



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

January 7, 2014

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

Bob Winstead
Environmental Manager
BAE Systems Ordnance Systems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

VIA Electronic Mail

Re: Radford Army Ammunition Plant, Radford, Virginia
Solid Waste Management Unit 40
Landfill Nitro Area
Annual Long Term Monitoring Report

Dear Mr. McKenna and Mr. Winstead:

The U.S. Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) have reviewed the U.S. Army's (Army's) Solid Waste Management Unit 40 (SWMU), Landfill Nitro Area Annual Long Term Monitoring Report, for SWMU 40 located at the Radford Army Ammunition Plant (RFAAP) in Radford, Virginia. Based upon our review, the Monitoring Report is approved, and in accordance with Part II. (E)(5) of RFAAP's Corrective Action Permit, the Completion Report is considered final. If you have any questions, please call me at 410-305-2779.

Sincerely,

A handwritten signature in cursive script that reads "Erich Weissbart".

Erich Weissbart, P.G.
RCRA Project Manager
Office of Remediation (3LC20)

c: James Cutler, VDEQ



ORDNANCE SYSTEMS INC.

Radford Army Ammunition Plant
4050 Peppers Ferry Road, P.O. Box 1
Radford, VA 24143
Telephone (540) 639-7631

BAE SYSTEMS

November 19, 2013

Mr. Erich Weissbart, P.G.
U. S. Environmental Protection Agency, Region III
Land and Chemicals Division (3LC20)
1650 Arch Street
Philadelphia, PA 19103-2029

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

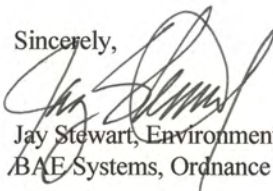
Subject: With Certification, SWMU 40 (RAAP-009) Landfill Nitro Area, Annual Long Term
Monitoring Report, Draft, October 2013
EPA ID# VA1210020730

Dear Mr. Weissbart and Mr. Cutler:

Enclosed is the certification for the subject documents that were sent to you on November 18, 2013. Also enclosed is the November 18, 2013 transmittal email.

Please coordinate with and provide any questions or comments to myself at 540 639 7785 or Mr. Jim McKenna, ACO Staff at 540 731 5782.

Sincerely,



Jay Stewart, Environmental Manager
BAE Systems, Ordnance Systems Inc

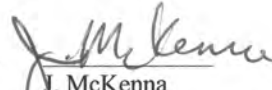
c: E. A. Lohman
Virginia Department of Environmental Quality
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

Rich Mendoza
U.S. Army Environmental Command
Cleanup and Munitions Response Division
2450 Connell Road, Bldg 2264, 1st Floor, Room 126
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Tom Meyer
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ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff

Coordination:

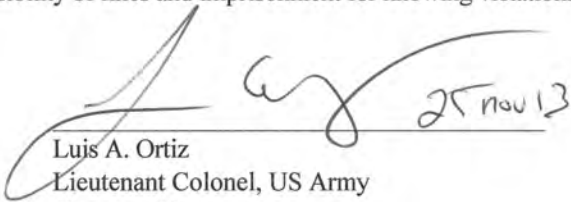

J. McKenna

Concerning the following:

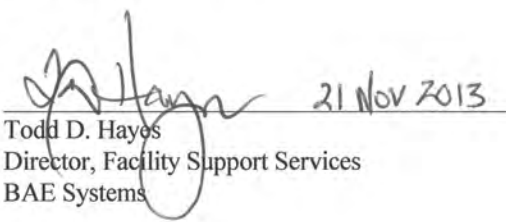
Radford Army Ammunition Plant
Solid Waste Management Unit 40(RAAP-009)
Landfill Nitro Area
Annual Long Term Monitoring Report
Draft, October 2013

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

SIGNATURE:
PRINTED NAME:
TITLE:

 25 Nov 13
Luis A. Ortiz
Lieutenant Colonel, US Army
Commanding

SIGNATURE:
PRINTED NAME:
TITLE:

 21 Nov 2013
Todd D. Hayes
Director, Facility Support Services
BAE Systems

Alberts, Matt (US SSA)

From: McKenna, James J CIV (US) <james.j.mckenna16.civ@mail.mil>
Sent: Monday, November 18, 2013 2:24 PM
To: Weissbart.Erich@epamail.epa.gov; Cutler,Jim
Cc: beth lohman (ealohman@deq.virginia.gov); Stewart, Jay (US SSA); Alberts, Matt (US SSA); Bogucki, MaryAnn (US SSA); Meyer, Tom NAB02; Mendoza, Richard R Jr CIV (US); Davie, Robert N.; Ortiz, Luis (RFAAP); Jonah Anderson; Mary Lou Rochotte
Subject: RE: RFAAP Draft SWMU 40 Year 2 Annual LTM Report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

All:

Note the contractor will ship the subject document with a copy of this email to the POCs and tracking numbers below. Certification will follow by separate letter.

Erich Weissbart, USEPA – 2 hard copies, 2 CD copies – FedEx tracking # 7971 7979 1734

James Cutler, Virginia DEQ – 1 hard copy, 1 CD copy - FedEx tracking # 7971 7976 6089

Karen Sismour, Virginia DEQ – 1 CD copy - FedEx tracking # 7971 7970 1828

Elizabeth Lohman, Virginia DEQ - 1 CD copy - FedEx tracking # 7971 7971 2104

Thank you for your support of the Radford Army Ammunition Plant Installation Restoration Program.

Jim McKenna

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Classification: UNCLASSIFIED
Caveats: FOUO

-----Original Message-----

From: McKenna, James J CIV (US) [<mailto:james.j.mckenna16.civ@mail.mil>]

Sent: Tuesday, November 26, 2013 7:59 AM

To: beth lohman (elohman@deq.virginia.gov); Cutler,Jim; Weissbart.Erich@epamail.epa.gov

Cc: Alberts, Matt (US SSA); MaryAnn Bogucki - Radford (maryann.bogucki@baesystems.com); Stewart, Jay (US SSA);
Mendoza, Richard R Jr CIV (US); Meyer, Tom NAB02; Jonah Anderson; Mary Lou Rochotte; Davie, Robert N III CIV (US);
Leahy, Timothy

Subject: RFAAP SWMU 40 Draft LTM Report Year 2 Certification Letter (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: FOUO

Erich, Jim, Beth, All:

Attached is the certification letter for the subject report that was sent November 18, 2013.

Thank you for your support of the Radford Army Ammunition Plant Installation Restoration Program.

Jim McKenna

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Classification: UNCLASSIFIED

Caveats: FOUO

From: McKenna, James J CIV (US) [<mailto:james.j.mckenna16.civ@mail.mil>]

Sent: Monday, November 18, 2013 2:21 PM

To: Weissbart.Erich@epamail.epa.gov; Cutler,Jim

Cc: beth lohman (elohman@deq.virginia.gov); Stewart, Jay (US SSA); Alberts, Matt (US SSA); MaryAnn Bogucki - Radford (maryann.bogucki@baesystems.com); Meyer, Tom NAB02; Mendoza, Richard R Jr CIV (US); Davie, Robert N III CIV (US); Ortiz, Luis A LTC USARMY JMC (US); Jonah Anderson; Mary Lou Rochotte
Subject: RE: RFAAP Draft SWMU 40 Year 2 Annual LTM Report (UNCLASSIFIED)

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Elizabeth Lohman, Virginia DEQ - 1 CD copy - FedEx tracking # 7971 7971 2104

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Jim McKenna

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Classification: UNCLASSIFIED

Caveats: FOUO

RADFORD ARMY AMMUNITION PLANT RADFORD, VIRGINIA

Performance Based Acquisition Solid Waste Management Unit 40 (RAAP-009) Landfill Nitro Area Annual Long Term Monitoring Report

**DRAFT
October 2013**

PREPARED BY:



**UXB-KEMRON Remediation Services, LLC
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Contract No. W912DY-10-D-0027
Delivery Order Number: DA01**

PREPARED FOR:

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**PERFORMANCE BASED ACQUISITION
INTERIM MEASURES COMPLETION REPORT
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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
CMOs	Corrective Measures Objectives
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CSL	Carcinogenic Screening Level
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
ECs	Engineering Controls
ICs	Institutional Controls
IM	Interim Measures
IMCR	Interim Measures Completion Report
IMWP	Interim Measures Work Plan
IRP	Installation Restoration Program
KM	Kaplan-Meyer
KEMRON	KEMRON Environmental Services, Inc.
LOD	Limit of Detection
LOQs	Limits of Quantitation
LTM	Long Term Monitoring
MMA	Main Manufacturing Area
NRU	New River Unit
NTP	Notice to Proceed
OCDD	Octachlorodibenzodioxin
PAHs	Polycyclic Aromatic Hydrocarbons
PBA TO	Performance Based Acquisition Firm Fixed Price Task Order
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFAAP	Radford Army Ammunition Plant
RL	Reporting Limit
ROS	Robust Regression on Order Statistics
RSL	Regional Screening Level
SOP	Standard Operating Procedure
SSL	Soil Screening Level
SWMU	Solid Waste Management Unit
TEF	Toxic Equivalence Factor
T-RBC	Tapwater Risk Based Concentration
TW	Tarone-Ware
URS	URS Corporation
USACE	United States Army Corp of Engineers
USEPA	United State Environmental Protection Agency
UTL	Upper Tolerance Limit
UXB-KEMRON	UXB-KEMRON Remediation Services, LLC
VDEQ	Virginia Department of Environmental Quality
2,3,7,8-TCDD	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin

1.0 INTRODUCTION

UXB-KEMRON Remediation Services, LLC (UXB-KEMRON) has been contracted by the U.S. Army Corps of Engineers (USACE) to perform Interim Measures (IM) at the Landfill Nitro Area, Solid Waste Management Area (SWMU) 40, at Radford Army Ammunition Plant (RFAAP), Radford, Virginia. This SWMU also is identified as RAAP-009 for purposes of the Army Environmental Database – Restoration (AEDB-R).

The Interim Measures Completion Report (IMCR), which included details of mobilization, installation of one additional downgradient monitoring well, repairs to the landfill cap North Slope, and implementing institutional controls (ICs) was approved as Final by US Environmental Protection Agency (USEPA) and the Virginia Department of Environmental Quality (VDEQ) in correspondence dated July 10, 2012. All work was performed in accordance with the IM Work Plan (IMWP) as approved by the USEPA and the VDEQ. In addition to the repairs specified in the IMWP, limited additional maintenance was conducted adjacent to SWMU 40 to further enhance and assure the stability of the landfill north slope and control stormwater runoff. Following completion of the Interim Measures, Long Term Monitoring was initiated November 2011.

The SWMU 40 LTM is being performed under a Performance Based Acquisition Firm Fixed Price Task Order (PBA TO) for environmental remediation services at RFAAP. The site is being addressed under the Installation Restoration Program (IRP). The Department of Defense (DoD) established the Defense Environmental Restoration Program (DERP) to address environmental contamination located on current and former military installations. Remedial action at this site also is authorized and conducted under the authority of the federal Resource Conservation and Recovery Act (RCRA). The contract was issued by the United States Army Corps of Engineers (USACE) – Baltimore located at 10 S. Howard Street, Box 1715, Room 7000 in Baltimore, Maryland. This TO # DA01 was issued under UXB-KEMRON's Worldwide Environmental Remediation Services contract number W912DY-10-D-0027, with an award date of 30 June 2010 and a Notice to Proceed (NTP) date of 15 July 2010.

1.1 Background

1.1.1 Site Description

RFAAP is a government owned; contractor operated manufacturing facility located in southwestern Virginia approximately eight (8) miles southwest of Blacksburg. BAE Systems is the current operator along with a variety of other tenants. RFAAP consists of two noncontiguous areas, the Main Manufacturing Area (MMA) and the New River Unit (NRU). RFAAP is operating under a 2000 RCRA Corrective Action permit, with a new permit currently being negotiated.

SWMU 40 is located within the south-central portion of the MMA at RFAAP (Figure 1). Figure 2 shows the site layout, which includes the approximate 2-acre landfill area that comprises SWMU 40.

SWMU 40 consists of an undeveloped open area covered with grass. A gravel covered and fenced area used for temporary storage of asbestos is located at the eastern edge of the site (Figure 2). A paved road, identified as Landfill South Road for purposes of this LTM Report, is located immediately south of the landfill area and undeveloped land borders the landfill area to the north (field) and west (wooded area).

1.1.2 Site History

The RCRA Facility Assessment (RFA) was conducted by the USEPA in 1987 and identified SWMU 40 as having the potential to release contaminants into the environment. SWMU 40 is included in the RFAAP RCRA Permit for Corrective Action (USEPA, 2000).

The Final RFI/CMS was approved by USEPA and VDEQ in April 2009. According to the Final RFI/CMS (URS, April 2009), SWMU 40 was used for the burial of materials, such as paper, office trash, concrete, and rubber tires in the 1970s and early 1980s. The unit was not permitted by the Commonwealth of Virginia as a solid waste landfill. Operations ceased and the unit was closed with a clay cap and grass cover. Subsequently, areas located northeast of the unit were used to stockpile soil derived from construction-related activities. In approximately 1991, a fenced enclosure was constructed in the northeastern corner of the SWMU 40 area for use as temporary asbestos accumulation area (Figure 2).

The results of the human health risk assessment included in the Final RFI/CMS (URS, 2009) indicated that calculated cancer risks and hazard indices are within the USEPA target risk range for each receptor with the exception of the cumulative risk for the hypothetical future lifetime resident due primarily to arsenic and PCBs in soil. A future construction worker also had potential risk based upon potential aluminum exposure via the inhalation pathway. The RFI/CMS documented that soil Constituents of Potential Concern (COPCs) are primarily limited to the landfill material itself with the exception of a surficial area of PCB contamination in soil located adjacent to the northern escarpment of the landfill.

Additionally, the Final RFI/CMS identified chloroform as a groundwater COPC. Extensive source characterization was conducted at SWMU 40 during the RFI, including the collection of 91 soil samples, many of which were collected from landfill material and soil below the landfill material at SWMU 40. Chloroform was not detected in these samples. The RFI/CMS notes that the lack of detections and absence of other volatile organic constituents in groundwater samples suggests a potential alternate source for chloroform in groundwater at SWMU 40. During conduct of the RFI, chloroform was detected in samples collected from wells 40MW3 (19 µg/L), 40MW5 DUP AVG (23 µg/L), and 40MW6 (24 µg/L) at concentrations above its unadjusted tapwater risk based concentration (T-RBC) (0.155 µg/L) but below the USEPA MCL of 80 µg/L for total trihalomethanes. The Final RFI/CMS notes that the landfill area is located downgradient of developed areas containing water lines that could be leaking, and which may be the source of chloroform in groundwater at SWMU 40. Therefore, based upon the site specific data, a SWMU 40 chloroform source is not identifiable. However, based upon the groundwater detections of chloroform, chloroform was retained as a COPC until the completion of the first four quarters of data collected during the LTM. The LTM Report for Year 1 removed chloroform as well as other analytes from the monitoring network parameters and was approved by USEPA and VDEQ May 30, 2013.

Perchlorate has been detected in numerous wells at RFAAP at low concentrations. The RFI/CMS noted that updated laboratory analytical detection limits that are lower than historic limits may be the reason for low level detections. The RFI/CMS also noted that groundwater samples located immediately adjacent to and downgradient of the landfill (40MW3, 40MW5, and 40MW6) were below the unadjusted T-RBC; therefore, perchlorate was not identified as a COPC in groundwater. However, the Army agreed to retain perchlorate as a groundwater monitoring analyte at this time, based on detections reported in the RFI/CMS.

The RAAP-009, SWMU 40 Final RFI/CMS was reviewed and approved by USEPA and VDEQ in correspondence dated June 30, 2009. The USEPA and VDEQ agreed to the use of Interim Measures as a means to accelerate closure of this site and begin long-term maintenance and monitoring. UXB-KEMRON prepared the Interim Measures Work Plan (IMWP) on behalf of the Army in conformance with the specifications detailed for Alternative 2 in the approved Final RFI/CMS. The IMWP included the repair to the landfill cap in areas impacted by surface erosion, placement of cover to address the potential exposure to the surficial area of PCB contamination in soil located adjacent to the northern escarpment of the landfill, installation of one additional downgradient monitoring well, and initiation of Long Term Monitoring and Maintenance (LTM) activities associated with cap maintenance and monitoring and groundwater monitoring. The IMWP was approved by USEPA and VDEQ on August 26,

2011. The IMCR provided documentation of the completion of the IM and was approved by USEPA and VDEQ July 10, 2012. The LTM activities and resulting data for Year 2 are contained within this LTM Report in accordance with the approved August 2011 IMWP and as outlined in the approved LTM Report for Year 1.

1.2 Corrective Measures Objectives

The Corrective Measures Objectives (CMOs) for SWMU 40 are:

- Maintain containment of the landfill material at the site and implement necessary controls to prevent future uncontrolled human exposure to this landfill material.
- Implement any necessary measures to stabilize and repair the landfill cover at the northern edge of the landfill area to prevent any further mass transport of soil material in this area.

1.3 Project Objectives

In accordance with the *SWMU 40 Final RFI/CMS*, April 2009, and the Final IMWP, August 2011, IMs were conducted to accelerate closure of this site and begin LTM. The IMs included:

- 1. Engineering Controls (ECs) and Landfill Cap Repairs:** ECs included repairs to the landfill cap where evidence of erosion had been noted, primarily the north face of the unit. Repaired areas were stabilized and seeded to support a vegetative cover and minimize additional erosion.
- 2. Monitoring Well Installation:** Installation of 40MW7 on the downgradient side of SWMU 40. A location was preselected approximately 135 feet west-northwest of the landfill area as indicated and more fully described in the approved RAAP-009 SWMU 40 Final RFI/CMS.
- 3. Long Term Monitoring and Maintenance:** Conduct of LTM per the LTM Plan.

Section 2 of this report provides additional details of the IM implementation (specifically Long Term Monitoring and Maintenance) to achieve the project objectives.

2.0 Long Term Monitoring and Maintenance

2.1 Long Term Monitoring Plan

The groundwater monitoring network at SWMU 40 consists of one upgradient well, LFMW01, and three downgradient wells. The three downgradient wells include existing wells 40MW5, 40MW6, and the new well 40MW7. Installation of this new well was presented in the IMCR. The table below summarizes the long term monitoring program that is being implemented as part of the Corrective Measures at SWMU 40.

Long Term Groundwater Monitoring Program, SWMU 40, RAAP-009:

Monitoring Well Designation	Relative Position to SWMU 40	Monitoring Frequency	Analytical Parameters
LFMW01	Upgradient	Year 1: Quarterly Years 2-5: Every 9 months Years 6-30: Annual	Field water quality: pH, turbidity, specific conductance, temperature, dissolved oxygen, oxidation/reduction potential
40MW05	Detection Well at edge of landfill boundary		
40MW06	Detection Well at edge of landfill boundary		TCL VOCS, SW846 Method 8260B; TCL SVOCs, SW846 Method 8270C SIM;
40MW07	Well downgradient of Landfill		TCL Pesticides, SW846 Method 8081A; TAL Metals, SW846 Method 6000/7000; Perchlorate, SW846 6850; Dioxins/furans, SW846 Method 8290 included in initial sampling event only

The first year of long term monitoring (LTM) included four quarterly monitoring events with the exception of dioxins and furans which were sampled and analyzed only in the first quarterly sampling event of the first year of LTM as specified in the approved IMWP and CMS. The LTM Report for year one was submitted with outlined reduction of analyte requirements. The reduction of COPC's for the LTM program was approved by USEPA and VDEQ May 30, 2013. This LTM report summarizes the sampling and analysis of the remaining analytes in the year two monitoring program (event five). Analytical results are summarized in tabular form, and complete laboratory analyses are presented in electronic form (e.g., CD ROM or equivalent).

The groundwater data were screened in accordance with the approved IMWP. Data screening was conducted in the Year 1 LTM plan to eliminate any analytes that met screening criteria outlined below as within the approved work plan for the first four quarters of monitoring. Retention of analytes in the LTM monitoring and reporting are evaluated in this Year 2 LTM report and for each subsequent sampling and analysis event based upon the site specific dataset that will be included and evaluated.

A list of the specific analytes included in the groundwater LTM program and their associated limits of detection (LODs) and limits of quantitation (LOQs) were presented in the site-specific Quality Assurance Project Plan (QAPP), Appendix B, Master Work Plan Addendum #30 (KEMRON, 2011).

The following criteria established in the IMWP were applied to the data evaluation and optimization of the monitoring program after the first four quarters of data generation, the year two data generation, and will continue to be implemented throughout the LTM program:

- 1) Analytes that did not exceed the laboratory LOD during three (3) consecutive monitoring events or exceed the LOQ during the first four (4) monitoring events will not require further sampling and analysis;
- 2) Analyte detections that did not exceed the established background concentration for 3 successive sampling events will not require further sampling and analysis;
- 3) Analyte detections that did not exceed half the relevant MCL or half the relevant Regional Screening Level (RSL) as presented in the approved IMWP for 3 successive sampling events and the results displayed a static or downward trend will not require further sampling and analysis.

