg		0/6	1.90E-02 - 3.88E-02	3.88E-02	3.71E-01	1.00E-01	No
	71-43-2	Benzene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.55E-01	1.00E-01	No
	65-85-0	Benzoic Acid			mg/kg		0/5	9.10E-01 - 9.70E-01	9.70E-01	7.30E+00	NVA	No
	100-51-6	Benzyl alcohol			mg/kg		0/6	1.80E-01 - 2.00E-01	2.00E-01	6.58E+01	NVA	No
	319-85-7	beta-BHC			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	3.98E-03	NVA	Yes
	111-91-1	bis(2-Chloroethoxy)methane			mg/kg		0/9	1.80E-01 - 2.00E-01	2.00E-01	3.02E-01	NVA	No
	111-44-4	bis(2-Chloroethyl)ether			mg/kg		0/9	1.80E-01 - 3.60E-01	3.60E-01	2.37E+01	NVA	No
	108-60-1	bis(2-Chloroisopropyl)ether			mg/kg		0/9	1.80E-01 - 4.40E-01	4.40E-01	NVA	NVA	No
	75-27-4	Bromodichloromethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	5.40E-01	4.50E+02	No
	74-83-9	Bromomethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.35E-01	NVA	No
	85-68-7	Butyl benzyl phthalate			mg/kg		0/9	1.90E-01 - 1.80E+00	1.80E+00	2.39E-01	NVA	Yes
	7440-43-9	Cadmium			mg/kg		0/9	5.50E-02 - 1.20E+00	1.20E+00	3.60E-01	2.50E+00	Yes
	86-74-8	Carbazole			mg/kg		0/6	1.80E-01 - 2.00E-01	2.00E-01	NVA	NVA	No
	75-15-0	Carbon disulfide			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	9.41E-02	NVA	No
	56-23-5	Carbon tetrachloride			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.98E+00	3.00E-01	No
	108-90-7	Chlorobenzene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	4.00E+01	1.00E-01	No
	75-00-3	Chloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	NVA	NVA	No
	75-00-3	Chloroethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	NVA	NVA	No
	67-66-3	Chloroform			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	1.19E+00	3.00E-01	No
	74-87-3	Chloromethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	1.04E+01	NVA	No
	156-59-2	cis-1,2-Dichloroethene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	7.84E-01	3.00E-01	No
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	3.98E-01	3.00E-01	No

Table F-30
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 49

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	121-82-4	Cyclonite			mg/kg		0/6	2.00E-01 - 2.40E-01	2.40E-01	5.80E+00	NVA	No
	75-99-0	Dalapon			mg/kg		0/6	3.60E-02 - 1.16E+00	1.16E+00	NVA	NVA	No
	319-86-8	delta-BHC			mg/kg		0/5	7.38E-04 - 9.65E-03	9.65E-03	9.94E+00	NVA	No
	132-64-9	Dibenzofuran			mg/kg		0/6	1.80E-01 - 2.00E-01	2.00E-01	6.10E+00	NVA	No
	124-48-1	Dibromochloromethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.05E+00	NVA	No
	1918-00-9	Dicamba			mg/kg		0/6	7.20E-03 - 2.33E-01	2.33E-01	NVA	NVA	No
	120-36-5	Dichloroprop			mg/kg		0/6	3.60E-02 - 2.33E-01	2.33E-01	NVA	NVA	No
	84-66-2	Diethyl phthalate			mg/kg		0/9	1.90E-01 - 3.80E-01	3.80E-01	1.00E+02	NVA	No
	131-11-3	Dimethylphthalate			mg/kg		0/9	6.30E-02 - 3.80E-01	3.80E-01	7.34E+02	1.00E+01	No
	117-84-0	Di-n-octyl phthalate			mg/kg		0/9	1.90E-01 - 3.80E-01	3.80E-01	7.09E+02	NVA	No
	959-98-8	Endosulfan I			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	1.19E-01	NVA	No
	53494-70-5	Endrin ketone			mg/kg		0/6	7.38E-04 - 1.90E-02	1.90E-02	NVA	NVA	No
	100-41-4	Ethylbenzene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	5.16E+00	1.00E-01	No
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	5.00E-03	1.00E-01	Yes
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	5.00E-03	1.00E-01	Yes
	5103-74-2	gamma-Chlordane			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	2.24E-01	1.00E-01	No
	76-44-8	Heptachlor			mg/kg		0/6	7.38E-04 - 1.90E-02	1.90E-02	5.98E-03	NVA	Yes
	1024-57-3	Heptachlor epoxide			mg/kg		0/6	7.38E-04 - 9.65E-03	9.65E-03	1.52E-01	1.00E-01	No
	118-74-1	Hexachlorobenzene			mg/kg		0/9	8.00E-02 - 2.00E-01	2.00E-01	1.99E-01	NVA	Yes
	87-68-3	Hexachlorobutadiene			mg/kg		0/9	1.80E-01 - 9.70E-01	9.70E-01	3.98E-02	NVA	Yes
	77-47-4	Hexachlorocyclopentadiene			mg/kg		0/9	1.80E-01 - 5.20E-01	5.20E-01	1.00E+01	NVA	No
	67-72-1	Hexachloroethane			mg/kg		0/9	1.80E-01 - 1.80E+00	1.80E+00	5.96E-01	NVA	Yes
	2691-41-0	HMX			mg/kg		0/6	2.00E-01 - 2.40E-01	2.40E-01	4.30E+01	NVA	No
	78-59-1	Isophorone			mg/kg		0/6	1.80E-01 - 2.00E-01	2.00E-01	1.39E+02	NVA	No
	ICF87	m+p-Xylenes			mg/kg		0/6	1.00E-02 - 1.80E-02	1.80E-02	1.00E+01	1.00E-01	No
	94-74-6	MCPA			mg/kg		0/6	1.80E-01 - 1.16E+02	1.16E+02	NVA	NVA	No
	93-65-2	MCPP			mg/kg		0/6	1.80E-01 - 1.16E+02	1.16E+02	NVA	NVA	No
	72-43-5	Methoxychlor			mg/kg		0/6	7.38E-04 - 3.85E-02	3.85E-02	1.99E-02	1.00E-01	Yes
	75-09-2	Methylene chloride			mg/kg		0/6	5.20E-03 - 1.80E-02	1.80E-02	4.05E+00	3.00E-01	No
	91-20-3	Naphthalene			mg/kg		0/9	1.90E-01 - 7.40E-01	7.40E-01	9.94E-02	1.00E-01	Yes
	98-95-3	Nitrobenzene			mg/kg		0/9	1.80E-01 - 1.80E+00	1.80E+00	1.31E+00	NVA	Yes
	55-63-0	Nitroglycerin			mg/kg		0/6	3.32E-01 - 1.90E+00	1.90E+00	1.50E+02f	NVA	No
	621-64-7	n-Nitroso-di-n-propylamine			mg/kg		0/9	1.80E-01 - 1.10E+00	1.10E+00	5.44E-01	NVA	Yes
	86-30-6	n-Nitrosodiphenylamine			mg/kg		0/9	1.80E-01 - 2.90E-01	2.90E-01	5.45E-01	NVA	No
	95-48-7	o-Cresol			mg/kg		0/9	9.80E-02 - 2.00E-01	2.00E-01	4.04E+01	1.00E-01	Yes
	95-47-6	o-Xylene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	1.00E+01	1.00E-01	No
	106-47-8	p-Chloroaniline			mg/kg		0/6	1.90E-01 - 3.80E-01	3.80E-01	1.10E+00	NVA	No
	106-44-5	p-Cresol			mg/kg		0/5	1.90E-01 - 2.40E-01	2.40E-01	1.63E+02	1.00E-01	Yes
	87-86-5	Pentachlorophenol			mg/kg		0/9	7.60E-01 - 9.70E-01	9.70E-01	3.00E+00	1.00E-01	Yes
	78-11-5	Pentaerythritol tetranitrate			mg/kg		0/6	3.32E-01 - 1.90E+00	1.90E+00	1.40E+04	NVA	No
	108-95-2	Phenol			mg/kg		0/9	5.20E-02 - 2.00E-01	2.00E-01	3.00E+01	1.00E-01	Yes
	110-86-1	Pyridine			mg/kg		0/2	1.90E-01 - 2.00E-01	2.00E-01	1.03E+00	NVA	No