The site specific data was evaluated using appropriate statistical methodologies, and data assessment was conducted in general conformance with the recommendations of USEPA guidance entitled *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance, March 2009* (EPA 530/R-09-007). A more detailed description on the data evaluation and remaining analytes is discussed in Sections 2.4 and 3.

2.2 Long Term Inspection and Maintenance Plan

Additional long term maintenance was conducted at SWMU 40, RAAP-009; including inspection of the landfill cap to ensure that the landfill cap integrity is maintained. Inspections were conducted in conjunction with groundwater monitoring events and thus follow the same schedule specified in the table in Section 2.1, Long Term Groundwater Monitoring Program.

Inspections included visual evaluation and documentation of negative effects of the following:

1. Precipitation run-on and runoff;
2. Water and/or wind erosion;
3. Rodent and/or vector activity;
4. Deep root vegetation;
5. Vegetative stress and other cover condition;
6. Subsidence or cracks in cap;
7. Excavation or other manmade intrusive work conducted within the landfill footprint.

The first four landfill cap inspection are outlined in the year one LTM report. The fifth inspection was conducted during the LTM groundwater sampling event June 18, 2013. No major issues or deficiencies were noted during the most recent inspection. The only element of the approved inspection program that is absent is required signage for the landfill that will complete institutional controls (ICs) for this SWMU. This is noted on each inspection as needing installed. However, as previously agreed with USEPA and VDEQ, the signage will be prepared and installed following final approval of the RFAAP RCRA Permit, which will establish final language of the sign. The sign will be prepared and installed after the final language is agreed upon, providing consistent language for all similarly restricted areas at RFAAP requiring identification with signage. The completed inspection sheet and supporting photos for the fifth inspection is included in Appendix A.

2.3 Groundwater Sampling

Groundwater samples were collected as part of the LTM. The groundwater monitoring network at SWMU 40 consists of one upgradient well, LFMW01, and three downgradient wells. The three downgradient wells include existing wells 40MW5 and 40MW6, as well as 40MW7. Monitoring wells locations are shown on Figure 2.

Sampling was conducted in conformance with approved standard operating procedure (SOP) 30.2 of the approved work plan and as described in the Section 5.2.10 of the MWP (URS, 2003). Groundwater sampling was conducted using low flow purge and sampling, consistent with past sampling events. All non-dedicated sampling equipment was decontaminated in accordance with SOP 80.1 of the approved work plan. Completed field documentation is included in Appendix B.

Water level measurements were collected and the potentiometric map from the fifth event is included in Appendix C. Based on the monitoring, ground water at SWMU 40 generally flows in a northwest direction which is consistent with historical ground water flow at the site.

2.4 Data Evaluation

The site specific data was evaluated using appropriate statistical methodologies, and data assessment was conducted in general conformance with the recommendations of USEPA guidance entitled *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance, March 2009* (EPA 530/R-09-007) in accordance with the approved work plan. Appendix D contains supporting data validation with analytical reports and Appendix E contains analytical summarization tables.

The following sections provide a summary of the data evaluation for each analyte group that remain in the LTM Program as approved from the Year 1 LTM Plan.

2.4.1 SVOC PAH

Applying the data screening established for the LTM program, the only analytes for SVOC PAHs that exceeded the LOD and/or LOQ are Benzo(k)fluoranthene, Chrysene, Benzo(a)anthracene, Benzo(a)pyrene, and Benzo(b)fluoranthene. Over the course of sampling monitor wells 40MW05, 40MW06 and 40MW07, only chrysene in 40MW06 showed two samples with quantified measurements at or above the LOQ. On 6/12/12 a concentration of 0.89 J $\mu\text{g/L}$ was reported in the normal sample and 0.0301 $\mu\text{g/L}$ was reported in the field duplicate sample. These samples, however, were taken on the same date and so do not qualify as concentrations above the LOQ on two consecutive dates. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and benzo(k)fluoranthene also showed reportable (but J-flagged) concentrations in the normal sample taken on 6/12/12 but these PAHs did not show reportable concentrations in the field duplicate sample. A subsequent sample of PAHs taken on 9/25/12 did not show concentrations of any of the PAHs above their LOD. The recent sampling event on 6/19/13 did not show concentrations of any of the remaining PAH's above their applicable LOD. These five analytes will remain in the upcoming monitoring event to verify presence/absence of detectable concentrations in groundwater. Table 1 summarizes the remaining required SVOC PAH analytical results for all the completed groundwater events.

2.4.2 VOC

Acetone and 2-Chloroethyl Vinyl Ether were rejected during data validation of each prior sampling event due to low response factors. The sampling event on 6/19/13 received validated nondetect data for both analytes. These two analytes will remain on the requirement list to provide sufficient data before removing them from the analyte list for future LTM events, per the IMWP requirements. Table 2 summarizes the remaining required VOC analytical results for all the completed groundwater events.

2.4.3 Metals

Remaining analytes for metals will be further evaluated following subsequent monitoring events. Table 3 summarizes the remaining required metals analytical data for all the completed groundwater events.

2.4.4 Perchlorate

Perchlorate exceeded the limits for screening by the LOD, LOQ, or one-half MCL as stated within the IMWP. Table 4 summarizes the Perchlorate analytical results for all the completed groundwater events.

3.0 CONCLUSIONS

The following Table 5 represents the remaining analytes for Year 3 long term monitoring at RFAAP SWMU 40. All screening of the data was completed in accordance with the approved IMWP, Section 9.1.

Table 5 Year 3 LTM Analytes		
Constituent	LTM Plan	Note
Volatile Organic Compounds		
2-Chloroethyl Vinyl Ether	Continue Monitoring	Continue monitoring to confirm validated Non detect data.
Acetone	Continue Monitoring	Continue monitoring to confirm validated Non detect data.
Metals		
Aluminum	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Arsenic	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Barium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Calcium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Cobalt	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Iron, Ferrous	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Lead	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Magnesium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Manganese	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Potassium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Selenium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Sodium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Vanadium	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
SVOC PAHs		
Benzo(a)anthracene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Benzo(a)pyrene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Benzo(b)fluoranthene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Benzo(k)fluoranthene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Chrysene	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.
Other		
Perchlorate	Continue Monitoring	Exceeded LOD, LOQ, or ½ the MCL in at least one prior sampling event.

The analyte list above (Table 5) will be implemented for the sampling and analysis in LTM Year 3, currently scheduled to occur in March 2014.

3.1 Groundwater Statistics

The IWMP for SWMU 40 indicated that the initial annual LTM report will include calculation of a background dataset, based upon the first four sampling events. The background well at SWMU 40 is LFMW01. The concentrations of contaminants in downgradient wells (40MW5, 40MW6 and 40MW7) that were not eliminated due to LOQ, LOD and MCL screening criteria are to be compared to the calculated background values and any analyte below background in all three of the downgradient wells will be eliminated from the analytical reporting list for future sampling events.

Within the first five years of monitoring, a remedy effectiveness evaluation will be conducted for SWMU 40. The remedy effectiveness evaluation will include a presentation of the groundwater data collected throughout the LTM program to date. The analytical results from the remaining analytes will be statistically evaluated against the background dataset, and to determine if any trends are exhibited.

While a statistical evaluation of both background and downgradient groundwater data is envisioned, the Final IMWP does not specify the statistical approach that will be used to evaluate groundwater data against the background data set. In fact, it anticipates that data collected after the first four quarters will be reviewed, and if appropriate, the monitoring program will be amended. This approach was agreed upon with USEPA and VDEQ due to the absence of available groundwater data from a monitoring network at SWMU 40.

RCRA regulations at 40 CFR 257.23(g) indicate that one (or a combination) of the following statistical methods be used in evaluating groundwater monitoring data for hazardous constituents.

1. A parametric analysis of variance (ANOVA) followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each downgradient well's mean and the background mean levels for each constituent.
2. An analysis of variance (ANOVA) based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each downgradient well's median and the background median levels for each constituent.
3. A tolerance interval or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each downgradient well is compared to the upper tolerance or prediction limit.
4. A control chart approach that gives control limits for each constituent.

The requirement to compare the concentrations in downgradient wells with calculated background values implies that the measurements of the concentrations of constituents in the background well as well as those in the downgradient well support the calculation of meaningful statistics on which to base the comparison. In general, if the measurements of a particular constituent do not include too many non-detects, and if the detected amounts can be characterized by a statistical distribution, then a parametric statistical approach can be used. If these characteristics of the data are not met, then a non-parametric approach may be possible. While statistical analysis was initiated for the first four quarters of data, statistics are not presented in this report based on the current limited sample size. Using the reduced monitoring list presented in Table 8, the Year 3 LTM event will be conducted and the data will be further evaluated at that time. The report for Year 3 LTM will present the dataset available at that time, and determine if initial statistical evaluation is appropriate. The dataset and potential statistically based decisions will be presented in the report for determination of future LTM needs, based upon the currently available data and in conjunction with technical discussion among the Army, KEMRON, USEPA Region

3 and VDEQ. The Year 3 LTM event will be conducted in March 2014. At least one week prior notice of the mobilization date for the LTM event will be provided to USEPA and VDEQ.

4.0 REFERENCES

Alliant Techsystems, Inc. (ATK), 2005. *Safety, Security and Environmental Rules for Contractors, Subcontractors, Tenants and Government Employees*. March 2005.

Intergovernmental Data Quality Task Force, 2005. *Uniform Federal Policy for Implementing Environmental Quality Systems; Evaluating, Assessing, and Documenting Environmental Data Collection/Use and Technology Program* (UFP QAPP), Final, Version 2. March 2005.

URS Corporation (URS), 2009. SWMU 40 (RAAP-009) and 71 (RAAP-002) RCRA Facility Investigation/Corrective Measures Study Report. Final. April 2009.

URS Corporation (URS), 2003. *Final Master Work Plan, Quality Assurance Plan, Health and Safety Plan*. Radford Army Ammunition Plant, Radford, Virginia. Prepared for the U.S. Army Corps of Engineers, Baltimore District. August 2003.

U.S. Environmental Protection Agency (USEPA), 2000. *Permit for Corrective Action and Waste Minimization*: Pursuant to the Resource Conservation and Recovery Act as Amended by the Hazardous and Solid Waste Amendment of 1984, Radford Army Ammunition Plant, Radford, Virginia. VA1210020730.

U.S. Environmental Protection Agency, 2011. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*, November 2011 revision. Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm.

U.S. Environmental Protection Agency, 2011. *List of Contaminants and Their Maximum Contaminant Levels (MCLs)*. Available at: <http://water.epa.gov/drink/contaminants/index.cfm#List>.

UXB-KEMRON, 2011. *Radford Army Ammunition Plant, Final Performance Based Acquisition Solid Waste Management Unit 40 (RAAP-009) Landfill Nitro Area Interim Measures Work Plan*. August 2011.

Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance, March 2009 (EPA 530/R-09-007)

FIGURES



0 500 1000 2000 3000 4000
Feet



Source: Google Earth; Imagery Date: February 1, 2007



UXB-KEMRON Remediation Services, LLC
2020 Kraft Drive, Suite 2100
Blacksburg, VA 24060

PROJECT NO. MR0669

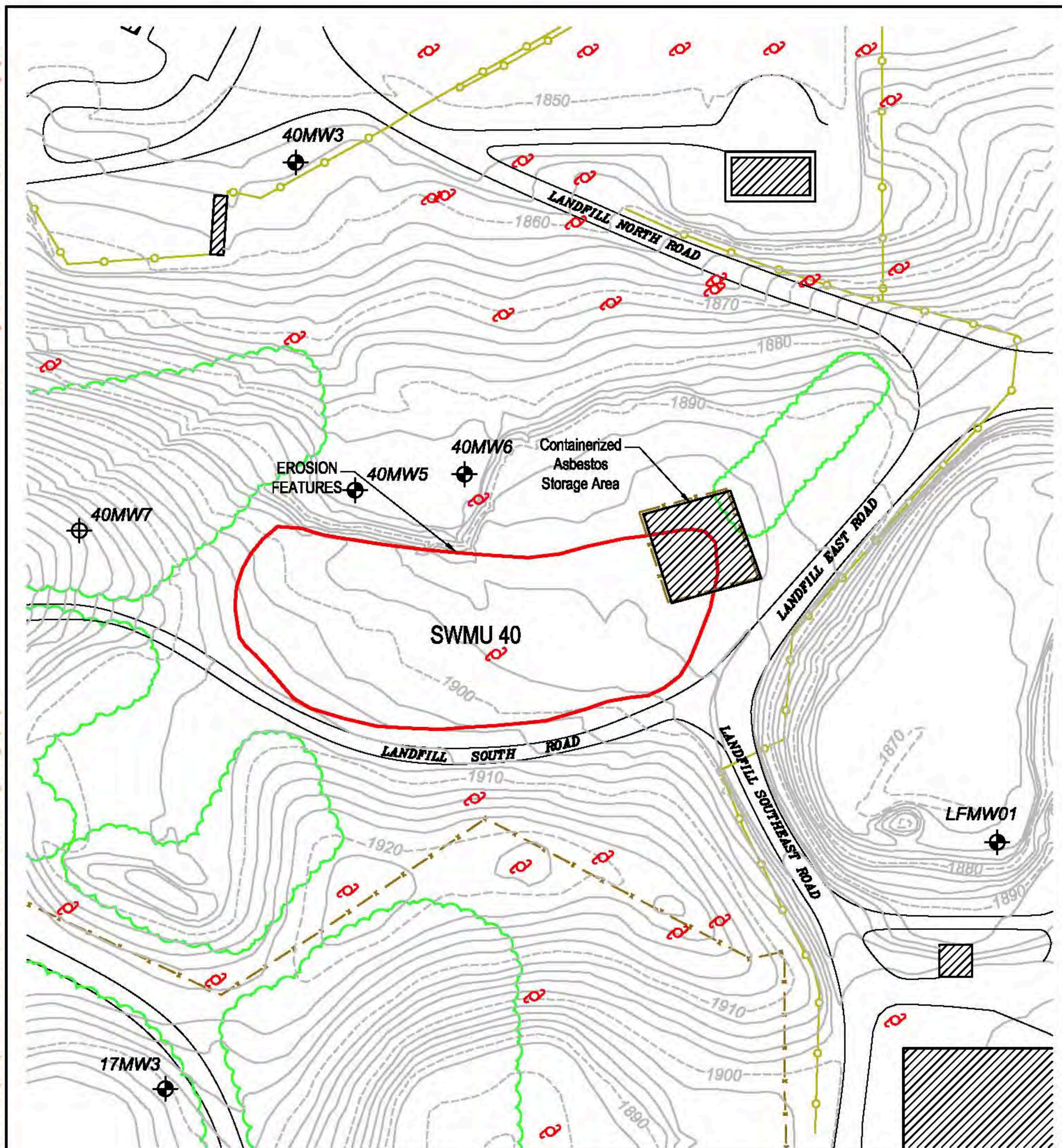
DRAWING DATE: 01/17/2013

DESIGNED
DRP
DETAILED
DRP
CHECKED
JA

SITE LOCATION MAP SWMU 40 LTM REPORT

LOCATION:
RADFORD ARMY AMMUNITION PLANT, RADFORD, VIRGINIA

FIGURE:
1



LEGEND

- | | | | |
|--|---------------------------|--|--------------------------|
| | BUILDINGS | | MONITORING WELL LOCATION |
| | VEGETATION | | OVERHEAD ELECTRIC POLE |
| | APPROXIMATE SWMU BOUNDARY | | TOPOGRAPHIC CONTOUR |
| | ABOVEGROUND PIPING | | FENCE LINE |

Note: Base map developed from fig. 2-2
Provided by URS Group, Inc., 1-2008



0 60 120
SCALE 1"=120'
(Approximate)

DRAWN BY:	KG	DATE	17 JAN 2013
REVIEWED:	R 5	PROJECT NO.	MR0669
APPROVED:		DWG. FILE NO.	SWMU 40, SITE MAP

FIGURE 2

SWMU 40 LTM REPORT
SITE LAYOUT
RADFORD ARMY AMMUNITION
PLANT-009
RADFORD, VIRGINIA

APPENDIX A
Inspection Sheets and Site Photographs

INSPECTION OF CLOSED WASTE MANAGEMENT FACILITIES

Name of Waste Management Facility: RFAAP SWMU 40 (RAAP-009)

EPA Permit No. N/A

Date of Inspection 6/18/13

Time of Inspection 11:30 AM PM

Reason for Inspection: Quarterly Major rainfall event (2" in 8 hr period)/ catastrophic event

ITEM	INSPECT FOR	DEFICIENCIES NOTED	REMEDIAL ACTION REQUIRED
Final Soil Cover	- Erosion ✓ - Settlement, Subsidence, or Displacement ✓ - Pooling ✓	NO DEFICIENCIES	
Vegetative Cover	- Dead vegetation, or inadequate growth ✓ - Presence of trees, shrubs, or deep rooted vegetation ✓ - Need to fertilize, irrigate, or cut grass ✓	NO DEFICIENCIES	
PVC Liner (if applicable)	Liner exposed	N/A	
Peripheral Drainage Swales	- Erosion ✓ - Subsidence ✓ - Pooling ✓	NO DEFICIENCIES	
Stormwater Drainage Areas	- Erosion ✓ - Subsidence ✓ - Vegetation growth ✓ - Accumulated sediment ✓	NO DEFICIENCIES	
Security (if applicable)	- Access road in place ✓ - Sign legible and in place ✓ - Fences not breached and no visible damage ✓	NO SIGN IN PLACE	
Monitoring Wells - Outer protective casing - Well caps and locks - Concrete pad - Inner cap and riser	- Casing in good condition ✓ - In place and functioning ✓ - Cracks or settlement ✓ - Intact and functioning ✓	NO DEFICIENCIES	
Benchmarks (2) (if applicable)	- Monuments present and visible - Damage to monument	N/A	

Date and nature of repairs or remedial action: WILL INSTALL SIGN ONCE FINAL APPROVAL OF RCRA PERMIT IS COMPLETED

Printed Name of Inspector: JOAN H ANDERSON

Signature of Inspector: [Signature]

Company: UXB-KOMROW

Date remedial action completed:

Remedial action approved by:



Photo 1 - View to the east of SWMU 40



Photo 2 - View to the west of SWMU 40



Photo 3 - View to the southwest of the northern face of SWMU 40



Photo 4 - Groundwater sampling event June 2013

APPENDIX B
Field Documentation

Location RADFORD, VA Date 6-18-13 47
Project / Client SWMU 40, RFAAD

0940 - ON SITE (JA & JC)
68°F, RAIN & THUNDER STORMS

TOM MAYNOR PHONE NUMBER
540-838-1005 BURNING GRASS AREAS

1030 - MET w/ MATT HUBERTS
AND SAFETY FOR AREA
ENTRY PERMITS & HOT
WORK PERMITS

1115 STARTED COLLECTING
WATER LEVELS

40 MW 7 - 121.85'
LFMW 81 - 51.22'
40 MW 6 - 82.37'
40 MW 5 - 93.00'
40 MW 3 - 91.15'

1130 - (COMPLETED) WATER LEVELS
@ SWMU CAP RESTRICTION
OFF SITE 1215 JA, CC

[Signature]

Location RADFORD, VA Date 6-19-13Project / Client SUMU 40, REAAP

0700 CALIBRATED YSI
 0800 ONSITE w/ JA & JC
 68°F, CLOUDY & SUNNY
 0830 COMPLETED HSS MEETING
 0850 SETTING UP ON 40MW7
 WL = 122.02'

0951 COLLECTED SAMPLES

FOR 40MW7 GW 61913

JIM MCKENNA STOPPED

BY AND APPROVED PICTURES

WALKED SUMU NOTED:

MINOR RUTS FROM TRACTOR

TIRES DURING MOVING.

NO WATER POND ON CAP.

J.M. STATED HE WOULD REQUEST

THAT THEY DO NOT MOW

DURING WET PERIODS

JIM MCKENNA STATED NO

MAJOR ISSUES w/SUMU WERE

VISUAL OFFSITE @ 1045

1050 DECONNECTED PUMP

1140 COLLECT EQUIPMENT RINSE @ 1140

? FIELD BLANK @ 1145

Location RADFORD, VA Date 6-19-13Project / Client SUMU 40, REAAP

1220 SETTING UP ON 40MW5
 WL = 93.42'

1304 COLLECTED SAMPLES
 40MW5 GW 61913 - @ 1304
 40MW5 ~~MS~~ MS GW 61913 > @ 1310
 40MW5 MSD GW 61913

1325 DECONNECTED PUMP

1406 SETTING UP ON 40MW6
 WL = 83.30

1451 COLLECTED SAMPLES
 40MW6 GW 61913

1510 DECONNECTED PUMP

1545 SETTING UP ON ~~40MW6~~ 40MW01
 WL = 50.90

1618 - COLLECTED SAMPLES
 40MW01 GW 61913 & 40BUP GW 61913

CONTACTED TOM MAYNOR

TO LET HIM KNOW WE WERE
 COMPLETED @ BURNING GROUND AREA

1715 - CONTAINERIZED PUMPS &
 DECON WATER ~ 80 gallons
 & TRANSPORTED TO BIOPHANT

Location RAIDFORD, VADate 6-19-13Project / Client Sumu 40, REAAP

1725 SIGNED IN w/ BIOPLANT
 OPERATOR & DISCHARGED
 ± 80 gallons of water
 @ LIFT STATION

PACKED MORE ICE ON SAMPLES

SA & JC OFF SITE @ 1800

HO

Location _____ Date _____

Project / Client _____

DAILY SAFETY MEETING

Project Name: Sum 40 LTM

Date: 6-19-13

Location: RFAAP

Presented by: Jonah Anderson

Check the Topics/Information Reviewed:

- | | |
|---|--|
| <ul style="list-style-type: none"> ☒ Daily work scope reviewed ☒ safety is everyone's responsibility ☒ site health and safety plan reviewed ☒ safety glasses, hard hat, safety boots ☒ employee Right-To-Know/MSDS location ☒ vehicle safety and driving/road conditions ☒ hazard analysis for all tasks or new technology ☒ chemical hazards ☒ first aid, safety, and PPE location ☒ sharp object, rebar, and scrap metal hazards ☒ latex gloves inner/nitrile gloves outer ☒ open pits, excavations, and trenching hazards ☒ excavation/trenching inspections/documentation ☒ full face respirators with proper cartridges ☒ upgrade to Level C at: ☒ work stoppage at: ☒ portable tool safety and awareness ☒ slips, trips, and falls ☒ strains and sprains ☒ anticipated visitors ☒ electrical ground fault ☒ public safety and fences ☒ excavator swing and loading ☒ orderly site and housekeeping ☒ smoking in designated areas | <ul style="list-style-type: none"> ☒ leather gloves for protection ☒ effects of the night before? Rain or snow? ☒ vibration related injuries ☒ noise hazards ☒ confined space entry ☒ hot work permits ☒ overhead utility locations cleared? ☒ all underground utilities cleared? ☒ equipment and machinery familiarization ☒ fire extinguisher locations ☒ eye wash station locations ☒ directions to hospital ☒ heat and cold stress ☒ decontamination steps ☒ review emergency protocol ☒ parking and laydown area ☒ vehicle backing up hazards ☒ accidents can be costly ☒ no horse play ☒ dust and vapor control ☒ refueling procedures ☒ flying debris hazards ☒ poison ivy/oak/sumac |
|---|--|

Other Discussion Items/Comments/Follow-up Actions:

NAME (PRINT)

JAMES COLE

Jonah Anderson

NAME (SIGNATURE)

[Signature]

[Signature]

COMPANY

6-19-13

6-19-13

Instructions:

- # Conduct a daily safety meeting prior to beginning each day's site activities.
- # Complete form, obtain signatures, and file with the Daily Summary.
- # Follow-up on any noted items and document resolution of any action items.

DAILY SAFETY MEETING

Project Name: SWMU 40 LTM

Date: 6-18-13

Location: REAP

Presented by: SONAH ANDERSON

Check the Topics/Information Reviewed:

- | | |
|--|--|
| <ul style="list-style-type: none"> ☒ Daily work scope reviewed ☒ safety is everyone's responsibility ☒ site health and safety plan reviewed ☒ safety glasses, hard hat, safety boots ☒ employee Right-To- Know/MSDS location ☒ vehicle safety and driving/road conditions ☒ hazard analysis for all tasks or new technology ☒ chemical hazards ☒ first aid, safety, and PPE location ☒ sharp object, rebar, and scrap metal hazards ☒ latex gloves inner/nitrile gloves outer ☒ open pits, excavations, and trenching hazards ☒ excavation/trenching inspections/documentation ☒ full face respirators with proper cartridges ☒ upgrade to Level C at: ☒ work stoppage at: ☒ portable tool safety and awareness ☒ slips, trips, and falls ☒ strains and sprains ☒ anticipated visitors ☒ electrical ground fault ☒ public safety and fences ☒ excavator swing and loading ☒ orderly site and housekeeping ☒ smoking in designated areas | <ul style="list-style-type: none"> ☒ leather gloves for protection ☒ effects of the night before? Rain or snow? ☒ vibration related injuries ☒ noise hazards ☒ confined space entry ☒ hot work permits ☒ overhead utility locations cleared? ☒ all underground utilities cleared? ☒ equipment and machinery familiarization ☒ fire extinguisher locations ☒ eye wash station locations ☒ directions to hospital ☒ heat and cold stress ☒ decontamination steps ☒ review emergency protocol ☒ parking and laydown area ☒ vehicle backing up hazards ☒ accidents can be costly ☒ no horse play ☒ dust and vapor control ☒ refueling procedures ☒ flying debris hazards ☒ poison ivy/oak/sumac |
|--|--|

Other Discussion Items/Comments/Follow-up Actions:

NAME (PRINT)	NAME (SIGNATURE)	COMPANY
<u>James Cove</u>	<u>[Signature]</u>	<u>6-18-13</u>
<u>SONAH ANDERSON</u>	<u>[Signature]</u>	<u>6-18-13</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

Instructions:

- # Conduct a daily safety meeting prior to beginning each day's site activities.
- # Complete form, obtain signatures, and file with the Daily Summary.
- # Follow-up on any noted items and document resolution of any action items.

FIELD CALIBRATION FORM

INITIAL CALIBRATION	FINAL CALIBRATION
DATE: 6-19-13	DATE: 6-19-13
TIME: 0700	TIME: 0720

pH METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

pH STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
7.0	7.04	6.99	6.99
10.0	9.98	10.00	10.00
4.0	4.02	4.01	4.01

CONDUCTIVITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

COND. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
1.413 $\mu S/cm$	1.389	1.417	1.413

DISSOLVED OXYGEN METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
TAP	99.83%	100.1%	100.1%

FIELD CALIBRATION FORM

TURBIDITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
126 (ntu)	117.4	126.1	126.1
0 (st)	3.2	0.3	0.3

ORD METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
229	236	228.9	228.9

PID CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
100 ppm	—	99.8	99.8
1500 TYNACOL			

COMMENTS _____

SIGNATURE [Signature]

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: REAR

Sample Point ID: LFmw01

Location: Sumu 40

Field Representatives: SA/JC

Sample Matrix: Ground Water

Lab Sample #: LFmw01GW 61913

PURGE INFORMATION:

Method of Well Purge: Low - Flow

Dedicated: Y or (N)

Date/Time Initiated 6-19-13 1545

Well Volume of Standing Water (gal) N/A

Initial Water Level (ft) 50.90'

Total Volume Purged (gal) 3.5

Mid-screen Depth (ft) ~ 98-93

Was well purged to dryness? No

Well Total Depth (ft) 103

Water Level After Purge (ft) 51.10

Casing Diameter, (inches) 2

Date/Time Completed 6-19-13 1618

Sand Pack Diameter, (inches) N/A

PURGE DATA:

Time	Depth to Water	Flow Rate (mL/min)	Temp (°C)	pH (su)	Specific Cond. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1601	51.98	1000	15.01	7.68	0.602	29.3	145.9	6.04
1603	51.13	700	14.48	7.35	0.603	35.0	154.7	5.29
1604	51.13	700	15.08	7.25	0.603	45.0	155.0	4.14
1609	51.14	700	15.08	7.23	0.603	44.8	155.6	3.95
1612	51.08	700	14.94	7.14	0.603	44.7	156.9	3.13
1615	51.11	700	14.92	7.13	0.602	43.2	158.0	3.09
1618	51.10	700	14.95	7.13	0.602	45.4	157.3	2.97

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: LFMW01

Method of Sampling: Low-Flow

Dedicated?: NO

Water Level at time of Sample Collection: 51.10

PARAMETERS: Annual () Semi-Annual () Quarterly () Monthly () Other ☒

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (°C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1618	51.10	700	14.95	7.13	0.602	45.6	157.3	2.97

GENERAL INFORMATION:

Weather conditions at time of sample collection: Sunny, Hot

Sample Characteristics: SLIGHTLY TURBID, no odor

COMMENTS AND OBSERVATIONS: _____

DATE: 6-19-13

SAMPLER: JAC

DATE: 6-19-13

QC Check By: JAC

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: RFAAP

Sample Point ID: 40mw6

Location: SWMU 40

Field Representatives: SA/SC

Sample Matrix: Ground Water

Lab Sample #: 40mw6GW6913

PURGE INFORMATION:

Method of Well Purge: Low Flow

Dedicated: Y or (N)

Date/Time Initiated 6-19-13 1404

Well Volume of Standing Water (gal) N/A

Initial Water Level (ft) 83.30

Total Volume Purged (gal) 3.0

Mid-screen Depth (ft) 127

Was well purged to dryness? NO

Well Total Depth (ft) 137

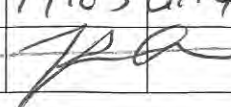
Water Level After Purge (ft) 84.65

Casing Diameter, (inches) 2

Date/Time Completed 6-19-13 1451

Sand Pack Diameter, (inches) N/A

PURGE DATA:

Time	Depth to Water	Flow Rate (mL/min)	Temp (°C)	pH (su)	Specific Cond. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1424	84.83	700	17.48	7.74	0.527	45.2	175.6	7.46
1427	84.98	500	15.94	7.35	0.642	39.7	181.7	6.36
1430	84.65	500	15.35	7.12	0.671	37.3	185.1	5.57
1433	84.64	500	15.24	7.01	0.674	31.7	186.4	4.12
1436	84.64	500	15.14	6.97	0.675	23.1	186.0	4.00
1439	84.65	500	14.93	6.95	0.673	16.7	186.0	3.90
1442	84.64	500	14.78	6.93	0.673	12.6	186.3	3.89
1445	84.65	500	14.83	6.93	0.671	10.8	184.4	3.86
1448	84.65	500	14.86	6.96	0.671	9.9	183.8	3.88
1451	84.65	500	14.83	6.96	0.672	9.7	183.6	3.89
								

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: 40 MW6

Method of Sampling: LOW-FLOW

Dedicated?: NO

Water Level at time of Sample Collection: 84.65

PARAMETERS: Annual () Semi-Annual () Quarterly () Monthly () Other ☒

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (°C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
14:51	84.65	500	14.83	6.96	0.472	9.7	183.6	3.89

GENERAL INFORMATION:

Weather conditions at time of sample collection: SUNNY, HOT

Sample Characteristics: CLEAR, NO OIL

COMMENTS AND OBSERVATIONS: _____

DATE: 6-19-13

SAMPLER: J. Allen

DATE: 6-19-13

QC Check By: J. Allen

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: RFAAP

Sample Point ID: 40 mw 5

Location: SWMU 40

Field Representatives: JA/JC

Sample Matrix: Ground Water

Lab Sample #: 40MW5 GW 61913

PURGE INFORMATION:

Method of Well Purge: Low Flow

Dedicated: Y or ☒ N

Date/Time Initiated 6-19-13 1220

Well Volume of Standing Water (gal) N/A

Initial Water Level (ft) 93.42

Total Volume Purged (gal) 3.5

Mid-screen Depth (ft) 148

Was well purged to dryness? NO

Well Total Depth (ft) 158

Water Level After Purge (ft) 96.20

Casing Diameter, (inches) 2

Date/Time Completed 6-19-13 1304

Sand Pack Diameter, (inches) N/A

PURGE DATA:

Time	Depth to Water	Flow Rate (mL/min)	Temp (°C)	pH (su)	Specific Cond. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1243	96.41	750	14.42	7.37	0.655	97.0	202.9	6.96
1246	96.50	600	14.57	7.27	0.662	68.8	204.7	5.51
1249	96.18	600	14.39	7.14	0.667	36.8	205.2	4.68
1252	96.10	600	14.35	7.09	0.666	26.1	204.5	4.22
1255	96.14	600	14.40	7.07	0.666	16.8	203.1	4.21
1258	96.15	600	14.23	7.04	0.668	11.6	201.8	4.18
1301	96.21	600	14.18	7.05	0.668	9.7	201.2	4.16
1304	96.20	600	14.16	7.04	0.668	9.4	200.6	4.03

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: 40 MW 5

Method of Sampling: Low Flow

Dedicated?: NO

Water Level at time of Sample Collection: 96.20

PARAMETERS: Annual () Semi-Annual () Quarterly () Monthly () Other (☒)

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (°C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1304	96.20	600	14.16	7.04	0.468	9.4	200.6	4.33

GENERAL INFORMATION:

Weather conditions at time of sample collection: Hot, Sunny

Sample Characteristics: Clear & no odor

COMMENTS AND OBSERVATIONS: _____

DATE: 6-19-13

SAMPLER: J-A Cole

DATE: 6-19-13

QC Check By: JSA

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: REAAP

Sample Point ID: 40MW7

Location: SWMU 40

Field Representatives: JA/JC

Sample Matrix: Ground Water

Lab Sample #: 40MW7GW 61813

PURGE INFORMATION:

Method of Well Purge: Low Flow

Dedicated: Y or (N)

Date/Time Initiated 6-19-13 850

Well Volume of Standing Water (gal) N/A

Initial Water Level (ft) 122.02

Total Volume Purged (gal) 4.5

Mid-screen Depth (ft) 157.5

Was well purged to dryness? No

Well Total Depth (ft) 167.5

Water Level After Purge (ft) 124.19

Casing Diameter, (inches) 2

Date/Time Completed 6-19-13 951

Sand Pack Diameter, (inches) N/A

PURGE DATA:

Time	Depth to Water	Flow Rate (mL/min)	Temp (°C)	pH (su)	Specific Cond. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
0927	124.50	400	13.32	7.06	0.404	5.4	318.7	8.59
0930	125.80	400	13.62	7.09	0.405	5.1	311.2	8.05
0933	124.95	400	13.80	7.15	0.406	2.4	305.2	7.85
0936	124.32	400	14.60	7.22	0.606	2.0	295.2	4.12
0939	124.24	400	14.19	7.19	0.607	1.4	293.5	5.03
0942	124.28	400	13.64	7.17	0.606	1.8	296.2	4.42
0945	124.28	400	13.70	7.14	0.406	2.0	296.4	4.21
0948	124.25	400	13.59	7.14	0.606	1.9	296.4	3.98
0951	124.19	400	13.43	7.12	0.607	1.7	297.0	3.89

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: 40 MW 7

Method of Sampling: Low - Flow

Dedicated?: NO

Water Level at time of Sample Collection: 124.19

PARAMETERS: Annual () Semi-Annual () Quarterly () Monthly () Other ☒

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (°C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
951	124.19	400	13.43	7.12	0.607	1.7	297.0	3.89

GENERAL INFORMATION:

Weather conditions at time of sample collection: WARM, SUNNY

Sample Characteristics: CLEAR, NO OIL

COMMENTS AND OBSERVATIONS: _____

DATE: 6-19-13

SAMPLER: J. H. H.

DATE: 6-19-13

QC Check By: J. H. H.

COC No. A 5003

156 Starlite Drive
Marietta, OH 45750**KEMRON**
ENVIRONMENTAL SERVICES
CHAIN-OF-CUSTODY RECORD

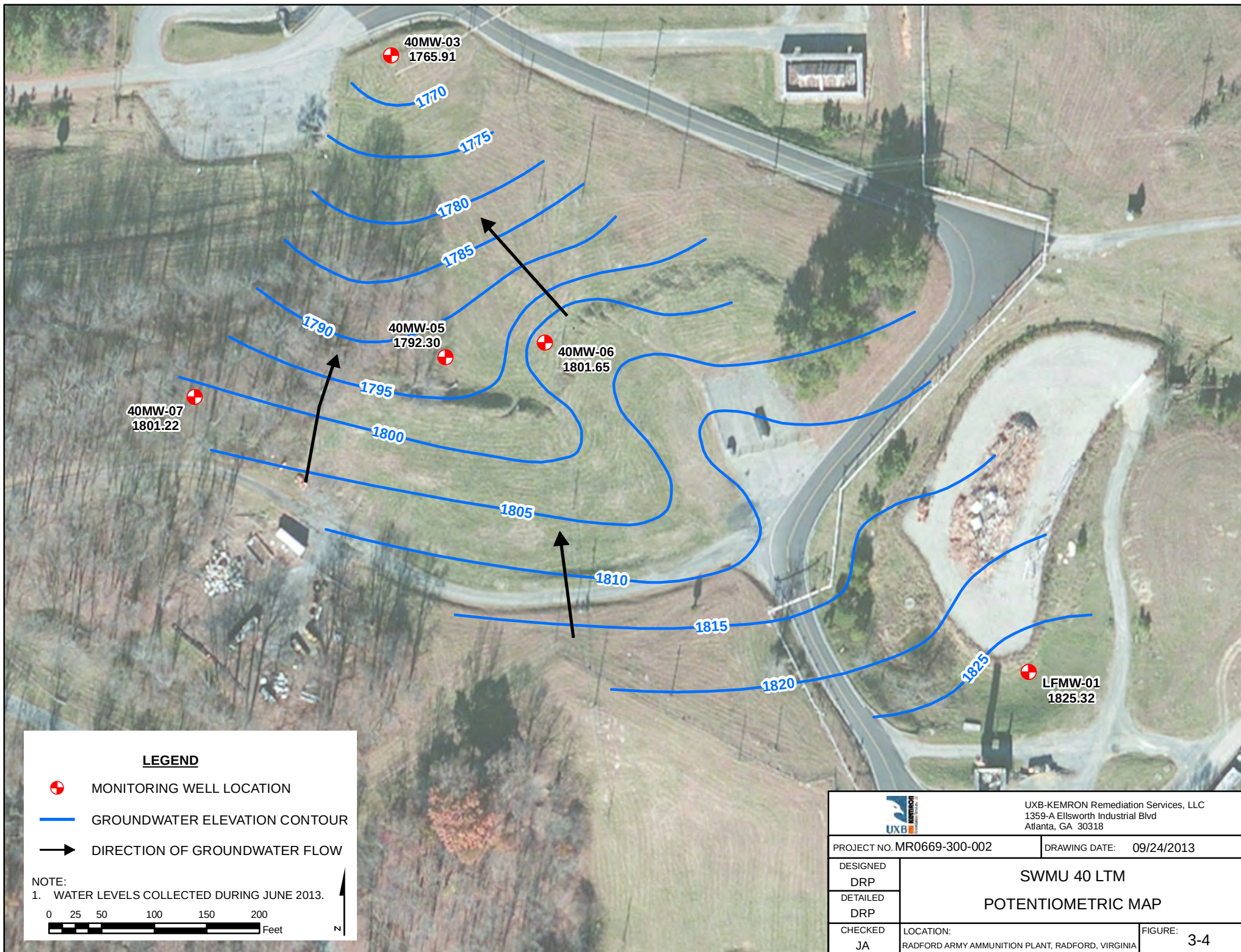
Phone: 740-373-4308

Fax: 740-376-2536

Company Name: LXB - KEMRON						Program ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____ ADDITIONAL REQUIREMENTS APRIL 2013 SUMU 40 RFAP SEE ATTACHED LIST FOR SPECIFIC ANALYTE LIST																		
Project Contact: MARY LOU ROCHOTTE			Contact Phone #: 740-373-4308																					
Turn Around Requirements: 14-DAY			Location: KADFORD, VA																					
Project ID: MRO669-300-002			Signature: [Signature]																					
Sampler (print): JOHN H. ANDERSON						TOTAL # (LAB USE)																		
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	VOC-8260	SVOC-PAH	PERCHLORATE	METALS	METALS - FILTERED												
40MW7GW61913		X	6-19-13	951	W	7		3	2	1	1													
40EAR61913		X	6-19-13	1140	W	7		3	2	1	1													
40FB61913		X	6-19-13	1145	W	7		3	2	1	1													
40TB61913			6-19-13		W	2		2																
40MWSGW61913		X	6-19-13	1304	W	7		3	2	1	1													
40MWSMSGW61913		X	6-19-13	1310	W	7		3	2	1	1													
40MWSMSD61913		X	6-19-13	1310	W	7		3	2	1	1													
40MWSMSD61913		X	6-19-13	1618	W	8		3	2	1	1	1												
40DUPGW61913		X	6-19-13	1618	W	8		3	2	1	1	1												
40MW6GW61913		X	6-19-13	1451	W	7		3	2	1	1													
[Signature]																								
Relinquished by: (Signature)		Date 6-20-13		Time 1200		Received by: (Signature)		Relinquished by: (Signature)		Date		Time		Received by: (Signature)										
Relinquished by: (Signature)		Date		Time		Received for Laboratory by: (Signature)		Date		Time		Remarks:												

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

APPENDIX C
Potentiometric Maps



APPENDIX D
Laboratory Reports and Data Validation Reports
(CD-ROM)



Date: August 30, 2013

Subject: Data Validation for Lab Report L13060982
Radford Army Ammunition Plant

From: Linda Thal
Senior Data Validator, AQA

To: Mary Lou Rochotte
Kemron Environmental Services, Inc.