Table F-30
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 49

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	7440-23-5	Sodium			mg/kg		0/6	1.70E+01 - 7.84E+01	7.84E+01	Nutrient	NVA	No
	100-42-5	Styrene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	3.00E+02	1.00E-01	No
	127-18-4	Tetrachloroethene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	9.92E+00	3.00E-01	No
	479-45-8	Tetryl			mg/kg		0/6	2.00E-01 - 4.70E-01	4.70E-01	2.00E+00	NVA	No
	108-88-3	Toluene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	2.00E+02	1.00E-01	No
	8001-35-2	Toxaphene			mg/kg		0/6	3.68E-02 - 4.80E-01	4.80E-01	1.19E-01	NVA	Yes
	156-60-5	trans-1,2-Dichloroethene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	7.84E-01	3.00E-01	No
	10061-02-6	trans-1,3-Dichloropropene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	3.98E-01	3.00E-01	No
	75-25-2	Tribromomethane			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	1.59E+01	1.47E+03	No
	79-01-6	Trichloroethene			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	1.24E+01	3.00E-01	No
	75-01-4	Vinyl Chloride			mg/kg		0/6	5.20E-03 - 9.20E-03	9.20E-03	6.46E-01	3.00E-01	No

(1) Maximum non-detect limit value used for screening.
(2) Screening toxicity values from USEPA EcoSSLs (2010); Efroymson et al., PRGs (1997); and USEPA Region 5 ESLs (2003).
(3) Screening toxicity values from USEPA Region III BTAG Screening Table (September, 1995).

Definitions: N/A = Not Applicable or Not Available
NVA = No Value Available

Table F-31
Selection of Ecological Soil Screening Toxicity Values, for Non Detect Constituents, for SWMUs 48 and 49

Parameter	Ecological Soil Screening Levels[a] (mg/kg)	Ecological Preliminary Remediation Goals[b] (mg/kg)	Ecological Screening Levels[c] (mg/kg)	Other Ecological Soil Screening Levels[d] (mg/kg)	Selected Ecological Screening Toxicity Value[e] (mg/kg)
1,1,1-Trichloroethane	NVA	NVA	2.98E+01	--	2.98E+01
1,1,2,2-Tetrachloroethane	NVA	NVA	1.27E-01	--	1.27E-01
1,1,2-Trichloroethane	NVA	NVA	2.86E+01	--	2.86E+01
1,1-Dichloroethane	NVA	NVA	2.01E+01	--	2.01E+01