OVERVIEW

Microbac Laboratories Inc., Marietta, Ohio, received 10 field samples associated with the project work described in the *Radford Army Ammunition Plant Final SWMU 40 (RAAP-009) Landfill Nitro Area IMWP (August 2011)* (project QAPP) on June 20, 2013. The field samples were assigned laboratory sample delivery group (SDG) number L13060982 and included four normal water samples, one field duplicate water sample, one matrix spike pair, one equipment blank, one field blank, and one trip blank. The samples were analyzed for volatile organic compounds (VOCs) using EPA method 8260B, polynuclear aromatic hydrocarbons (PAHs) by EPA method 8270C SIM, perchlorates by EPA method 6850, and total and dissolved metals by EPA methods 6010B, 6020, and 7470A as detailed in *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846)*, Third Edition, Final Update III.

SUMMARY

The samples were analyzed according to the quality control (QC) criteria of the applicable analytical method. The data for these samples were found to be compliant with the requirements of the project QAPP and/or EPA Region III's *Innovative Approaches to Data Validation* (June 1995) and *EPA Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994) or *EPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (April 1993) (Region III NFG, collectively), as applicable, and the results for all target analytes are considered usable.

MAJOR PROBLEMS

(Refer to Appendix B – Data Qualifier Summary)

- There were no major problems associated with the samples in this data package.

MINOR PROBLEMS

(Refer to Appendix B – Data Qualifier Summary)

- 40MW7GW61913: Acetone (UJ)
- 40EQR61913: Acetone (UJ)
- LFMW01GW61913: Selenium, dissolved 0.00171 (J)
- 40DUPGW61913: Selenium, dissolved 0.000523 (J)

NOTES

(Refer to Appendix D – Support Documentation)

Sample Chain of Custody (COC) Records

- The samples were listed on COC #50xx. The last two digits of the COC were illegible due to poor copy quality. Data were reported for all required analyses.

Preservation and Holding Times

- The samples were correctly preserved and analyzed within the holding times specified in the project QAPP and the Region III NFG.

Instrument Tune

- The instrument tunes for all applicable analyses were within the criteria specified in the project QAPP and the Region III NFG with the following exception.
 - The perchlorate tune data were not included in the data package. The laboratory stated that the instrument was tuned after maintenance was performed and that the ion ratio was verified with every sample reported to demonstrate that the instrument was working properly. No sample data were qualified based on professional judgment.

Initial Calibration (ICAL)

- The ICAL percent relative standard deviations (%RSDs) and/or correlation coefficients, as applicable, for all analyses were within the criteria specified in the project QAPP and the Region III NFG with the following exceptions.
 - The ICAL RRFs associated with samples 40MW7GW61913 and 40EQR61913 were <0.05 for acetone. Because acetone is considered to be a poor responder and the RRFs were >0.01, the associated non-detect sample results were **qualified UJ** based on professional judgment.

Initial Calibration Verification (ICV)/Continuing Calibration Verification (CCV)

- The ICV and/or CCV RRFs percent differences (%Ds) and/or recoveries, as applicable, for all analyses were within the criteria specified in the project QAPP and the Region III NFG with the following exceptions.
 - The ICV/CCV RRFs associated with samples 40MW7GW61913 and 40EQR61913 were <0.05 for acetone. Because acetone is considered to be a poor responder and the RRFs were >0.01, the associated non-detect sample results were **qualified UJ** based on professional judgment.

Contract Required Detection Limit (CRDL)

- The perchlorate CRDL was analyzed at the reporting limit (RL) and not at 2X the RL. No sample data were qualified as a result.
- A CRDL standard was not analyzed for methods 6010B and 6020. The laboratory calibration curve was linear with a standard at or near the RL and, therefore, no sample results were qualified. The laboratory analyzed LLICVs and LLCCVs. However the results were not reported in the data package and it was not possible to recalculate the results due to insufficient information available.

Inductively Coupled Plasma (ICP) Interference Check Sample

- ICP/ICP-MS interference check sample recoveries were within the project QAPP- and Region III-specified control limits, and all non-spiked ICS A results were < the MDL.
- Perchlorate interference check samples were not analyzed or reported in the data package. The laboratory analyzed and reported an MCT sample that met the criteria for the ICS.

Field Blanks

- No target analytes were detected in the field blank, equipment blank, or trip blank.

Laboratory Method Blanks

- No target analytes were detected in the method blanks.

Laboratory Calibration Blanks

- No target analytes were detected in the calibration blanks.

Laboratory Control Samples/Laboratory Control Sample Duplicates (LCSs/LCSDs)

- The LCS and/or LCSD recoveries met project QAPP- and Region III-specified QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

- One MS/MSD pair was analyzed on sample 40MW5GW61913 for all analyses and met project QAPP- and Region III-specified QC acceptance criteria with the following exceptions.

The MS/MSD recoveries were > the upper acceptance limit for calcium, and the MS recovery was < the lower acceptance limit for magnesium. The parent sample results were >4X the spike amount and, therefore, no sample results were qualified.

ICP Serial Dilution Analyses

- The serial dilution %Ds met project QAPP- and Region III-specified QC acceptance criteria with the following exception.
 - The ICP-MS serial dilution was performed on an equipment rinse.

Laboratory Sample Duplicate

- MSDs were analyzed as the laboratory duplicates for all analyses and met project QAPP- and Region III-specified QC acceptance criteria for precision.

Field Sample Duplicate

- Sample LFMW01GW61913 was collected and analyzed in duplicate (sample 40DUPGW61913) for all analyses. The relative percent differences (RPDs) between the sample and duplicate results were within the project QAPP-specified control limits with the following exceptions.

The dissolved selenium result was > the reporting limit (RL) for sample LFMW01GW61913 and < the RL for its duplicate, and the absolute difference between the two results was > the RL. Both results were **qualified J**.

Analyte	LFMW01GW61913		40DUPGW61913		RPD	>25%
	Result	RL	Result	RL		
Perchlorate	4.38	0.2	4.44	0.2	1.36	
Al, total	0.145	0.2	0.127	0.2	<RL	
Ca, total	75.9	0.5	75.8	0.5	0.13	
Fe, total	0.311	0.1	0.29	0.1	6.99	
Mg, total	29.2	0.5	30.3	0.5	3.70	
K, total	1.66	1	1.74	1	4.71	
Na, total	8.18	0.5	8.41	0.5	2.77	
V, total	0.00929	0.01	0.00864	0.01	<RL	
Ba, total	0.0623	0.003	0.0619	0.003	0.64	
Mn, total	0.00289	0.002	0.00248	0.002	15.27	
Se, total	0.000928	0.001	0.000676	0.001	<RL	
Ca, dissolved	77.7	0.5	78.1	0.5	0.51	
Mg, dissolved	29.8	0.5	29.3	0.5	1.69	
K, dissolved	1.69	1	1.62	1	4.23	
Na, dissolved	8.54	0.5	8.49	0.5	0.59	
V, dissolved	0.0108	0.01	0.0109	0.01	0.92	
Ba, dissolved	0.0575	0.003	0.0614	0.003	6.56	
Se, dissolved	0.00171	0.001	0.000523	0.001	106.32	J

NOTE: All results not listed in the table were non-detects.

Sample Surrogate Spikes

- Surrogate spikes added to all field samples analyzed for VOCs and PAHs were within the project QAPP-specified control limits.

Sample Internal Standard Recoveries

- The internal standard recoveries for VOCs, PAHs, and perchlorates were within the project QAPP- and Region III-specified control limits.
- The internal standard recoveries for metals by method 6020 were within the 60-125% limits provided in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (NFG) (October 2004).

Sample Results

- The samples were analyzed for the methods requested on the COC. Method detection limits (MDLs) and RLs were reported for all analyses and met project-specified MDLs and RLs with the following exceptions.
 - The MDLs and RLs for aluminum and calcium were > the MDLs/RLs specified in the project QAPP.
 - The MDLs for Fe, K, As, Ba, Co, Pb and Mn were > the MDLs specified in the project QAPP; however, their associated RLs were ≤ the RLs specified in the project QAPP.
- Sample LFMW01GW61913 and its duplicate, sample 40DUPGW61913, were diluted 2X for perchlorate.
- The sample IDs and analytical dates/times analyzed on the result forms for method 6010B match the sample IDs and analytical dates/times on the run log; however, the raw data with the same analytical dates/times as the run log do not have matching sample IDs. The laboratory confirmed that the samples IDs and analytical dates/times on the run log and result forms were correct.

Action Level Notification

- No results were above the action levels specified in the EPA Region III's *Innovative Approaches to Data Validation* (June 1995).

Usability Statement

- There were 175 field sample data points associated with the data package for SDG L13060982. Of these field sample data points, 171 (97.71% of the total) were assessed and left unqualified, 2 (1.14% of the total) were assessed and qualified UJ, and 2 (1.14% of the total) were assessed and qualified J.

- The field sample data points that were qualified UJ can be categorized as definitive data with non-detectable analyte concentrations that are only estimates due to QC deficiencies.
- The field sample data points that were qualified J can be categorized as definitive data with positively identified analyte concentrations that are only estimates due to QC deficiencies.
- The unqualified field sample data points can be categorized as definitive data with no associated QC deficiencies. Based on the number of unqualified data points, the percent completeness is 97.71%.

Report Content Statement

This report has been formatted for consistency with Appendix B, Region III Standard Operating Procedures for Data Validation Reports, contained in the guidance *EPA Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994). The laboratory data were reviewed in accordance with the EPA Region III's *Innovative Approaches to Data Validation* (June 1995) and *EPA Region III Modifications to the National Functional Guidelines for Organic Data Review* (September 1994) or *EPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (April 1993) (Region III NFG, collectively), as applicable; and the *Radford Army Ammunition Plant Final SWMU 40 (RAAP-009) Landfill Nitro Area IMWP* (August 2011) (project QAPP); and the applicable SW-846 methods. This report only addresses those problems and issues that may affect data usability.

Attachments

Appendix A – Glossary of Data Qualifiers

Appendix B – Data Qualifier Summary

Appendix C – Laboratory Report Results/Data Summary

Appendix D – Support Documentation

Appendix A – Glossary of Data Qualifiers

Data Qualifier Codes

Codes Related to Identification

- U Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
- B Not detected substantially above the level reported in laboratory or field blanks.
- R Unusable result. Analyte may or may not be present in the sample.

Codes Related to Quantitation

- J Analyte present. Reported value may or may not be accurate or precise.
- 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.
- UJ Not detected. Quantitation limit may be inaccurate or imprecise.
- UL The analyte was not detected, and the reported quantitation limit is probably higher than reported.

Appendix B – Data Qualifier Summary

Data Qualifier Summary

Note: The results listed in this table are detects and qualified non-detects only. Unqualified non-detects are not listed.

FIELD SAMPLE ID/ LAB SAMPLE ID	ANALYTE	FINAL VALIDATION QUALIFIER	INITIAL LAB QUALIFIER	REASON
40MW7GW61913 L13060982-01	Acetone	UJ	U	ICAL/ICV/CCV RRF <0.05
	Iron, total	J	J	>MDL, <RL
	Vanadium, total	J	J	>MDL, <RL
	Manganese, total	J	J	>MDL, <RL
	Selenium, total	J	J	>MDL, <RL
40EQR61913 L13060982-02	Acetone	UJ	U	ICV/CCV RRF <0.05
40MW5GW61913 L13060982-05	Manganese, total	J	J	>MDL, <RL
	Selenium, total	J	J	>MDL, <RL
LFMW01GW61913 L13060982-08, -09	Selenium, dissolved	J		FD RPD >CL
	Aluminum, total	J	J	>MDL, <RL
	Vanadium, total	J	J	>MDL, <RL
	Selenium, total	J	J	>MDL, <RL
40DUPGW61913 L13060982-10, -11	Selenium, dissolved	J	J	>MDL, <RL, FD RPD >CL
	Aluminum, total	J	J	>MDL, <RL
	Vanadium, total	J	J	>MDL, <RL
	Selenium, total	J	J	>MDL, <RL
40MW6GW61913 L13060982-12	Lead, total	J	J	>MDL, <RL

Appendix C – Laboratory Report Results/Data Summary

Certificate of Analysis

Sample #: L13060982-01	PrePrep Method: N/A	Instrument: HPMS6
Client ID: 40MW7GW61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/20/2013 19:32
Workgroup #: WG435036	Analyst: MES	Run Date: 06/22/2013 13:14
Collect Date: 06/19/2013 09:51	Dilution: 1	File ID: 6M117692
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	102	70	120		
4-Bromofluorobenzene	109	75	120		
Dibromofluoromethane	106	85	115		
Toluene-d8	104	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-01	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40MW7GW61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 13:31
Collect Date: 06/19/2013 09:51	Dilution: 1	File ID: 15M09561
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0549	0.0275
Benzo(a)pyrene	50-32-8		U	0.0549	0.0275
Benzo(b)fluoranthene	205-99-2		U	0.0549	0.0275
Benzo(k)fluoranthene	207-08-9		U	0.0549	0.0275
Chrysene	218-01-9		U	0.0549	0.0275
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	77.4	40	110		
2-Fluorobiphenyl	93.4	50	110		
p-Terphenyl-d14	111	50	135		
U	Analyte was not detected. The concentration is below the reported LOD.				

Certificate of Analysis

Sample #: L13060982-01	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40MW7GW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 18:42
Collect Date: 06/19/2013 09:51	Dilution: 1	File ID: 1LM.LM21602
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	4.10		0.200	0.100

Sample #: L13060982-01	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40MW7GW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:21
Collect Date: 06/19/2013 09:51	Dilution: 1	File ID: P2.070113.122148
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	71.3		0.500	0.250
Iron, Total	7439-89-6	0.0553	J	0.100	0.0500
Magnesium, Total	7439-95-4	32.2		0.500	0.250
Potassium, Total	7440-09-7	1.55		1.00	0.500
Sodium, Total	7440-23-5	3.99		0.500	0.250
Vanadium, Total	7440-62-2	0.00980	J	0.0100	0.00500
J	Estimated value ; the analyte concentration was less than the LOQ.				
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-01	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40MW7GW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 13:36
Collect Date: 06/19/2013 09:51	Dilution: 1	File ID: NI.062513.133606
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.130		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00176	J	0.00200	0.00100

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Analyte	CAS #	Result	Qual	LOQ	LOD
Selenium, Total	7782-49-2	0.000678	J	0.00100	0.000500
J	Estimated value ; the analyte concentration was less than the LOQ.				
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-02	PrePrep Method: N/A	Instrument: HPMS6
Client ID: 40EQR61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/20/2013 19:32
Workgroup #: WG435036	Analyst: MES	Run Date: 06/22/2013 17:53
Collect Date: 06/19/2013 11:40	Dilution: 1	File ID: 6M117701
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	106	70	120		
4-Bromofluorobenzene	106	75	120		
Dibromofluoromethane	107	85	115		
Toluene-D8	102	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-02	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40EQR61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 13:57
Collect Date: 06/19/2013 11:40	Dilution: 1	File ID: 15M09562
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0526	0.0263
Benzo(a)pyrene	50-32-8		U	0.0526	0.0263
Benzo(b)fluoranthene	205-99-2		U	0.0526	0.0263
Benzo(k)fluoranthene	207-08-9		U	0.0526	0.0263
Chrysene	218-01-9		U	0.0526	0.0263
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	63.3	40	110		
2-Fluorobiphenyl	75.6	50	110		
p-Terphenyl-d14	81.0	50	135		
U	Analyte was not detected. The concentration is below the reported LOD.				

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Sample #: L13060982-02	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40EQR61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 19:01
Collect Date: 06/19/2013 11:40	Dilution: 1	File ID: 1LM.LM21603
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0		U	0.200	0.100
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-02	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40EQR61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:29
Collect Date: 06/19/2013 11:40	Dilution: 1	File ID: P2.070113.122954
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2		U	0.500	0.250
Iron, Total	7439-89-6		U	0.100	0.0500
Magnesium, Total	7439-95-4		U	0.500	0.250
Potassium, Total	7440-09-7		U	1.00	0.500
Sodium, Total	7440-23-5		U	0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-02	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40EQR61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 13:39
Collect Date: 06/19/2013 11:40	Dilution: 1	File ID: NI.062513.133953
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3		U	0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5		U	0.00200	0.00100

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Analyte	CAS #	Result	Qual	LOQ	LOD
Selenium, Total	7782-49-2		U	0.00100	0.000500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-03	PrePrep Method: N/A	Instrument: HPMS8
Client ID: 40FB61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 17:09
Collect Date: 06/19/2013 11:45	Dilution: 1	File ID: 8M388980
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	94.4	70	120		
4-Bromofluorobenzene	99.6	75	120		
Dibromofluoromethane	96.1	85	115		
Toluene-d8	98.0	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-03	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40FB61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 14:22
Collect Date: 06/19/2013 11:45	Dilution: 1	File ID: 15M09563
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0526	0.0263
Benzo(a)pyrene	50-32-8		U	0.0526	0.0263
Benzo(b)fluoranthene	205-99-2		U	0.0526	0.0263
Benzo(k)fluoranthene	207-08-9		U	0.0526	0.0263
Chrysene	218-01-9		U	0.0526	0.0263
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	70.5	40	110		
2-Fluorobiphenyl	88.5	50	110		
p-Terphenyl-d14	96.8	50	135		
U	Analyte was not detected. The concentration is below the reported LOD.				

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Sample #: L13060982-03	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40FB61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 19:20
Collect Date: 06/19/2013 11:45	Dilution: 1	File ID: 1LM.LM21604
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0		U	0.200	0.100
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-03	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40FB61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:32
Collect Date: 06/19/2013 11:45	Dilution: 1	File ID: P2.070113.123255
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2		U	0.500	0.250
Iron, Total	7439-89-6		U	0.100	0.0500
Magnesium, Total	7439-95-4		U	0.500	0.250
Potassium, Total	7440-09-7		U	1.00	0.500
Sodium, Total	7440-23-5		U	0.500	0.250
Vanadium, Total	7440-62-2		U	0.0100	0.00500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-03	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40FB61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 14:06
Collect Date: 06/19/2013 11:45	Dilution: 1	File ID: NI.062513.140622
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3		U	0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5		U	0.00200	0.00100

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Analyte	CAS #	Result	Qual	LOQ	LOD
Selenium, Total	7782-49-2		U	0.00100	0.000500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-04	PrePrep Method: N/A	Instrument: HPMS8
Client ID: 40TB61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 16:39
Collect Date: 06/19/2013 00:01	Dilution: 1	File ID: 8M388979
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	90.8	70	120		
4-Bromofluorobenzene	99.8	75	120		
Dibromofluoromethane	93.9	85	115		
Toluene-d8	97.6	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-05	PrePrep Method: N/A	Instrument: HPMS8
Client ID: 40MW5GW61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 17:39
Collect Date: 06/19/2013 13:04	Dilution: 1	File ID: 8M388981
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	93.8	70	120		
4-Bromofluorobenzene	99.9	75	120		
Dibromofluoromethane	95.6	85	115		
Toluene-d8	98.4	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

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Sample #: L13060982-05	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40MW5GW61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 14:48
Collect Date: 06/19/2013 13:04	Dilution: 1	File ID: 15M09564
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0538	0.0269
Benzo(a)pyrene	50-32-8		U	0.0538	0.0269
Benzo(b)fluoranthene	205-99-2		U	0.0538	0.0269
Benzo(k)fluoranthene	207-08-9		U	0.0538	0.0269
Chrysene	218-01-9		U	0.0538	0.0269
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	66.0	40	110		
2-Fluorobiphenyl	85.3	50	110		
p-Terphenyl-d14	94.8	50	135		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-05	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40MW5GW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 19:39
Collect Date: 06/19/2013 13:04	Dilution: 1	File ID: 1LM.LM21605
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	0.850		0.200	0.100

Sample #: L13060982-05	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40MW5GW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:35
Collect Date: 06/19/2013 13:04	Dilution: 1	File ID: P2.070113.123555
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5		U	0.200	0.100
Calcium, Total	7440-70-2	91.6		0.500	0.250
Iron, Total	7439-89-6	0.137		0.100	0.0500
Magnesium, Total	7439-95-4	32.5		0.500	0.250

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Analyte	CAS #	Result	Qual	LOQ	LOD
Potassium, Total	7440-09-7	1.10		1.00	0.500
Sodium, Total	7440-23-5	4.59		0.500	0.250
Vanadium, Total	7440-62-2	0.0105		0.0100	0.00500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-05	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40MW5GW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 13:24
Collect Date: 06/19/2013 13:04	Dilution: 1	File ID: NI.062513.132448
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0569		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00180	J	0.00200	0.00100
Selenium, Total	7782-49-2	0.000943	J	0.00100	0.000500
J	Estimated value ; the analyte concentration was less than the LOQ.				
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-06	PrePrep Method: N/A	Instrument: HPMS8
Client ID: 40MW5MSGW61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 18:09
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: 8M388982
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8	21.2		10.0	2.00
Acetone	67-64-1	16.1		10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	96.6	70	120		
4-Bromofluorobenzene	100	75	120		
Dibromofluoromethane	98.1	85	115		
Toluene-d8	97.7	85	120		