1,1-Dichloroethene	NVA	NVA	8.28E+00	--	8.28E+00
1,2,4-Trichlorobenzene	NVA	$20_{(earthworm)}$	1.11E+01	--	2.00E+01
1,2-Dichlorobenzene	NVA	NVA	2.96E+00	--	2.96E+00
1,2-Dichloroethane	NVA	NVA	2.12E+01	--	2.12E+01
1,2-Dichloroethene (total)	NVA	NVA	8.28E+00	--	8.28E+00
1,2-Dichloropropane	NVA	NVA	3.27E+01	--	3.27E+01
1,3,5-Trinitrobenzene	NVA	NVA	3.76E-01	--	3.76E-01
1,3-Dichlorobenzene	NVA	NVA	3.77E+01	--	3.77E+01
1,3-Dinitrobenzene	NVA	NVA	6.55E-01	--	6.55E-01
1,4-Dichlorobenzene	NVA	$20_{(earthworm)}$	5.46E-01	--	2.00E+01
2,4,5-Trichlorophenol	NVA	$9_{(earthworm)}$	1.41E+01	--	9.00E+00
2,4,5-T	NVA	NVA	5.96E-01	--	5.96E-01
2,4,5-TP (Silvex)	NVA	NVA	1.09E-01	--	1.09E-01
2,4,6-Trichlorophenol	NVA	$4_{(plant)}$	9.94E+00	--	4.00E+00
2,4,6-Trinitrotoluene	NVA	NVA	NVA	NVA	NVA
2,4-Dinitrotoluene	NVA	NVA	1.28E+00	--	1.28E+00
2,6-Dinitrotoluene	NVA	NVA	3.28E-02	--	3.28E-02
2,4-D	NVA	NVA	2.73E-02	--	2.73E-02
2,4-DB	NVA	NVA	NVA	NVA	NVA
2,4-Dichlorophenol	NVA	NVA	8.75E+01	--	8.75E+01
2,4-Dimethylphenol	NVA	NVA	1.00E-02	--	1.00E-02
2,4-Dinitrophenol	NVA	$20_{(plant)}$	6.09E-02	--	2.00E+01
2-amino-4,6-Dinitrotoluene	NVA	NVA	NVA	5.30E+00	5.30E+00
2-Butanone	NVA	NVA	8.96E+01	--	8.96E+01
2-Chloronaphthalene	NVA	NVA	1.22E-02	--	1.22E-02
2-Chlorophenol	NVA	NVA	2.43E-01	--	2.43E-01
2-Hexanone	NVA	NVA	1.26E+01	--	1.26E+01
2-Nitroaniline	NVA	NVA	7.41E+01	--	7.41E+01
2-Nitrophenol	NVA	NVA	1.60E+00	--	1.60E+00
2-Nitrotoluene	NVA	NVA	NVA	NVA	NVA
2-sec-butyl-4,6-dinitrophenol	NVA	NVA	2.18E-02	--	2.18E-02
3,3'-Dichlorobenzidine	NVA	NVA	6.46E-01	--	6.46E-01
3-Nitroaniline	NVA	NVA	3.16E+00	--	3.16E+00
3-Nitrotoluene	NVA	NVA	NVA	NVA	NVA
3&4-Methylphenol	NVA	NVA	7.95E+00	--	7.95E+00
4,4'-DDE	NVA	NVA	5.96E-01	--	5.96E-01
4,4'-DDT	NVA	NVA	1.75E-02	--	1.75E-02
4,6-Dinitro-o-cresol	NVA	NVA	1.44E-01	--	1.44E-01
4-amino-2,6-Dinitrotoluene	NVA	NVA	NVA	3.60E+00	3.60E+00
4-Bromophenyl phenylether	NVA	NVA	NVA	NVA	NVA
4-Chlorophenyl phenylether	NVA	NVA	NVA	NVA	NVA
4-Methyl-2-pentanone	NVA	NVA	4.43E+02	--	4.43E+02
4-Nitroaniline	NVA	NVA	2.19E+01	--	2.19E+01

Table F-31
Selection of Ecological Soil Screening Toxicity Values, for Non Detect Constituents, for SWMUs 48 and 49

Parameter	Ecological Soil Screening Levels[a] (mg/kg)	Ecological Preliminary Remediation Goals[b] (mg/kg)	Ecological Screening Levels[c] (mg/kg)	Other Ecological Soil Screening Levels[d] (mg/kg)	Selected Ecological Screening Toxicity Value[e] (mg/kg)
4-Nitrophenol	NVA	$7_{(earthworm)}$	5.12E+00	--	7.00E+00
4-Nitrotoluene	NVA	NVA	NVA	NVA	NVA
Acenaphthene	NVA	20(plant)	6.82E+02	--	2.00E+01
Acenaphthylene	NVA	NVA	6.82E+02	--	6.82E+02
Acetone	NVA	NVA	2.50E+00	--	2.50E+00
Acrylonitrile	NVA	NVA	2.39E-02	--	2.39E-02
Aldrin	NVA	NVA	3.32E-03	--	3.32E-03
alpha-BHC	NVA	NVA	9.94E-02	--	9.94E-02
alpha-Chlordane	NVA	NVA	2.24E-01	--	2.24E-01
Antimony	$0.27_{(mammal)}$	5(plant)	1.42E-01	--	2.70E-01
Aroclor 1016	NVA	$0.371_{(mammal)}$	3.32E-04	--	3.71E-01
Aroclor 1221	NVA	$0.371_{(mammal)}$	3.32E-04	--	3.71E-01
Aroclor 1232	NVA	$0.371_{(mammal)}$	3.32E-04	--	3.71E-01
Aroclor 1242	NVA	$0.371_{(mammal)}$	3.32E-04	--	3.71E-01
Aroclor 1248	NVA	$0.371_{(mammal)}$	3.32E-04	--	3.71E-01
Aroclor 1260	NVA	$0.371_{(mammal)}$	3.32E-04	--	3.71E-01
Benzene	NVA	NVA	2.55E-01	--	2.55E-01
Benzoic acid	NVA	NVA	NVA	7.3[f]	7.3
Benzyl alcohol	NVA	NVA	6.58E+01	--	6.58E+01
beta-BHC	NVA	NVA	3.98E-03	--	3.98E-03
bis(2-Chloroethoxy)methane	NVA	NVA	3.02E-01	--	3.02E-01
bis(2-Chloroethyl)ether	NVA	NVA	2.37E+01	--	2.37E+01
bis(2-Chloroisopropyl)ether	NVA	NVA	NVA	NVA	NVA
Bromodichloromethane	NVA	NVA	5.40E-01	--	5.40E-01
Bromomethane	NVA	NVA	2.35E-01	--	2.35E-01
Butyl benzyl phthalate	NVA	NVA	2.39E-01	--	2.39E-01
Cadmium	$0.36_{(mammal)}$	NVA	2.22E-03	--	3.60E-01
Carbazole	NVA	NVA	NVA	NVA	NVA
Carbon disulfide	NVA	NVA	9.41E-02	--	9.41E-02
Carbon tetrachloride	NVA	NVA	2.98E+00	--	2.98E+00
Chlorobenzene	NVA	$40_{(earthworm)}$	1.31E+01	--	4.00E+01
Chloroethane	NVA	NVA	NVA	NVA	NVA
Chloroform	NVA	NVA	1.19E+00	--	1.19E+00
Chloromethane	NVA	NVA	1.04E+01	--	1.04E+01
cis-1,2-Dichloroethene	NVA	NVA	7.84E-01	--	7.84E-01
cis-1,3-Dichloro-1-propene	NVA	NVA	3.98E-01	--	3.98E-01
Cyclonite	$5.8_{(mammal)}$	NVA	NVA	--	5.80E+00
Dalapon	NVA	NVA	NVA	NVA	NVA
delta-BHC	NVA	NVA	9.94E+00	--	9.94E+00
Dibenzofuran	NVA	NVA	NVA	6.1	6.1
Dibromochloromethane	NVA	NVA	2.05E+00	--	2.05E+00
Dicamba	NVA	NVA	NVA	NVA	NVA
Dichloroprop	NVA	NVA	NVA	NVA	NVA
Dieldrin	$0.0049_{(mammal)}$	NVA	2.38E-03	--	4.90E-03
Diethyl phthalate	NVA	$100_{(plant)}$	2.48E+01	--	1.00E+02
Dimethylphthalate	NVA	NVA	7.34E+02	--	7.34E+02

Table F-31
Selection of Ecological Soil Screening Toxicity Values, for Non Detect Constituents, for SWMUs 48 and 49