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Sample #: L13060982-06	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40MW5MSGW61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 15:14
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: 15M09565
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3	0.743		0.0532	0.0266
Benzo(a)pyrene	50-32-8	0.700		0.0532	0.0266
Benzo(b)fluoranthene	205-99-2	0.655		0.0532	0.0266
Benzo(k)fluoranthene	207-08-9	0.721		0.0532	0.0266
Chrysene	218-01-9	0.769		0.0532	0.0266
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	60.0	40	110		
2-Fluorobiphenyl	75.6	50	110		
p-Terphenyl-d14	84.8	50	135		

Sample #: L13060982-06	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40MW5MSGW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 19:58
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: 1LM.LM21606
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	1.03		0.200	0.100

Sample #: L13060982-06	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40MW5MSGW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:43
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: P2.070113.124359
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	5.65		0.200	0.100
Calcium, Total	7440-70-2	99.9		0.500	0.250
Iron, Total	7439-89-6	2.33		0.100	0.0500
Magnesium, Total	7439-95-4	36.5		0.500	0.250
Potassium, Total	7440-09-7	28.7		1.00	0.500

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Analyte	CAS #	Result	Qual	LOQ	LOD
Sodium, Total	7440-23-5	32.3		0.500	0.250
Vanadium, Total	7440-62-2	0.586		0.0100	0.00500

Sample #: L13060982-06	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40MW5MSGW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 13:28
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: NI.062513.132834
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2	0.0643		0.00100	0.000500
Barium, Total	7440-39-3	0.117		0.00300	0.00150
Cobalt, Total	7440-48-4	0.0611		0.00100	0.000500
Lead, Total	7439-92-1	0.0643		0.00100	0.000500
Manganese, Total	7439-96-5	0.0629		0.00200	0.00100
Selenium, Total	7782-49-2	0.0659		0.00100	0.000500

Sample #: L13060982-07	PrePrep Method: N/A	Instrument: HPMS8
Client ID: 40MW5MSDGW61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 18:39
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: 8M388983
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8	20.9		10.0	2.00
Acetone	67-64-1	15.9		10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	94.6	70	120		
4-Bromofluorobenzene	99.7	75	120		
Dibromofluoromethane	96.3	85	115		
Toluene-d8	98.1	85	120		

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Sample #: L13060982-07	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40MW5MSDGW61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 15:40
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: 15M09566
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3	0.648		0.0521	0.0260
Benzo(a)pyrene	50-32-8	0.641		0.0521	0.0260
Benzo(b)fluoranthene	205-99-2	0.634		0.0521	0.0260
Benzo(k)fluoranthene	207-08-9	0.600		0.0521	0.0260
Chrysene	218-01-9	0.689		0.0521	0.0260
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	53.9	40	110		
2-Fluorobiphenyl	64.6	50	110		
p-Terphenyl-d14	78.2	50	135		

Sample #: L13060982-07	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40MW5MSDGW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 20:17
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: 1LM.LM21607
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	1.06		0.200	0.100

Sample #: L13060982-07	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40MW5MSDGW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:46
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: P2.070113.124603
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	6.05		0.200	0.100
Calcium, Total	7440-70-2	103		0.500	0.250
Iron, Total	7439-89-6	2.40		0.100	0.0500
Magnesium, Total	7439-95-4	37.3		0.500	0.250
Potassium, Total	7440-09-7	31.1		1.00	0.500

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Sodium, Total	7440-23-5	35.0		0.500	0.250
Vanadium, Total	7440-62-2	0.603		0.0100	0.00500

Sample #: L13060982-07	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40MW5MSDGW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 13:32
Collect Date: 06/19/2013 13:10	Dilution: 1	File ID: NI.062513.133220
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2	0.0642		0.00100	0.000500
Barium, Total	7440-39-3	0.118		0.00300	0.00150
Cobalt, Total	7440-48-4	0.0610		0.00100	0.000500
Lead, Total	7439-92-1	0.0649		0.00100	0.000500
Manganese, Total	7439-96-5	0.0624		0.00200	0.00100
Selenium, Total	7782-49-2	0.0661		0.00100	0.000500

Sample #: L13060982-08	PrePrep Method: N/A	Instrument: HPMS8
Client ID: LFMW01GW61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 19:09
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: 8M388984
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	93.7	70	120		
4-Bromofluorobenzene	100	75	120		
Dibromofluoromethane	95.5	85	115		
Toluene-d8	97.8	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Certificate of Analysis

Sample #: L13060982-08	PrePrep Method: N/A	Instrument: HPMS15
Client ID: LFMW01GW61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 16:06
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: 15M09567
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0515	0.0258
Benzo(a)pyrene	50-32-8		U	0.0515	0.0258
Benzo(b)fluoranthene	205-99-2		U	0.0515	0.0258
Benzo(k)fluoranthene	207-08-9		U	0.0515	0.0258
Chrysene	218-01-9		U	0.0515	0.0258
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	68.8	40	110		
2-Fluorobiphenyl	86.1	50	110		
p-Terphenyl-d14	99.3	50	135		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-08	PrePrep Method: N/A	Instrument: LCMS1
Client ID: LFMW01GW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 20:35
Collect Date: 06/19/2013 16:18	Dilution: 2	File ID: 1LM.LM21608
Sample Tag: DL01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	4.38		0.400	0.200

Sample #: L13060982-08	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: LFMW01GW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:48
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: P2.070113.124807
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.145	J	0.200	0.100
Calcium, Total	7440-70-2	75.9		0.500	0.250
Iron, Total	7439-89-6	0.311		0.100	0.0500
Magnesium, Total	7439-95-4	29.2		0.500	0.250

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Potassium, Total	7440-09-7	1.66		1.00	0.500
Sodium, Total	7440-23-5	8.18		0.500	0.250
Vanadium, Total	7440-62-2	0.00929	J	0.0100	0.00500
J	Estimated value ; the analyte concentration was less than the LOQ.				

Sample #: L13060982-08	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: LFMW01GW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 14:10
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: NI.062513.141008
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0623		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00289		0.00200	0.00100
Selenium, Total	7782-49-2	0.000928	J	0.00100	0.000500
J	Estimated value ; the analyte concentration was less than the LOQ.				
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-09	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: LFMW01GW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:51
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: P2.070113.125107
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Calcium, Dissolved	7440-70-2	77.7		0.500	0.250
Iron, Dissolved	7439-89-6		U	0.100	0.0500
Magnesium, Dissolved	7439-95-4	29.8		0.500	0.250
Potassium, Dissolved	7440-09-7	1.69		1.00	0.500
Sodium, Dissolved	7440-23-5	8.54		0.500	0.250
Vanadium, Dissolved	7440-62-2	0.0108		0.0100	0.00500
U	Analyte was not detected. The concentration is below the reported LOD.				

Certificate of Analysis

Sample #: L13060982-09	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: LFMW01GW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 14:13
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: NI.062513.141355
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Dissolved	7440-38-2		U	0.00100	0.000500
Barium, Dissolved	7440-39-3	0.0575		0.00300	0.00150
Cobalt, Dissolved	7440-48-4		U	0.00100	0.000500
Lead, Dissolved	7439-92-1		U	0.00100	0.000500
Manganese, Dissolved	7439-96-5		U	0.00200	0.00100
Selenium, Dissolved	7782-49-2	0.00171		0.00100	0.000500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-10	PrePrep Method: N/A	Instrument: HPMS8
Client ID: 40DUPGW61913	Prep Method: 5030B/5030C/5035A	Prep Date: N/A
Matrix: Water	Analytical Method: 8260B	Cal Date: 06/12/2013 18:20
Workgroup #: WG435060	Analyst: MES	Run Date: 06/22/2013 19:39
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: 8M388985
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	94.4	70	120		
4-Bromofluorobenzene	101	75	120		
Dibromofluoromethane	94.9	85	115		
Toluene-d8	98.5	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-10	PrePrep Method: N/A	Instrument: HPMS15
Client ID: 40DUPGW61913	Prep Method: 3510C	Prep Date: 06/23/2013 12:01
Matrix: Water	Analytical Method: 8270C	Cal Date: 06/16/2013 21:00
Workgroup #: WG435197	Analyst: MES/MDC	Run Date: 06/25/2013 16:32
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: 15M09568
Sample Tag: 01	Units: ug/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0521	0.0260
Benzo(a)pyrene	50-32-8		U	0.0521	0.0260
Benzo(b)fluoranthene	205-99-2		U	0.0521	0.0260
Benzo(k)fluoranthene	207-08-9		U	0.0521	0.0260
Chrysene	218-01-9		U	0.0521	0.0260
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
Nitrobenzene-d5	79.7	40	110		
2-Fluorobiphenyl	96.6	50	110		
p-Terphenyl-d14	109	50	135		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-10	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40DUPGW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 20:54
Collect Date: 06/19/2013 16:18	Dilution: 2	File ID: 1LM.LM21609
Sample Tag: DL01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	4.44		0.400	0.200

Sample #: L13060982-10	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40DUPGW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:54
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: P2.070113.125407
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.127	J	0.200	0.100
Calcium, Total	7440-70-2	75.8		0.500	0.250
Iron, Total	7439-89-6	0.290		0.100	0.0500
Magnesium, Total	7439-95-4	30.3		0.500	0.250
Potassium, Total	7440-09-7	1.74		1.00	0.500
Sodium, Total	7440-23-5	8.41		0.500	0.250
Vanadium, Total	7440-62-2	0.00864	J	0.0100	0.00500
J	Estimated value ; the analyte concentration was less than the LOQ.				

Certificate of Analysis

Sample #: L13060982-10	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40DUPGW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 14:17
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: NI.062513.141742
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0619		0.00300	0.00150
Cobalt, Total	7440-48-4		U	0.00100	0.000500
Lead, Total	7439-92-1		U	0.00100	0.000500
Manganese, Total	7439-96-5	0.00248		0.00200	0.00100
Selenium, Total	7782-49-2	0.000676	J	0.00100	0.000500
J	Estimated value ; the analyte concentration was less than the LOQ.				
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-11	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40DUPGW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 12:57
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: P2.070113.125707
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Dissolved	7429-90-5		U	0.200	0.100
Calcium, Dissolved	7440-70-2	78.1		0.500	0.250
Iron, Dissolved	7439-89-6		U	0.100	0.0500
Magnesium, Dissolved	7439-95-4	29.3		0.500	0.250
Potassium, Dissolved	7440-09-7	1.62		1.00	0.500
Sodium, Dissolved	7440-23-5	8.49		0.500	0.250
Vanadium, Dissolved	7440-62-2	0.0109		0.0100	0.00500
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-11	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40DUPGW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 14:21
Collect Date: 06/19/2013 16:18	Dilution: 1	File ID: NI.062513.142128
Sample Tag: 01	Units: mg/L	

Certificate of Analysis

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Dissolved	7440-38-2		U	0.00100	0.000500
Barium, Dissolved	7440-39-3	0.0614		0.00300	0.00150
Cobalt, Dissolved	7440-48-4		U	0.00100	0.000500
Lead, Dissolved	7439-92-1		U	0.00100	0.000500
Manganese, Dissolved	7439-96-5		U	0.00200	0.00100
Selenium, Dissolved	7782-49-2	0.000523	J	0.00100	0.000500
J	Estimated value ; the analyte concentration was less than the LOQ.				
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-12

PrePrep Method: N/A

Instrument: HPMS8

Client ID: 40MW6GW61913

Prep Method: 5030B/5030C/5035A

Prep Date: N/A

Matrix: Water

Analytical Method: 8260B

Cal Date: 06/12/2013 18:20

Workgroup #: WG435060

Analyst: MES

Run Date: 06/22/2013 20:08

Collect Date: 06/19/2013 14:51

Dilution: 1

File ID: 8M388986

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
2-Chloroethyl vinyl ether	110-75-8		U	10.0	2.00
Acetone	67-64-1		U	10.0	2.50
Surrogate	Recovery	Lower Limit	Upper Limit	Q	
1,2-Dichloroethane-d4	95.3	70	120		
4-Bromofluorobenzene	102	75	120		
Dibromofluoromethane	96.7	85	115		
Toluene-d8	98.4	85	120		
U	Analyte was not detected. The concentration is below the reported LOD.				

Sample #: L13060982-12

PrePrep Method: N/A

Instrument: HPMS15

Client ID: 40MW6GW61913

Prep Method: 3510C

Prep Date: 06/23/2013 12:01

Matrix: Water

Analytical Method: 8270C

Cal Date: 06/16/2013 21:00

Workgroup #: WG435197

Analyst: MES/MDC

Run Date: 06/25/2013 16:57

Collect Date: 06/19/2013 14:51

Dilution: 1

File ID: 15M09569

Sample Tag: 01

Units: ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD
Benzo(a)anthracene	56-55-3		U	0.0515	0.0258
Benzo(a)pyrene	50-32-8		U	0.0515	0.0258
Benzo(b)fluoranthene	205-99-2		U	0.0515	0.0258
Benzo(k)fluoranthene	207-08-9		U	0.0515	0.0258
Chrysene	218-01-9		U	0.0515	0.0258
Surrogate	Recovery	Lower Limit	Upper Limit	Q	

Certificate of Analysis

Nitrobenzene-d5	51.1	40	110	
2-Fluorobiphenyl	62.3	50	110	
p-Terphenyl-d14	71.0	50	135	

U	Analyte was not detected. The concentration is below the reported LOD.			
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Sample #: L13060982-12	PrePrep Method: N/A	Instrument: LCMS1
Client ID: 40MW6GW61913	Prep Method: 6850	Prep Date: 06/24/2013 16:30
Matrix: Water	Analytical Method: 6850	Cal Date: 06/08/2013 02:05
Workgroup #: WG435251	Analyst: JWR	Run Date: 06/24/2013 22:10
Collect Date: 06/19/2013 14:51	Dilution: 1	File ID: 1LM.LM21613
Sample Tag: 01	Units: ug/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Perchlorate	14797-73-0	0.535		0.200	0.100

Sample #: L13060982-12	PrePrep Method: N/A	Instrument: PE-ICP2
Client ID: 40MW6GW61913	Prep Method: 3015	Prep Date: 06/23/2013 09:17
Matrix: Water	Analytical Method: 6010B	Cal Date: 07/01/2013 08:36
Workgroup #: WG435260	Analyst: KHR	Run Date: 07/01/2013 13:00
Collect Date: 06/19/2013 14:51	Dilution: 1	File ID: P2.070113.130007
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Aluminum, Total	7429-90-5	0.378		0.200	0.100
Calcium, Total	7440-70-2	89.8		0.500	0.250
Iron, Total	7439-89-6	0.478		0.100	0.0500
Magnesium, Total	7439-95-4	33.9		0.500	0.250
Potassium, Total	7440-09-7	1.24		1.00	0.500
Sodium, Total	7440-23-5	4.09		0.500	0.250
Vanadium, Total	7440-62-2	0.0109		0.0100	0.00500

Sample #: L13060982-12	PrePrep Method: N/A	Instrument: ICP-MS2
Client ID: 40MW6GW61913	Prep Method: 3015	Prep Date: 06/24/2013 06:38
Matrix: Water	Analytical Method: 6020	Cal Date: 06/25/2013 09:20
Workgroup #: WG435288	Analyst: JYH	Run Date: 06/25/2013 14:25
Collect Date: 06/19/2013 14:51	Dilution: 1	File ID: NI.062513.142514
Sample Tag: 01	Units: mg/L	

Analyte	CAS #	Result	Qual	LOQ	LOD
Arsenic, Total	7440-38-2		U	0.00100	0.000500
Barium, Total	7440-39-3	0.0491		0.00300	0.00150

Certificate of Analysis

Analyte		CAS #	Result	Qual	LOQ	LOD
Cobalt, Total		7440-48-4		U	0.00100	0.000500
Lead, Total		7439-92-1	0.000569	J	0.00100	0.000500
Manganese, Total		7439-96-5	0.00292		0.00200	0.00100
Selenium, Total		7782-49-2	0.00106		0.00100	0.000500
J	Estimated value ; the analyte concentration was less than the LOQ.					
U	Analyte was not detected. The concentration is below the reported LOD.					

Appendix D – Support Documentation

Laboratory Report Number: L13060982

Mary Lou Rochette
Kemron Environmental Services
2343-A State Rt 821
Marietta, OH 45750

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Stephanie Mossburg – Team Chemist/Data Specialist
(740) 373-4071
Stephanie.Mossburg@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 03 2013



David Vandenberg – Managing Director

State of Origin: VA
Accrediting Authority: N/A ID:N/A
QAPP: DOD Ver 4.1



Microbac Laboratories * Ohio Valley Division
158 Starlite Drive, Marietta, OH 45750 * T: (740) 373-4071 F: (740) 373-4835 * www.microbac.com

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution
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Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0018956	H	2.0			
0018227	H	0.0			
0017093	H	0.0			

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	NA
2	Were custody seals intact?	NA
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	Yes

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
40MW7GW61913	L13060982-01	06/19/2013 09:51	06/20/2013 12:03
40EQR61913	L13060982-02	06/19/2013 11:40	06/20/2013 12:03
40FB61913	L13060982-03	06/19/2013 11:45	06/20/2013 12:03
40TB61913	L13060982-04	06/19/2013 00:01	06/20/2013 12:03
40MW5GW61913	L13060982-05	06/19/2013 13:04	06/20/2013 12:03
40MW5MSGW61913	L13060982-06	06/19/2013 13:10	06/20/2013 12:03
40MW5MSDGW61913	L13060982-07	06/19/2013 13:10	06/20/2013 12:03
LFMW01GW61913	L13060982-08	06/19/2013 16:18	06/20/2013 12:03
LFMW01GW61913	L13060982-09	06/19/2013 16:18	06/20/2013 12:03
40DUPGW61913	L13060982-10	06/19/2013 16:18	06/20/2013 12:03
40DUPGW61913	L13060982-11	06/19/2013 16:18	06/20/2013 12:03
40MW6GW61913	L13060982-12	06/19/2013 14:51	06/20/2013 12:03

COC No. A 5000

156 Starlite Drive

Marietta, OH 45750

KEMRON
ENVIRONMENTAL SERVICES

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4308

Fax: 740-376-2536

Company Name: UXB-KEMRON		Contact Phone #: 740-373-4308														
Project Contact: MARY LOU ROCHETTE		Location: KADFOR, VA														
Turn Around Requirements: 14-DAY		Project ID: MRD669-300-002														
Sampler (print): JONATHAN ANDERSON		Signature: <i>[Signature]</i>														
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	Hold	NUMBER OF CONTAINERS	VOC-BZED *UNPRESERVED	SVOC-PATH	PERCHLORATE	METALS	METALS-HIGHLY ENRICHED	TOTAL # (LAB USE)	Program	ADDITIONAL REQUIREMENTS	
40MW76W61913	X	X	6-19-13	951	W	3	7	3	2	1	1	1			☐ CWA	SEE ATTACHED LIST FOR SPECIFIC ANALYTE LIST
40EQR61913	X	X	6-19-13	1140	W	3	7	3	2	1	1	1		☐ RCRA		
40FB61913	X	X	6-19-13	1145	W	3	7	3	2	1	1	1		☐ DOD		
40TB61913	X	X	6-19-13	1304	W	2	2	3	2	1	1	1		☐ AFCEE		
40MWS6W61913	X	X	6-19-13	1310	W	7	7	3	2	1	1	1		☐ Other		
40MWSMS6W61913	X	X	6-19-13	1310	W	7	7	3	2	1	1	1				
40MWSMS6W61913	X	X	6-19-13	1310	W	8	8	3	2	1	1	1				
40MWSMS6W61913	X	X	6-19-13	1418	W	8	8	3	2	1	1	1				
40DUP6W61913	X	X	6-19-13	1418	W	7	7	3	2	1	1	1				
40MW66W61913	X	X	6-19-13	1451	W	7	7	3	2	1	1	1				
Microbac OVD Received: 06/20/2013 12:03 By: ROSEMARY SCOTT <i>[Signature]</i> 221000037739																
Relinquished by: <i>[Signature]</i>		Date: 6-20-13	Time: 1200	Received for Laboratory by: <i>[Signature]</i>		Date: 6-20-13	Time: 1200	Remarks:		Date	Time	Received by: (Signature)				

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page _____ of _____



Login Number: L13060982
Department: Volatiles
Analyst: Mary Schilling

METHOD

Preparation SW-846 5030C/5035A

Analysis SW-846 8260B

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: For all compounds that yielded a %RSD greater than 15%, linear or higher order equations were applied. All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Internal Standards: All acceptance criteria were met.

Surrogates: All acceptance criteria were met.

Other: None.

Manual Integration Reason Codes

Reason #1: Data System Fails to Select Correct Peak. In some cases the chromatography system selects and integrates the 'wrong peak'. In this case the analyst must correct the selection and force the system to integrate the proper peak. Other times the system may miss the peak completely.

Reason #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak. This phenomena is common at low concentrations where the signal:noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low area counts for the target compound.

Reason #3: Improperly Integrated Isomers and/or coeluting compounds. This system often fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations are wrong, and they must be corrected by manual integration. Prime examples are benzo(k)fluoranthene and benzo(b)fluoranthene which are often unresolved and integrated improperly when both are present at low concentrations in standards or samples.

Reason #4: System Establishes Incorrect Baseline. There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and should be corrected via manual procedures.

Reason #5: Miscellaneous. Other situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the laboratory management. If the form of manual integration is not clearly covered by these four cases, then review and approval by the Managing Director or the QAO will be required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 66718

Approved By: Michael Albertson



Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L13060982
Instrument Id: HPMS8
Workgroup (AAB#): WG435060

Method: 8260
CAL ID: HPMS8 - 12-JUN-13
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L13060982-03	1.00	01	94.4	96.1	99.6	98.0
L13060982-04	1.00	01	90.8	93.9	99.8	97.6
L13060982-05	1.00	01	93.8	95.6	99.9	98.4
L13060982-06	1.00	01	96.6	98.1	100	97.7
L13060982-07	1.00	01	94.6	96.3	99.7	98.1
L13060982-08	1.00	01	93.7	95.5	100	97.8
L13060982-10	1.00	01	94.4	94.9	101	98.5
L13060982-12	1.00	01	95.3	96.7	102	98.4
WG435060-01	1.00	01	90.3	94.6	98.0	96.7
WG435060-02	1.00	01	90.7	95.6	98.6	96.7

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	70	-	120
2 - Dibromofluoromethane	85	-	115
3 - 4-Bromofluorobenzene	75	-	120
4 - Toluene-d8	85	-	120

Underline = Result out of surrogate limits

DL = surrogate diluted out

ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 2950580
Report generated: 06/27/2013 13:03



**Microbac Laboratories Inc.
SURROGATE STANDARDS**

Login Number: L13060982
Instrument Id: HPMS6
Workgroup (AAB#): WG435036

Method: 8260
CAL ID: HPMS6 - 20-JUN-13
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L13060982-01	1.00	01	102	106	109	104
L13060982-02	1.00	01	106	107	106	102
WG435036-01	1.00	01	105	106	109	103
WG435036-02	1.00	01	103	106	106	103
WG435036-06	1.00	01	108	110	106	102

Surrogates	Surrogate Limits
1 - 1,2-Dichloroethane-d4	70 - 120
2 - Dibromofluoromethane	85 - 115
3 - 4-Bromofluorobenzene	75 - 120
4 - Toluene-d8	85 - 120

Underline = Result out of surrogate limits

DL = surrogate diluted out

ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 2950580
Report generated: 06/27/2013 13:03



METHOD BLANK SUMMARY

Login Number: <u>L13060982</u>	Work Group: <u>WG435036</u>
Blank File ID: <u>6M117690</u>	Blank Sample ID: <u>WG435036-01</u>
Prep Date: <u>06/22/13 12:13</u>	Instrument ID: <u>HPMS6</u>
Analyzed Date: <u>06/22/13 12:13</u>	Method: <u>8260B</u>
Analyst: <u>MES</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG435036-02	6M117691	06/22/13 12:44	01
40MW7GW61913	L13060982-01	6M117692	06/22/13 13:14	01
40EQR61913	L13060982-02	6M117701	06/22/13 17:53	01

Report Name: BLANK_SUMMARY
PDF File ID: 2950572
Report generated 06/27/2013 13:03



METHOD BLANK SUMMARY

Login Number: <u>L13060982</u>	Work Group: <u>WG435060</u>
Blank File ID: <u>8M388976</u>	Blank Sample ID: <u>WG435060-01</u>
Prep Date: <u>06/22/13 15:10</u>	Instrument ID: <u>HPMS8</u>
Analyzed Date: <u>06/22/13 15:10</u>	Method: <u>8260B</u>
Analyst: <u>MES</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG435060-02	8M388977	06/22/13 15:40	01
40TB61913	L13060982-04	8M388979	06/22/13 16:39	01
40FB61913	L13060982-03	8M388980	06/22/13 17:09	01
40MW5GW61913	L13060982-05	8M388981	06/22/13 17:39	01
40MW5MSGW61913	L13060982-06	8M388982	06/22/13 18:09	01
40MW5MSDGW61913	L13060982-07	8M388983	06/22/13 18:39	01
LFMW01GW61913	L13060982-08	8M388984	06/22/13 19:09	01
40DUPGW61913	L13060982-10	8M388985	06/22/13 19:39	01
40MW6GW61913	L13060982-12	8M388986	06/22/13 20:08	01

Report Name: BLANK_SUMMARY
 PDF File ID: 2950572
 Report generated 06/27/2013 13:03



METHOD BLANK REPORT

Login Number: L13060982 Prep Date: 06/22/13 12:13 Sample ID: WG435036-01
 Instrument ID: HPMS6 Run Date: 06/22/13 12:13 Prep Method: 5030B/5030C/503
 File ID: 6M117690 Analyst: MES Method: 8260B
 Workgroup (AAB#): WG435036 Matrix: Water Units: ug/L
 Contract #: _____ Cal ID: HPMS6 - 20-JUN-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
2-Chloroethyl vinyl ether	2.00	10.0	2.00	1	U
Acetone	2.50	10.0	2.50	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	105	70 - 120	PASS
4-Bromofluorobenzene	109	75 - 120	PASS
Dibromofluoromethane	106	85 - 115	PASS
Toluene-d8	103	85 - 120	PASS

LOD Method Detection Limit

LOQ Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > 1/2 RL

Report Name: BLANK

PDF ID: 2950573

27-JUN-2013 13:03



METHOD BLANK REPORT

Login Number: L13060982 Prep Date: 06/22/13 15:10 Sample ID: WG435060-01
 Instrument ID: HPMS8 Run Date: 06/22/13 15:10 Prep Method: 5030B/5030C/503
 File ID: 8M388976 Analyst: MES Method: 8260B
 Workgroup (AAB#): WG435060 Matrix: Water Units: ug/L
 Contract #: _____ Cal ID: HPMS8 - 12-JUN-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
2-Chloroethyl vinyl ether	2.00	10.0	2.00	1	U
Acetone	2.50	10.0	2.50	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	90.3	70 - 120	PASS
4-Bromofluorobenzene	98.0	75 - 120	PASS
Dibromofluoromethane	94.6	85 - 115	PASS
Toluene-d8	96.7	85 - 120	PASS

LOD Method Detection Limit

LOQ Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > 1/2 RL

Report Name: BLANK

PDF ID: 2950573

27-JUN-2013 13:03



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L13060982 Run Date: 06/22/2013 Sample ID: WG435036-02
Instrument ID: HPMS6 Run Time: 12:44 Prep Method: 5030B/5030C/503
File ID: 6M117691 Analyst: MES Method: 8260B
Workgroup (AAB#): WG435036 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD58581 Cal ID: HPMS6 - 20-JUN-13

Analytes	Expected	Found	% Rec	LCS Limits	Q
2-Chloroethyl vinyl ether	20.0	20.0	100	45 - 160	
Acetone	20.0	17.4	87.1	40 - 140	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	103	70 - 120	PASS
4-Bromofluorobenzene	106	75 - 120	PASS
Dibromofluoromethane	106	85 - 115	PASS
Toluene-d8	103	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 2950574
Report generated: 06/27/2013 13:03



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L13060982 Run Date: 06/22/2013 Sample ID: WG435060-02
Instrument ID: HPMS8 Run Time: 15:40 Prep Method: 5030B/5030C/503
File ID: 8M388977 Analyst: MES Method: 8260B
Workgroup (AAB#): WG435060 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD58581 Cal ID: HPMS8 - 12-JUN-13

Analytes	Expected	Found	% Rec	LCS Limits	Q
2-Chloroethyl vinyl ether	20.0	19.9	99.6	45 - 160	
Acetone	20.0	15.2	76.0	40 - 140	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	90.7	70 - 120	PASS
4-Bromofluorobenzene	98.6	75 - 120	PASS
Dibromofluoromethane	95.6	85 - 115	PASS
Toluene-d8	96.7	85 - 120	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 2950574
Report generated: 06/27/2013 13:03



MS/MSD REPORT

Loginnum: L13060982 Cal ID: HPMS8- 12-JUN-13
 Instrument ID: HPMS8 Contract #: _____
 Parent ID: L13060982-05 File ID: 8M388981 Dil: 1
 Sample ID: L13060982-06 MS File ID: 8M388982 Dil: 1
 Sample ID: L13060982-07 MSD File ID: 8M388983 Dil: 1

Worknum: WG435060
 Prep Method: 5030B/5030C/
 Method: 5035A
 Matrix: 8260B
 Units: Water
 ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
2-Chloroethyl vinyl ether	U	20.0	21.2	106	20.0	20.9	104	1.60	58 - 160	20	
Acetone	U	20.0	16.1	80.5	20.0	15.9	79.4	1.47	40 - 140	30	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 2950575
 Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L13060982

Instrument: HPMS6

Analyst: ADC

Workgroup: WG434805

Tune ID: WG434805-01

Run Date: 06/20/2013

Run Time: 13:57

File ID: 6M117639

Cal ID: HPMS6 - 20-JUN-13

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	16.7	3177	PASS
75.0	95.0	30.0	60.0	44.1	8360	PASS
95.0	95.0	100	100	100	18975	PASS
96.0	95.0	5.00	9.00	6.39	1213	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	85.1	16155	PASS
175	174	5.00	9.00	7.27	1175	PASS
176	174	95.0	101	98.1	15853	PASS
177	176	5.00	9.00	6.71	1063	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG434805-02	STD	01	06/20/2013 14:52	
WG434805-03	STD	01	06/20/2013 15:23	
WG434805-04	STD	01	06/20/2013 15:54	
WG434805-05	STD	01	06/20/2013 16:25	
WG434805-06	STD	01	06/20/2013 16:57	
WG434805-07	STD	01	06/20/2013 17:28	
WG434805-08	STD-CCV	01	06/20/2013 17:59	
WG434805-09	STD	01	06/20/2013 18:30	
WG434805-10	STD	01	06/20/2013 19:02	
WG434805-11	STD	01	06/20/2013 19:32	
WG434805-12	SSCV	01	06/20/2013 20:33	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 2950577
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L13060982

Instrument: HPMS6

Analyst: MES

Workgroup: WG435035

Tune ID: WG435035-01

Run Date: 06/22/2013

Run Time: 10:25

File ID: 6M117687

Cal ID: HPMS6 - 20-JUN-13

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	16.0	3325	PASS
75.0	95.0	30.0	60.0	44.1	9180	PASS
95.0	95.0	100	100	100	20837	PASS
96.0	95.0	5.00	9.00	6.66	1388	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	89.3	18614	PASS
175	174	5.00	9.00	7.53	1402	PASS
176	174	95.0	101	97.7	18192	PASS
177	176	5.00	9.00	5.70	1037	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG435035-02	CCV	01	06/22/2013 10:48	
WG435036-01	BLANK	01	06/22/2013 12:13	
WG435036-02	LCS	01	06/22/2013 12:44	
L13060982-01	40MW7GW61913	01	06/22/2013 13:14	
L13060982-02	40EQR61913	01	06/22/2013 17:53	
WG435036-06	BLANK2	01	06/22/2013 23:33	*

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 2950577
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L13060982

Instrument: HPMS8

Analyst: ADC

Workgroup: WG433808

Tune ID: WG433808-01

Run Date: 06/12/2013

Run Time: 10:58

File ID: 8M388737

Cal ID: HPMS8-12-JUN-13

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	22.5	8426	PASS
75.0	95.0	30.0	60.0	43.7	16317	PASS
95.0	95.0	100	100	100	37376	PASS
96.0	95.0	5.00	9.00	6.98	2610	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	82.1	30704	PASS
175	174	5.00	9.00	7.17	2200	PASS
176	174	95.0	101	96.3	29573	PASS
177	176	5.00	9.00	6.14	1816	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG433808-02	STD	01	06/12/2013 11:51	
WG433808-04	STD	01	06/12/2013 13:15	
WG433808-05	STD	01	06/12/2013 13:45	
WG433808-06	STD	01	06/12/2013 14:15	
WG433808-07	STD	01	06/12/2013 14:51	
WG433808-08	STD-CCV	01	06/12/2013 15:21	
WG433808-09	STD	01	06/12/2013 15:51	
WG433808-10	STD	01	06/12/2013 16:20	
WG433808-11	STD	01	06/12/2013 16:50	
WG433808-03	STD	01	06/12/2013 18:20	
WG433808-12	SSCV	01	06/12/2013 18:49	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 2950577
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L13060982
Instrument: HPMS8
Analyst: MES
Workgroup: WG435059

Tune ID: WG435059-01
Run Date: 06/22/2013
Run Time: 13:48
File ID: 8M388973

Cal ID: HPMS8-12-JUN-13

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50.0	95.0	15.0	40.0	20.8	4280	PASS
75.0	95.0	30.0	60.0	41.7	8576	PASS
95.0	95.0	100	100	100	20581	PASS
96.0	95.0	5.00	9.00	6.25	1287	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	81.1	16685	PASS
175	174	5.00	9.00	6.89	1149	PASS
176	174	95.0	101	97.2	16216	PASS
177	176	5.00	9.00	6.52	1057	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG435059-02	CCV	01	06/22/2013 14:10	
WG435060-01	BLANK	01	06/22/2013 15:10	
WG435060-02	LCS	01	06/22/2013 15:40	
L13060982-04	40TB61913	01	06/22/2013 16:39	
L13060982-03	40FB61913	01	06/22/2013 17:09	
L13060982-05	40MW5GW61913	01	06/22/2013 17:39	
L13060982-06	40MW5MSGW61913	01	06/22/2013 18:09	
L13060982-07	40MW5MSDGW61913	01	06/22/2013 18:39	
L13060982-08	LFMW01GW61913	01	06/22/2013 19:09	
L13060982-10	40DUPGW61913	01	06/22/2013 19:39	
L13060982-12	40MW6GW61913	01	06/22/2013 20:08	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 2950577
Report generated 06/27/2013 13:03



Calibration Table Report
Method: 8260WT.M
Title: 8260B/624_WATER SOP:OVLMSV01 06/20/13 - HPMS6
Last Calibration: Fri Jun 21 11:13:43 2013
Curve: WG434805
Calibration Files

Compound											R^2	
	0.3	0.4	1	2	5	20	50	100	200	300		
	6M117641.D	6M117642.D	6M117643.D	6M117644.D	6M117645.D	6M117646.D	6M117647.D	6M117648.D	6M117649.D	6M117650.D	Avg	%RSD
											Linear	Quadratic
Fluorobenzene	ISTD											
Dichlorodifluoromethane			0.231	0.210	0.225	0.256	0.263	0.233	0.242	0.245	0.238	7.088
Chloromethane		0.307	0.254	0.237	0.229	0.231	0.240	0.235	0.244	0.238	0.246	9.736
Vinyl Chloride		0.264	0.237	0.240	0.240	0.246	0.255	0.240	0.237	0.228	0.243	4.334
1,3-Butadiene					0.202	0.201	0.204	0.170	0.154	0.149	0.180	14.129
Bromomethane			0.121	0.128	0.142	0.152	0.170	0.171	0.181	0.174	0.155	14.618
Chloroethane		0.115	0.156	0.159	0.163	0.171	0.178	0.172	0.172	0.163	0.161	11.600
Trichlorofluoromethane		0.425	0.465	0.468	0.477	0.463	0.484	0.444	0.445	0.436	0.456	4.365
Diethyl ether			0.130	0.131	0.133	0.136	0.134	0.135		0.126	0.132	2.806
Isoprene			0.346	0.360	0.366	0.355	0.387	0.367	0.370	0.378	0.366	3.510
Acrolein				0.009	0.009	0.011	0.011	0.013		0.014	0.011	16.452
1,1,2-Trichloro-1,2,2-Trifluoroel			0.248	0.260	0.271	0.257	0.270	0.244	0.254	0.256	0.257	3.728
Acetone					0.028	0.026	0.028	0.027	0.029	0.026	0.027	4.659
1,1-Dichloroethene		0.370	0.412	0.403	0.397	0.400	0.420	0.399	0.398	0.384	0.398	3.640
Tert-Butyl Alcohol				0.007	0.007	0.008	0.008	0.008		0.007	0.007	6.145
Dimethyl Sulfide		0.168	0.213	0.219	0.232	0.228	0.246	0.245	0.242	0.238	0.226	10.864
Iodomethane			0.111	0.135	0.162	0.222	0.274	0.293	0.302	0.284	0.223	34.594
Methyl acetate				0.061	0.074	0.073	0.077	0.077	0.075	0.075	0.073	7.550
Methylene Chloride		0.242	0.248	0.241	0.254	0.247	0.256	0.249	0.249	0.237	0.247	2.496
Carbon Disulfide		0.844	0.881	0.844	0.854	0.837	0.897	0.878	0.862	0.848	0.868	3.510
Acrylonitrile			0.029	0.032	0.034	0.039	0.039	0.040		0.042	0.036	13.253
Methyl Tert Butyl Ether		0.357	0.390	0.394	0.429	0.431	0.451	0.449	0.451	0.428	0.420	7.754
trans-1,2-Dichloroethene		0.267	0.269	0.280	0.278	0.279	0.293	0.288	0.287	0.278	0.280	3.096
n-Hexane			0.303	0.314	0.316	0.307	0.325	0.308	0.307	0.324	0.313	2.643
Diisopropyl ether			0.657	0.627	0.650	0.666	0.655	0.645		0.610	0.644	3.005
Vinyl Acetate					0.186	0.179	0.193	0.197	0.193	0.180	0.188	3.980
1,1-Dichloroethane		0.440	0.476	0.484	0.481	0.471	0.485	0.469	0.473	0.450	0.470	3.234
Ethyl-Tert-Butyl ether			0.609	0.582	0.608	0.628	0.619	0.619		0.588	0.608	2.792
2-Butanone					0.032	0.034	0.036	0.036	0.036	0.035	0.035	4.374
Propionitrile			0.008	0.011	0.012	0.013	0.013	0.013		0.012	0.012	14.453
2,2-Dichloropropane		0.406	0.432	0.444	0.440	0.441	0.455	0.434	0.433	0.414	0.433	3.458
cis-1,2-Dichloroethene		0.265	0.284	0.286	0.288	0.293	0.303	0.301	0.304	0.291	0.290	4.110
Chloroform		0.497	0.509	0.497	0.502	0.491	0.507	0.493	0.493	0.468	0.497	2.543
1-Bromopropane			0.039	0.052	0.057	0.059	0.063	0.063	0.063	0.063	0.057	14.377
Bromochloromethane		0.117	0.160	0.155	0.164	0.158	0.165	0.163	0.165	0.154	0.156	9.612
Tetrahydrofuran			0.024	0.022	0.022	0.023	0.023	0.023		0.021	0.022	4.444
Dibromofluoromethane			0.261	0.266	0.280	0.268	0.283	0.278	0.280	0.263	0.272	3.270
1,1,1-Trichloroethane		0.422	0.485	0.462	0.472	0.470	0.492	0.468	0.465	0.445	0.465	4.481
Cyclohexane		0.407	0.426	0.432	0.436	0.421	0.449	0.417	0.417	0.427	0.426	2.915
1,1-Dichloropropene		0.318	0.358	0.375	0.376	0.375	0.396	0.380	0.381	0.370	0.370	5.862
Tert-Amyl-Methyl ether			0.452	0.431	0.452	0.470	0.470	0.469		0.451	0.456	3.163
Carbon Tetrachloride		0.424	0.433	0.425	0.43	0.434	0.458	0.43	0.432	0.413	0.431	2.7913
1,2-Dichloroethane-d4				0.214	0.225	0.218	0.23	0.224	0.22	0.206	0.2195	3.6025
Heptane										0	0	
1,2-Dichloroethane		0.238	0.27	0.262	0.276	0.275	0.284	0.276	0.274	0.258	0.2681	5.1617
Benzene		1.104	1.053	1.053	1.065	1.036	1.082	1.052	1.04	0.988	1.0524	3.051
Trichloroethene		0.264	0.288	0.299	0.303	0.307	0.321	0.309	0.312	0.301	0.3005	5.4094
Methylcyclohexane		0.373	0.416	0.363	0.389	0.376	0.407	0.384	0.392	0.415	0.3905	4.8137
1,2-Dichloropropane		0.218	0.223	0.237	0.227	0.233	0.245	0.241	0.242	0.231	0.2329	3.8398
1,4-Dioxane				0	0.001	0.001	0.001	0.001		0.001	0.0007	42.428
Bromodichloromethane		0.292	0.321	0.315	0.329	0.336	0.357	0.348	0.35	0.331	0.331	6.1292
Dibromomethane		0.045	0.093	0.102	0.11	0.11	0.116	0.114	0.117	0.111	0.102	22.321
2-Chloroethyl Vinyl Ether					0.067	0.076	0.084	0.086	0.088	0.087	0.0812	10.269
4-Methyl-2-Pentanone					0.031	0.032	0.037	0.037	0.037	0.036	0.0351	7.719
cis-1,3-Dichloropropene		0.281	0.294	0.323	0.343	0.36	0.383	0.376	0.382	0.362	0.3448	10.972
Dimethyl Disulfide				0.125	0.153	0.174	0.197	0.204	0.205	0.201	0.1797	17.182
Chlorobenzene-d5	ISTD											
Toluene-d8				1.304	1.338	1.3	1.365	1.336	1.344	1.295	1.326	2.0117
Toluene		1.688	1.598	1.582	1.62	1.571	1.61	1.565	1.537	1.46	1.581	3.9383
Ethyl Methacrylate			0.203	0.199	0.2	0.208	0.231	0.232	0.234	0.228	0.2169	7.1969
Paraldehyde										0	0	
trans-1,3-Dichloropropene			0.301	0.333	0.366	0.395	0.42	0.415	0.421	0.406	0.3821	11.746
1,1,2-Trichloroethane		0.16	0.175	0.184	0.202	0.206	0.214	0.21	0.213	0.205	0.1965	9.7741
2-Hexanone					0.06	0.067	0.073	0.074	0.074	0.069	0.0695	8.02
1,3-Dichloropropane		0.275	0.308	0.331	0.343	0.343	0.36	0.356	0.359	0.347	0.3359	8.2913
Tetrachloroethene		0.421	0.446	0.437	0.47	0.468	0.489	0.468	0.472	0.465	0.4596	4.5571
Dibromochloromethane		0.239	0.277	0.277	0.295	0.311	0.328	0.327	0.331	0.318	0.3095	10.435
1,2-Dibromoethane			0.176	0.175	0.21	0.207	0.221	0.221	0.225	0.218	0.2067	9.7093
1-Chlorohexane			0.459	0.463	0.457	0.466	0.499	0.486	0.485	0.495	0.4765	3.5375
Chlorobenzene		1.039	0.966	1.012	1.029	1.044	1.039	1.064	1.037	0.987	1.0247	2.8392
1,1,1,2-Tetrachloroethane			0.31	0.352	0.358	0.373	0.376	0.394	0.385	0.372	0.3676	6.9854
Ethylbenzene		0.537	0.588	0.565	0.578	0.579	0.599	0.583	0.579	0.56	0.5742	3.1573
m-,p-Xylene		0.669	0.693	0.678	0.715	0.71	0.726	0.707	0.685	0.641	0.6916	3.8228
o-Xylene		0.619	0.658	0.614	0.672	0.688	0.707	0.69	0.689	0.659	0.6662	4.846
Styrene		0.839	0.939	0.991	1.064	1.116	1.155	1.14	1.129	1.064	1.0485	10.146
Bromoform			0.13	0.147	0.172	0.18	0.192	0.195	0.199	0.189	0.1755	14.259
Isopropylbenzene		1.581	1.722	1.705	1.795	1.789	1.851	1.774	1.716	1.598	1.7257	5.2086
1,4-Dichlorobenzene-d4	ISTD											
1,1,2,2-Tetrachloroethane		0.271	0.337	0.348	0.375	0.371	0.386	0.384	0.392	0.382	0.3607	10.596
p-Bromofluorobenzene			0.818	0.87	0.916	0.901	0.956	0.931	0.941	0.907	0.905	4.8339