Parameter	Ecological Soil Screening Levels[a] (mg/kg)	Ecological Preliminary Remediation Goals[b] (mg/kg)	Ecological Screening Levels[c] (mg/kg)	Other Ecological Soil Screening Levels[d] (mg/kg)	Selected Ecological Screening Toxicity Value[e] (mg/kg)
Di-n-butyl phthalate	NVA	2.00E+02	1.50E-01	--	2.00E+02
Di-n-octyl phthalate	NVA	NVA	7.09E+02	--	7.09E+02
Endosulfan I	NVA	NVA	1.19E-01	--	1.19E-01
Endosulfan sulfate	NVA	NVA	3.58E-02	--	3.58E-02
Endrin	NVA	NVA	1.01E-02	--	1.01E-02
Endrin ketone	NVA	NVA	NVA	NVA	NVA
Ethylbenzene	NVA	NVA	5.16E+00	--	5.16E+00
gamma-BHC (Lindane)	NVA	NVA	5.00E-03	--	5.00E-03
gamma-Chlordane	NVA	NVA	2.24E-01	--	2.24E-01
Heptachlor	NVA	NVA	5.98E-03	--	5.98E-03
Heptachlor epoxide	NVA	NVA	1.52E-01	--	1.52E-01
Hexachlorobenzene	NVA	NVA	1.99E-01	--	1.99E-01
Hexachlorobutadiene	NVA	NVA	3.98E-02	--	3.98E-02
Hexachlorocyclopentadiene	NVA	$10_{(plant)}$	7.55E-01	--	1.00E+01
Hexachloroethane	NVA	NVA	5.96E-01	--	5.96E-01
HMX	NVA	NVA	NVA	4.30E+01	4.30E+01
Isophorone	NVA	NVA	1.39E+02	--	1.39E+02
MCPA	NVA	NVA	NVA	NVA	NVA
MCPP	NVA	NVA	NVA	NVA	NVA
Methoxychlor	NVA	NVA	1.99E-02	--	1.99E-02
Methylene chloride	NVA	NVA	4.05E+00	--	4.05E+00
Naphthalene	NVA	NVA	9.94E-02	--	9.94E-02
Nitrobenzene	NVA	NVA	1.31E+00	--	1.31E+00
Nitroglycerin	NVA	NVA	NVA	--	1.50E+02[f]
n-Nitroso-di-n-propylamine	NVA	NVA	5.44E-01	--	5.44E-01
n-Nitrosodiphenylamine	NVA	NVA	5.45E-01	--	5.45E-01
o-Cresol	NVA	NVA	4.04E+01	--	4.04E+01
o-Xylene	NVA	NVA	1.00E+01	--	1.00E+01
p-Chloroaniline	NVA	NVA	1.10E+00	--	1.10E+00
p-Cresol	NVA	NVA	1.63E+02	--	1.63E+02
Pentachlorophenol	NVA	$3_{(plant)}$	1.19E-01	--	3.00E+00
Pentaerythritol tetranitrate	NVA	NVA	NVA	1.40E+04	1.40E+04
Phenol	NVA	$30_{(earthworm)}$	1.20E+02	--	3.00E+01
Pyridine	NVA	NVA	1.03E+00	--	1.03E+00
Selenium	$0.52_{(plant)}$	$0.21_{(mammal)}$	2.76E-02	--	2.10E-01
Sodium	NVA	NVA	NVA	NVA	Nutrient
Styrene	NVA	$300_{(plant)}$	4.69E+00	--	3.00E+02
Tetrachloroethene	NVA	NVA	9.92E+00	--	9.92E+00
Tetryl	NVA	NVA	NVA	2.00E+00	2.00E+00
Toluene	NVA	$200_{(plant)}$	5.45	--	200
Total Petroleum Hydrocarbons	NVA	NVA	NVA	NVA	NVA
Toxaphene	NVA	NVA	1.19E-01	--	1.19E-01
trans-1,2-Dichloroethene	NVA	NVA	7.84E-01	--	7.84E-01
trans-1,3-Dichloropropene	NVA	NVA	3.98E-01	--	3.98E-01
Tribromomethane	NVA	NVA	1.59E+01	--	1.59E+01
Trichloroethene	NVA	NVA	1.24E+01	--	1.24E+01
Trichlorofluoromethane	NVA	NVA	1.64E+01	--	1.64E+01

Table F-31
Selection of Ecological Soil Screening Toxicity Values, for Non Detect Constituents, for SWMUs 48 and 49

Parameter	Ecological Soil Screening Levels[a] (mg/kg)	Ecological Preliminary Remediation Goals[b] (mg/kg)	Ecological Screening Levels[c] (mg/kg)	Other Ecological Soil Screening Levels[d] (mg/kg)	Selected Ecological Screening Toxicity Value[e] (mg/kg)
Vinyl acetate	NVA	NVA	1.27E+01	--	1.27E+01
Vinyl Chloride	NVA	NVA	6.46E-01	--	6.46E-01
m+p-Xylenes	NVA	NVA	1.00E+01	--	1.00E+01
Xylenes (total)	NVA	NVA	1.00E+01	--	1.00E+01

[a] Ecological Soil Screening Level Guidance, USEPA, 2008.

[b] Preliminary Remediation Goals for Ecological Endpoints, R.A. Efroymson et al., August 1997.

[c] Ecological Screening Levels, USEPA Region 5, August 2003.

[d] Other Values.

[e] The following hierarchy was utilized to select the final Ecological Screening Toxicity Values for this assessment:

1. The lower value of either the Ecological Soil Screening Level Guidance or the Preliminary Remediation Goals for Ecological Endpoints.
2. Ecological Screening Levels, USEPA Region 5
3. Other Values.

NVA = No Value Available

[f] Value is from Los Alamos National Laboratory, 2002, Environmental Restoration Project, Environmental Screening Levels.