1,2,3-Trichloropropane		0.089	0.089	0.116	0.12	0.121	0.12	0.121	0.118	0.1117	12.417	
trans-1,4-Dichloro-2-Butene			0.058	0.102	0.112	0.126	0.122	0.122	0.12	0.1087	21.899	1
n-Propylbenzene	3.452	3.753	3.663	3.845	3.866	4.006	3.798	3.654	3.434	3.7189	5.09	
Bromobenzene	0.823	0.779	0.84	0.84	0.878	0.859	0.89	0.867	0.872	0.851	0.8497	3.752
1,3,5-Trimethylbenzene		2.491	2.759	2.736	2.847	2.861	2.957	2.84	2.779	2.668	2.7709	4.8394
2-Chlorotoluene		2.731	2.757	2.708	2.83	2.762	2.809	2.772	2.645	2.532	2.7274	3.3453
4-Chlorotoluene		2.231	2.283	2.259	2.3	2.332	2.445	2.294	2.354	2.279	2.3085	2.7202
a-Methylstyrene			1.228	1.322	1.43	1.446	1.567	1.557	1.528	1.53	1.4511	8.3919
tert-Butylbenzene		0.539	0.594	0.549	0.583	0.583	0.604	0.578	0.582	0.582	0.577	3.5549
1,2,4-Trimethylbenzene		2.703	2.846	2.767	2.937	2.882	2.959	2.834	2.774	2.653	2.8171	3.643
sec-Butylbenzene		3.242	3.373	3.303	3.359	3.387	3.525	3.324	3.24	3.104	3.3176	3.5422
p-Isopropyltoluene			2.708	2.854	2.834	2.913	2.98	3.097	2.926	2.852	2.747	2.8789
1,3-Dichlorobenzene			1.511	1.667	1.616	1.67	1.658	1.719	1.654	1.644	1.587	1.6364
1,4-Dichlorobenzene	1.533		1.545	1.694	1.586	1.661	1.619	1.69	1.628	1.618	1.556	1.6128
n-Butylbenzene			2.326	2.359	2.401	2.417	2.459	2.574	2.418	2.381	2.299	2.4038
1,2-Dichlorobenzene	1.28		1.323	1.432	1.381	1.42	1.393	1.454	1.413	1.401	1.354	1.385
1,2-Dibromo-3-Chloropropane				0.039	0.051	0.059	0.064	0.063	0.064	0.061	0.0574	15.803
1,2,4-Trichlorobenzene		0.952	0.96	0.996	1.003	1.031	1.082	1.031	1.038	1.004	1.0108	3.9683
Hexachlorobutadiene		0.37	0.48	0.502	0.511	0.51	0.536	0.499	0.502	0.498	0.49	9.6517
Naphthalene			1.243	1.24	1.203	1.298	1.327	1.428	1.39	1.385	1.346	1.3179
1,2,3-Trichlorobenzene	0.667	0.756	0.821	0.805	0.833	0.847	0.881	0.842	0.847	0.82	0.812	7.4346

Wed Jun 26 14:56:31 2013

Calibration Table Report
Method: 8260WT.M
Title: Method 8260B/624 WTR-SOP:OVLMSV01 06/12/13 HPMS 8
Last Calibration: Thu Jun 13 12:33:09 2013
Curve: WG433808
Calibration Files

Compound											R^2	
	0.3	0.4	1	2	5	20	50	100	200	300	Avg	%RSD
	8M388739.D	8M388751.D	8M388741.D	8M388742.D	8M388743.D	8M388744.D	8M388745.D	8M388746.D	8M388747.D	8M388748.D		
Fluorobenzene	ISTD											
Dichlorodifluoromethane			0.328	0.322	0.327	0.359	0.375	0.354	0.348	0.314	0.341	6.193
Chloromethane			0.457	0.454	0.402	0.398	0.400	0.389	0.388	0.359	0.406	8.280
Vinyl Chloride		0.346	0.302	0.295	0.313	0.306	0.314	0.299	0.288	0.262	0.303	7.425
1,3-Butadiene					0.301	0.321	0.276	0.220	0.206	0.188	0.252	21.795
Bromomethane			0.109	0.112	0.120	0.142	0.175	0.195	0.208	0.196	0.157	26.009
Chloroethane		0.243	0.235	0.221	0.256	0.236	0.244	0.230	0.224	0.204	0.233	6.538
Trichlorofluoromethane		0.528	0.569	0.559	0.568	0.545	0.562	0.534	0.548	0.513	0.547	3.515
Diethyl ether			0.200	0.175	0.205	0.200	0.210	0.197		0.183	0.196	6.260
Isoprene			0.450	0.427	0.434	0.450	0.435	0.422	0.427	0.388	0.429	4.543
Acrolein			0.016	0.019	0.024	0.023	0.025	0.024		0.023	0.022	15.306
1,1,2-Trichloro-1,2,2-Trifluoroethane			0.312	0.291	0.309	0.290	0.311	0.296	0.296	0.271	0.297	4.596
Acetone					0.071	0.061	0.069	0.065	0.063	0.061	0.065	6.406
1,1-Dichloroethene		0.532	0.582	0.549	0.579	0.552	0.569	0.533	0.525	0.509	0.548	4.607
Tert-Butyl Alcohol			0.011	0.011	0.012	0.012	0.012	0.011		0.012	0.011	4.836
Dimethyl Sulfide			0.344	0.337	0.358	0.352	0.349	0.330	0.325	0.303	0.337	5.263
Iodomethane			0.152	0.174	0.247	0.323	0.366	0.382	0.389	0.357	0.299	31.778
Methyl acetate				0.190	0.195	0.173	0.172	0.159	0.152	0.157	0.171	9.737
Methylene Chloride		0.386	0.354	0.324	0.323	0.288	0.302	0.285	0.271	0.249	0.309	13.736
Carbon Disulfide		1.012	0.985	0.989	0.966	0.969	0.947	0.910	0.874	0.795	0.939	7.289
Acrylonitrile			0.070	0.060	0.071	0.076	0.084	0.080		0.086	0.075	12.035
Methyl Tert Butyl Ether			0.529	0.559	0.554	0.525	0.581	0.541	0.538	0.524	0.544	3.613
trans-1,2-Dichloroethene		0.609	0.561	0.532	0.564	0.521	0.544	0.516	0.505	0.460	0.535	7.858
n-Hexane			0.556	0.547	0.565	0.571	0.546	0.514	0.494	0.453	0.531	7.681
Diisopropyl ether			1.291	1.042	1.228	1.216	1.218	1.131		1.040	1.167	8.373
Vinyl Acetate					0.420	0.431	0.477	0.457	0.421	0.396	0.434	6.627
1,1-Dichloroethane		0.640	0.649	0.644	0.658	0.606	0.633	0.603	0.587	0.533	0.617	6.376
Ethyl-Tert-Butyl ether			0.904	0.766	0.892	0.883	0.918	0.859		0.822	0.863	6.164
2-Butanone					0.079	0.078	0.088	0.084	0.084	0.082	0.083	4.751
Propionitrile			0.023	0.021	0.024	0.024	0.027	0.026		0.027	0.025	9.443
2,2-Dichloropropane		0.436	0.521	0.493	0.499	0.485	0.514	0.506	0.501	0.453	0.490	5.728
cis-1,2-Dichloroethene		0.309	0.329	0.338	0.335	0.322	0.335	0.323	0.315	0.291	0.322	4.731
Chloroform		0.654	0.582	0.568	0.568	0.541	0.561	0.546	0.535	0.493	0.559	7.410
1-Bromopropane			0.059	0.063	0.066	0.072	0.072	0.072	0.074	0.070	0.068	7.845
Bromochloromethane		0.204	0.187	0.198	0.198	0.190	0.203	0.194	0.192	0.179	0.194	4.180
Tetrahydrofuran			0.059	0.044	0.051	0.052	0.056	0.052		0.052	0.052	9.075
Dibromofluoromethane					0.328	0.328	0.325	0.321		0.303	0.321	3.255
1,1,1-Trichloroethane		0.490	0.528	0.524	0.539	0.523	0.553	0.551	0.546	0.497	0.528	4.245
Cyclohexane			0.670	0.662	0.678	0.676	0.660	0.647	0.653	0.603	0.656	3.678
1,1-Dichloropropene		0.445	0.401	0.400	0.416	0.395	0.428	0.417	0.413	0.380	0.411	4.679
Tert-Amyl-Methyl ether			0.532	0.465	0.536	0.530	0.557	0.521		0.509	0.521	5.568
Carbon Tetrachloride		0.434	0.458	0.463	0.488	0.465	0.501	0.496	0.508	0.453	0.47405	5.29982
1,2-Dichloroethane-d4					0.312	0.317	0.306	0.301		0.282	0.30383	4.43497
Heptane										0	0	0
1,2-Dichloroethane		0.441	0.375	0.391	0.404	0.381	0.41	0.391	0.383	0.357	0.39263	6.10907
Benzene		1.259	1.131	1.106	1.134	1.047	1.085	1.033	0.979	0.885	1.07327	9.84975
Trichloroethene		0.32	0.312	0.322	0.343	0.315	0.336	0.33	0.326	0.303	0.32319	3.79796
Methylcyclohexane			0.473	0.47	0.495	0.481	0.463	0.448	0.447	0.423	0.46239	4.85426
1,2-Dichloropropane		0.33	0.346	0.327	0.319	0.319	0.337	0.33	0.324	0.301	0.32591	3.90275
Bromodichloromethane		0.379	0.377	0.366	0.405	0.387	0.425	0.418	0.419	0.389	0.39609	5.32658
1,4-Dioxane					0.001	0.001	0.001	0.001		0.001	0.00127	10.4143
Dibromomethane		0.131	0.144	0.144	0.146	0.133	0.149	0.141	0.142	0.135	0.14059	4.32919
2-Chloroethyl Vinyl Ether			0.112	0.119	0.141	0.132	0.149	0.143	0.14	0.133	0.13362	9.21059
4-Methyl-2-Pentanone					0.06	0.059	0.072	0.068	0.067	0.064	0.06506	7.41547
cis-1,3-Dichloropropene		0.4	0.413	0.411	0.43	0.417	0.455	0.442	0.436	0.404	0.42305	4.41987
Dimethyl Disulfide			0.312	0.355	0.394	0.422	0.455	0.45	0.452	0.429	0.40865	12.6357
Chlorobenzene-d5	ISTD											
Toluene-d8						1.529	1.453	1.417	1.34	1.225	1.39276	8.32749
Toluene		1.802	1.766	1.675	1.727	1.604	1.618	1.522	1.404	1.235	1.59481	11.4871
Ethyl Methacrylate			0.251	0.268	0.289	0.296	0.308	0.283	0.277	0.268	0.28006	6.42668
Paraldehyde										0	0	0
trans-1,3-Dichloropropene		0.463	0.482	0.49	0.517	0.498	0.538	0.516	0.487	0.452	0.49365	5.49311
1,1,2-Trichloroethane		0.289	0.247	0.256	0.27	0.261	0.273	0.261	0.251	0.237	0.2606	5.95472
2-Hexanone					0.076	0.074	0.09	0.081	0.08	0.075	0.07949	7.55048
1,3-Dichloropropane		0.463	0.431	0.432	0.453	0.416	0.455	0.438	0.416	0.388	0.43235	5.41842
Tetrachloroethene		0.462	0.38	0.397	0.407	0.379	0.398	0.389	0.376	0.345	0.39235	8.04087
Dibromochloromethane		0.315	0.363	0.372	0.397	0.393	0.425	0.418	0.406	0.383	0.38578	8.59542
1,2-Dibromoethane		0.216	0.285	0.293	0.292	0.273	0.303	0.295	0.286	0.269	0.27909	9.28316
1-Chlorohexane		0.53	0.528	0.542	0.547	0.546	0.519	0.5	0.482	0.448	0.51575	6.47474
Chlorobenzene		1.33	1.285	1.223	1.26	1.173	1.178	1.123	1.023	0.908	1.16696	11.4282
1,1,1,2-Tetrachloroethane		0.4	0.479	0.472	0.474	0.441	0.464	0.451	0.425	0.381	0.44304	7.79162
Ethylbenzene		0.723	0.682	0.648	0.694	0.62	0.624	0.596	0.547	0.493	0.62524	11.6504
m-,p-Xylene		0.853	0.814	0.797	0.826	0.752	0.751	0.693	0.611	0.532	0.73643	14.4786
o-Xylene		0.846	0.786	0.78	0.788	0.749	0.754	0.716	0.659	0.59	0.74091	10.3641
Styrene		1.343	1.212	1.257	1.308	1.22	1.236	1.169	1.062	0.946	1.19481	10.3226
Bromoform			0.191	0.204	0.237	0.222	0.25	0.247	0.247	0.236	0.2292	9.5978
Isopropylbenzene		2.154	2.068	1.976	2.089	1.918	1.94	1.828	1.639	1.419	1.89227	12.3947
1,4-Dichlorobenzene-d4	ISTD											
1,1,2,2-Tetrachloroethane		0.399	0.471	0.514	0.482	0.471	0.497	0.486	0.467	0.448	0.47062	6.97013
p-Bromofluorobenzene					1.105	1.051	1.042	0.99		0.927	1.02289	6.573

1,2,3-Trichloropropane		0.139	0.156	0.168	0.155	0.165	0.161	0.155	0.15	0.15613	5.78784	
trans-1,4-Dichloro-2-Butene		0.109	0.184	0.182	0.194	0.204	0.199	0.193	0.189	0.18174	16.6859	0.999
n-Propylbenzene	4.591	4.477	4.233	4.442	4.112	3.959	3.764	3.301	2.825	3.96724	14.7959	
Bromobenzene	0.878	1.001	0.958	0.865	0.973	0.913	0.907	0.895	0.846	0.784	0.90193	7.14207
1,3,5-Trimethylbenzene		3.412	3.255	3.053	3.296	3.057	2.959	2.874	2.562	2.245	2.96819	12.4858
2-Chlorotoluene		3.205	2.921	3.137	3.272	2.978	2.395	2.869	2.527	2.276	2.84222	12.7445
4-Chlorotoluene		3.002	2.556	2.553	2.544	2.393	2.52	2.197	2.068	1.809	2.40475	14.2952
a-Methylstyrene			1.598	1.595	1.657	1.742	1.604	1.57	1.457	1.338	1.57025	7.85622
tert-Butylbenzene	0.69	0.748	0.656	0.729	0.668	0.66	0.651	0.607	0.556	0.66278	8.7943	
1,2,4-Trimethylbenzene		3.355	3.375	3.203	3.3	3.07	2.956	2.844	2.539	2.21	2.98356	13.3224
sec-Butylbenzene	4.248	4.005	3.745	3.966	3.684	3.581	3.408	3.031	2.622	3.58762	14.1555	
p-Isopropyltoluene		3.788	3.778	3.604	3.704	3.48	3.37	3.218	2.854	2.456	3.36132	13.4826
1,3-Dichlorobenzene		2.067	1.943	1.833	1.974	1.83	1.82	1.761	1.618	1.451	1.81084	10.3213
1,4-Dichlorobenzene	1.841	2.067	1.999	1.844	1.936	1.8	1.804	1.752	1.6	1.445	1.80878	10.1168
n-Butylbenzene		3.592	3.057	3	3.043	2.881	2.747	2.621	2.35	2.91137	12.5637	
1,2-Dichlorobenzene	1.578	1.846	1.652	1.615	1.758	1.596	1.633	1.573	1.452	1.319	1.60211	9.10925
1,2-Dibromo-3-Chloropropane				0.077	0.092	0.084	0.095	0.092	0.089	0.086	0.08786	6.99849
1,2,4-Trichlorobenzene		1.431	1.263	1.226	1.276	1.17	1.19	1.144	1.053	0.965	1.19087	11.254
Hexachlorobutadiene		0.813	0.606	0.566	0.6	0.593	0.595	0.595	0.574	0.531	0.60813	13.1962
Naphthalene		2.043	1.937	2.041	2.067	1.956	2.039	1.901	1.727	1.586	1.92197	8.55733
1,2,3-Trichlorobenzene	0.954	1.109	1.014	1.035	1.039	0.996	1.008	0.976	0.906	0.839	0.98769	7.61159

Mon Jun 17 09:37:29 2013

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L13060982 Run Date: 06/20/2013 Sample ID: WG434805-12
Instrument ID: HPMS6 Run Time: 20:33 Method: 8260B
File ID: 6M117652 Analyst: ADC QC Key: D0D4
ICal Workgroup: WG434805 Cal ID: HPMS6 - 20-JUN-13

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chlorobenzene	SPCC	50.0	46.7	ug/L	0.958	6.50	20	
Chloromethane	SPCC	50.0	46.5	ug/L	0.229	6.90	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	53.3	ug/L	0.385	6.70	20	
1,1-Dichloroethane	SPCC	50.0	48.6	ug/L	0.457	2.80	20	
Bromoform	SPCC	50.0	52.6	ug/L	0.185	5.20	20	
2-Chloroethyl Vinyl Ether		50.0	52.5	ug/L	0.0852	5.00	30	
Acetone		50.0	45.8	ug/L	0.0251	8.40	20	

* Exceeds %D Limit

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 2950576
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L13060982 Run Date: 06/12/2013 Sample ID: WG433808-12
Instrument ID: HPMS8 Run Time: 18:49 Method: 8260B
File ID: 8M388752 Analyst: ADC QC Key: D0D4
ICal Workgroup: WG433808 Cal ID: HPMS8 - 12-JUN-13

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Chlorobenzene	SPCC	50.0	45.3	ug/L	1.06	9.30	20	
Chloromethane	SPCC	50.0	45.9	ug/L	0.373	8.20	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	53.2	ug/L	0.501	6.40	20	
1,1-Dichloroethane	SPCC	50.0	48.0	ug/L	0.592	4.00	20	
Bromoform	SPCC	50.0	53.1	ug/L	0.244	6.30	20	
2-Chloroethyl Vinyl Ether		50.0	52.9	ug/L	0.141	5.80	30	
Acetone		50.0	43.9	ug/L	0.0570	12.1	20	

* Exceeds %D Limit

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 2950576
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>06/22/2013</u>	Sample ID: <u>WG435035-02</u>
Instrument ID: <u>HPMS6</u>	Run Time: <u>10:48</u>	Method: <u>8260B</u>
File ID: <u>6M117688</u>	Analyst: <u>MES</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435036</u>	Cal ID: <u>HPMS6 - 20-JUN-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	50.6	ug/L	0.403	1.26	20	
1,2-Dichloropropane	CCC	50.0	53.2	ug/L	0.248	6.46	20	
Chloroform	CCC	50.0	50.5	ug/L	0.502	0.989	20	
Ethylbenzene	CCC	50.0	51.6	ug/L	0.593	3.20	20	
Toluene	CCC	50.0	50.5	ug/L	1.60	1.07	20	
Vinyl Chloride	CCC	50.0	48.3	ug/L	0.235	3.41	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	50.9	ug/L	0.367	1.71	20	
1,1-Dichloroethane	SPCC	50.0	51.5	ug/L	0.484	3.00	20	
Bromoform	SPCC	50.0	52.7	ug/L	0.185	5.36	20	
Chlorobenzene	SPCC	50.0	51.3	ug/L	1.05	2.54	20	
Chloromethane	SPCC	50.0	43.8	ug/L	0.216	12.4	20	
2-Chloroethyl Vinyl Ether		50.0	50.1	ug/L	0.0813	0.148	40	
Acetone		50.0	49.2	ug/L	0.0270	1.55	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 2950578
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>06/22/2013</u>	Sample ID: <u>WG435059-02</u>
Instrument ID: <u>HPMS8</u>	Run Time: <u>14:10</u>	Method: <u>8260B</u>
File ID: <u>8M388974</u>	Analyst: <u>MES</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435060</u>	Cal ID: <u>HPMS8 - 12-JUN-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	48.3	ug/L	0.529	3.44	20	
1,2-Dichloropropane	CCC	50.0	48.9	ug/L	0.319	2.12	20	
Chloroform	CCC	50.0	49.2	ug/L	0.551	1.50	20	
Ethylbenzene	CCC	50.0	48.3	ug/L	0.604	3.37	20	
Toluene	CCC	50.0	51.2	ug/L	1.63	2.38	20	
Vinyl Chloride	CCC	50.0	50.5	ug/L	0.306	0.910	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	46.0	ug/L	0.433	7.98	20	
1,1-Dichloroethane	SPCC	50.0	48.9	ug/L	0.603	2.28	20	
Bromoform	SPCC	50.0	49.5	ug/L	0.227	1.08	20	
Chlorobenzene	SPCC	50.0	48.9	ug/L	1.14	2.19	20	
Chloromethane	SPCC	50.0	45.2	ug/L	0.367	9.68	20	
2-Chloroethyl Vinyl Ether		50.0	47.4	ug/L	0.127	5.20	40	
Acetone		50.0	42.0	ug/L	0.0545	15.9	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 2950578
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L13060982
Instrument ID: HPMS6
Workgroup (AAB#): WG435036

ICAL CCV Number: WG434805-08
CAL ID: HPMS6 - 20-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG434805-08	NA	NA	235881	450153	616275
Upper Limit	NA	NA	471762	900306	1232550
Lower Limit	NA	NA	117941	225077	308138
<u>L13060982-01</u>	<u>1.00</u>	<u>01</u>	<u>232661</u>	<u>449222</u>	<u>576093</u>
<u>L13060982-02</u>	<u>1.00</u>	<u>01</u>	<u>235750</u>	<u>444458</u>	<u>564354</u>
<u>WG435036-01</u>	<u>1.00</u>	<u>01</u>	<u>239174</u>	<u>454990</u>	<u>581318</u>
<u>WG435036-02</u>	<u>1.00</u>	<u>01</u>	<u>241978</u>	<u>453985</u>	<u>590231</u>

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 2950579
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L13060982
Instrument ID: HPMS8
Workgroup (AAB#): WG435060

ICAL CCV Number: WG433808-08
CAL ID: HPMS8 - 12-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG433808-08	NA	NA	281473	490615	657742
Upper Limit	NA	NA	562946	981230	1315484
Lower Limit	NA	NA	140737	245308	328871
<u>L13060982-03</u>	<u>1.00</u>	<u>01</u>	<u>243823</u>	<u>434089</u>	<u>561179</u>
L13060982-04	1.00	01	242367	439431	562942
L13060982-05	1.00	01	239210	430443	553183
L13060982-06	1.00	01	243267	430422	548181
L13060982-07	1.00	01	239768	430428	553898
L13060982-08	1.00	01	238248	427778	553396
L13060982-10	1.00	01	235384	429550	557824
L13060982-12	1.00	01	232170	424175	555456
WG435060-01	1.00	01	254744	457920	585110
WG435060-02	1.00	01	256493	453374	576758

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 2950579
Report generated 06/27/2013 13:03



Microbac Laboratories Inc.
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L13060982
Instrument ID: HPMS8
Workgroup (AAB#): WG435060

ICAL CCV Number: WG433808-08
CAL ID: HPMS8 - 12-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG433808-08	NA	NA	16.68	13.68	9.84
Upper Limit	NA	NA	17.18	14.18	10.34
Lower Limit	NA	NA	16.18	13.18	9.34
<u>L13060982-03</u>	<u>1.00</u>	<u>01</u>	<u>16.68</u>	<u>13.68</u>	<u>9.84</u>
L13060982-04	1.00	01	16.68	13.68	9.84
L13060982-05	1.00	01	16.68	13.68	9.84
L13060982-06	1.00	01	16.68	13.68	9.83
L13060982-07	1.00	01	16.68	13.68	9.84
L13060982-08	1.00	01	16.68	13.68	9.84
L13060982-10	1.00	01	16.68	13.68	9.84
L13060982-12	1.00	01	16.68	13.68	9.84
WG435060-01	1.00	01	16.68	13.68	9.83
WG435060-02	1.00	01	16.68	13.68	9.84

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 2950581
Report generated: 06/27/2013 13:03



Microbac Laboratories Inc.
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L13060982
Instrument ID: HPMS6
Workgroup (AAB#): WG435036

ICAL CCV Number: WG434805-08
CAL ID: HPMS6 - 20-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG434805-08	NA	NA	18.26	14.71	10.23
Upper Limit	NA	NA	18.76	15.21	10.73
Lower Limit	NA	NA	17.76	14.21	9.73
L13060982-01	1.00	01	18.26	14.71	10.24
L13060982-02	1.00	01	18.26	14.71	10.23
WG435036-01	1.00	01	18.26	14.71	10.23
WG435036-02	1.00	01	18.26	14.71	10.23

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

INTERNAL_STD_RT_ICAL - Modified 03/06/2008
PDF File ID: 2950581
Report generated: 06/27/2013 13:03





Login Number: L13060982
Department: Semivolatiles
Analyst: Mary Schilling

METHOD

Preparation 3510C

Analysis SW-846 8270 SIM

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: For all compounds that yielded a %RSD greater than 15%, linear or higher order equations were applied. All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: All acceptance criteria were met.

Internal Standards: All acceptance criteria were met.

Surrogates: All acceptance criteria were met.

Manual Integration Reason Codes

Reason #1: Data System Fails to Select Correct Peak In some cases the chromatography system selects and integrates the 'wrong peak'. In this case the analyst must correct the selection and force the system to integrate the proper peak. Other times the system may miss the peak completely.

Reason #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak This phenomena is common at low concentrations where the signal:noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low areacounts for the target compound.

Reason #3: Improperly Integrated Isomers and/or coeluting compounds. This system often fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations are wrong, and they must be corrected by manual integration. Prime examples are benzo(k)fluoranthene and benzo(b)fluoranthene which are often unresolved and integrated improperly when both are present at low concentrations in standards or samples.

Reason #4: System Establishes Incorrect Baseline There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and should be corrected via manual procedures.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Reason #5: Miscellaneous Other situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the laboratory management. If the form of manual integration is not clearly covered by these four cases, then review and approval by the Managing Director or the QAO will be required.

Narrative ID: 66953

Approved By: Mike Cochran



Microbac Laboratories Inc.
SURROGATE STANDARDS

Login Number: L13060982
Instrument Id: HPMS15
Workgroup (AAB#): WG435197

Method: 8270L
CAL ID: HPMS15 - 16-JUN-13
Matrix: Water

Sample Number	Dilution	Tag	1	2	3
L13060982-01	1.00	01	93.4	77.4	111
L13060982-02	1.00	01	75.6	63.3	81.0
L13060982-03	1.00	01	88.5	70.5	96.8
L13060982-05	1.00	01	85.3	66.0	94.8
L13060982-06	1.00	01	75.6	60.0	84.8
L13060982-07	1.00	01	64.6	53.9	78.2
L13060982-08	1.00	01	86.1	68.8	99.3
L13060982-10	1.00	01	96.6	79.7	109
L13060982-12	1.00	01	62.3	51.1	71.0
WG435152-01	1.00	01	74.3	62.1	84.5
WG435152-02	1.00	01	69.1	58.2	79.1

Surrogates	Surrogate Limits
1 - 2-Fluorobiphenyl	50 - 110
2 - Nitrobenzene-d5	40 - 110
3 - p-Terphenyl-d14	50 - 135

Underline = Result out of surrogate limits

DL = surrogate diluted out

ND = surrogate not detected

SURROGATES - Modified 03/06/2008
PDF File ID: 2952859
Report generated: 07/02/2013 11:34



METHOD BLANK SUMMARY

Login Number: L13060982
 Blank File ID: 15M09559
 Prep Date: 06/23/13 12:01
 Analyzed Date: 06/25/13 12:40
 Analyst: MES/MDC

Work Group: WG435197
 Blank Sample ID: WG435152-01
 Instrument ID: HPMS15
 Method: 8270C

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG435152-02	15M09560	06/25/13 13:05	01
40MW7GW61913	L13060982-01	15M09561	06/25/13 13:31	01
40EQR61913	L13060982-02	15M09562	06/25/13 13:57	01
40FB61913	L13060982-03	15M09563	06/25/13 14:22	01
40MW5GW61913	L13060982-05	15M09564	06/25/13 14:48	01
40MW5MSGW61913	L13060982-06	15M09565	06/25/13 15:14	01
40MW5MSDGW61913	L13060982-07	15M09566	06/25/13 15:40	01
LFMW01GW61913	L13060982-08	15M09567	06/25/13 16:06	01
40DUPGW61913	L13060982-10	15M09568	06/25/13 16:32	01
40MW6GW61913	L13060982-12	15M09569	06/25/13 16:57	01

Report Name: BLANK_SUMMARY
 PDF File ID: 2952848
 Report generated 07/02/2013 11:33



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L13060982 **Prep Date:** 06/23/13 12:01 **Sample ID:** WG435152-01
Instrument ID: HPMS15 **Run Date:** 06/25/13 12:40 **Prep Method:** 3510C
File ID: 15M09559 **Analyst:** MES/MDC **Method:** 8270C
Workgroup (AAB#): WG435197 **Matrix:** Water **Units:** ug/L
Contract #: _____ **Cal ID:** HPMS15 - 16-JUN-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Benzo(a)anthracene	0.0250	0.0500	0.0250	1	U
Benzo(a)pyrene	0.0250	0.0500	0.0250	1	U
Benzo(b)fluoranthene	0.0250	0.0500	0.0250	1	U
Benzo(k)fluoranthene	0.0250	0.0500	0.0250	1	U
Chrysene	0.0250	0.0500	0.0250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
Nitrobenzene-d5	62.1	40 - 110	PASS
2-Fluorobiphenyl	74.3	50 - 110	PASS
p-Terphenyl-d14	84.5	50 - 135	PASS

LOD Method Detection Limit
 LOQ Reporting/Practical Quantitation Limit
 ND Analyte Not detected at or above reporting limit
 * |Analyte concentration| > 1/2 RL

Report Name: BLANK
PDF ID: 2952849
02-JUL-2013 11:33



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L13060982	Run Date: 06/25/2013	Sample ID: WG435152-02
Instrument ID: HPMS15	Run Time: 13:05	Prep Method: 3510C
File ID: 15M09560	Analyst: MES/MDC	Method: 8270C
Workgroup (AAB#): WG435197	Matrix: Water	Units: ug/L
QC Key: DOD4	Lot#: STD57618	Cal ID: HPMS15 - 16-JUN-13

Analytes	Expected	Found	% Rec	LCS Limits	Q
Benzo(a)anthracene	1.00	0.658	65.8	55 - 110	
Benzo(a)pyrene	1.00	0.632	63.2	55 - 110	
Benzo(b)fluoranthene	1.00	0.647	64.7	45 - 120	
Benzo(k)fluoranthene	1.00	0.577	57.7	45 - 125	
Chrysene	1.00	0.689	68.9	55 - 110	

Surrogates	% Recovery	Surrogate Limits	Qualifier
Nitrobenzene-d5	58.2	40 - 110	PASS
2-Fluorobiphenyl	69.1	50 - 110	PASS
p-Terphenyl-d14	79.1	50 - 135	PASS

* EXCEEDS %REC LIMIT

LCS - Modified 03/06/2008
PDF File ID: 2952850
Report generated: 07/02/2013 11:33



MS/MSD REPORT

Loginnum: L13060982 Cal ID: HPMS15- 16-JUN-13
 Instrument ID: HPMS15 Contract #: _____
 Parent ID: L13060982-05 File ID: 15M09564 Dil: 1
 Sample ID: L13060982-06 MS File ID: 15M09565 Dil: 1
 Sample ID: L13060982-07 MSD File ID: 15M09566 Dil: 1

Worknum: WG435197
 Prep Method: 3510C
 Method: 8270C
 Matrix: Water
 Units: ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Benzo(a)anthracene	U	1.06	0.743	69.8	1.04	0.648	62.2	13.6	55 - 110	30	
Benzo(a)pyrene	U	1.06	0.700	65.8	1.04	0.641	61.5	8.83	55 - 110	30	
Benzo(b)fluoranthene	U	1.06	0.655	61.6	1.04	0.634	60.9	3.25	45 - 120	30	
Benzo(k)fluoranthene	U	1.06	0.721	67.8	1.04	0.600	57.6	18.2	45 - 125	30	
Chrysene	U	1.06	0.769	72.3	1.04	0.689	66.2	10.9	55 - 110	30	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 2952851
 Report generated 07/02/2013 11:33



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L13060982

Instrument: HPMS15

Analyst: MES/MDC

Workgroup: WG434145

Tune ID: WG434145-01

Run Date: 06/16/2013

Run Time: 18:09

File ID: 15M09379

Cal ID: HPMS15 - 16-JUN-13

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	41.5	29871	PASS
68.0	69.0	0	2.00	1.04	357	PASS
69.0	198	0	100	47.9	34486	PASS
70.0	69.0	0	2.00	1.33	458	PASS
127	198	40.0	60.0	55.0	39541	PASS
197	198	0	1.00	0	0	PASS
198	198	100	100	100	71947	PASS
199	198	5.00	9.00	6.86	4936	PASS
275	198	10.0	30.0	25.6	18418	PASS
365	198	1.00	100	2.75	1980	PASS
441	443	0.0100	100	79.9	7320	PASS
442	198	40.0	100	74.3	53477	PASS
443	442	17.0	23.0	17.1	9161	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG434145-02	STD-CCV	01	06/16/2013 18:25	
WG434145-03	STD	01	06/16/2013 18:51	
WG434145-04	STD	01	06/16/2013 19:17	
WG434145-05	STD	01	06/16/2013 19:43	
WG434145-06	STD	01	06/16/2013 20:08	
WG434145-07	STD	01	06/16/2013 20:34	
WG434145-08	STD	01	06/16/2013 21:00	
WG434145-09	SSCV	01	06/16/2013 21:26	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 2952856
Report generated 07/02/2013 11:34



Microbac Laboratories Inc.
ORGANIC INSTRUMENT CHECK

DFTPP

Login Number: L13060982
Instrument: HPMS15
Analyst: MES/MDC
Workgroup: WG435377

Tune ID: WG435377-01
Run Date: 06/25/2013
Run Time: 11:35
File ID: 15M09557

Cal ID: HPMS15 - 16-JUN-13

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51.0	198	30.0	60.0	41.9	37138	PASS
68.0	69.0	0	2.00	0	0	PASS
69.0	198	0	100	42.8	37924	PASS
70.0	69.0	0	2.00	1.03	389	PASS
127	198	40.0	60.0	52.9	46920	PASS
197	198	0	1.00	0	0	PASS
198	198	100	100	100	88627	PASS
199	198	5.00	9.00	6.98	6190	PASS
275	198	10.0	30.0	25.8	22885	PASS
365	198	1.00	100	2.63	2327	PASS
441	443	0.0100	100	74.5	9493	PASS
442	198	40.0	100	74.8	66280	PASS
443	442	17.0	23.0	19.2	12743	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG435377-02	CCV	01	06/25/2013 12:14	
WG435152-01	BLANK	01	06/25/2013 12:40	
WG435152-02	LCS	01	06/25/2013 13:05	
L13060982-01	40MW7GW61913	01	06/25/2013 13:31	
L13060982-02	40EQR61913	01	06/25/2013 13:57	
L13060982-03	40FB61913	01	06/25/2013 14:22	
L13060982-05	40MW5GW61913	01	06/25/2013 14:48	
L13060982-06	40MW5MSGW61913	01	06/25/2013 15:14	
L13060982-07	40MW5MSDGW61913	01	06/25/2013 15:40	
L13060982-08	LFMW01GW61913	01	06/25/2013 16:06	
L13060982-10	40DUPGW61913	01	06/25/2013 16:32	
L13060982-12	40MW6GW61913	01	06/25/2013 16:57	

* Sample past 12 hour tune limit

TUNE - Modified 03/06/2008
PDF File ID: 2952856
Report generated 07/02/2013 11:34



Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L13060982
Analytical Method: 8270C
ICAL Workgroup: WG434145

Instrument ID: HPMS15
Initial Calibration Date: 16-JUN-13 21:00
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R ²)
Benzo[a]pyrene	CCC	1.100	7.60		
Benzo[a]anthracene		0.9731	7.55		
Benzo[b]fluoranthene		1.137	9.06		
Benzo[k]fluoranthene		1.153	2.59		
Chrysene		1.082	3.21		

R = Correlation coefficient; 0.995 minimum
R² = Coefficient of determination; 0.99 minimum

If the %RSD is greater than the limit specified by the method or project QAP, then linear or quadratic equations will be used.

INT_CAL - Modified 03/06/2008
PDF File ID: 2952852
Report generated 07/02/2013 11:33



Login Number: L13060982
Analytical Method: 8270C

Instrument ID: HPMS15
Initial Calibration Date: 16-JUN-13 21:00
Column ID: F

Analyte	WG434145-02			WG434145-03			WG434145-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Benzo[a]pyrene	1.00	165705.000	1.127	10.0	1691360.00	1.170	5.00	773423.000	1.176
Benzo[a]anthracene	1.00	163724.000	0.9974	10.0	1715976.00	1.031	5.00	785493.000	1.049
Benzo[b]fluoranthene	1.00	164903.000	1.122	10.0	1774771.00	1.228	5.00	824074.000	1.253
Benzo[k]fluoranthene	1.00	175237.000	1.192	10.0	1680705.00	1.163	5.00	755919.000	1.149
Chrysene	1.00	174231.000	1.061	10.0	1718257.00	1.033	5.00	791259.000	1.057

INT_CAL - Modified 03/06/2008
PDF File ID: 2952852
Report generated 07/02/2013 11:33



Login Number: L13060982
Analytical Method: 8270C

Instrument ID: HPMS15
Initial Calibration Date: 16-JUN-13 21:00
Column ID: F

Analyte	WG434145-05			WG434145-06			WG434145-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Benzo[a]pyrene	2.50	392106.000	1.157	0.500	67089.0000	1.101	0.100	12612.0000	1.008
Benzo[a]anthracene	2.50	395343.000	1.028	0.500	64497.0000	0.9499	0.100	12575.0000	0.8986
Benzo[b]fluoranthene	2.50	410190.000	1.210	0.500	69387.0000	1.139	0.100	12712.0000	1.016
Benzo[k]fluoranthene	2.50	398262.000	1.175	0.500	69579.0000	1.142	0.100	14428.0000	1.153
Chrysene	2.50	412837.000	1.074	0.500	75288.0000	1.109	0.100	15625.0000	1.117

INT_CAL - Modified 03/06/2008
PDF File ID: 2952852
Report generated 07/02/2013 11:33



Login Number: L13060982
Analytical Method: 8270C

Instrument ID: HPMS15
Initial Calibration Date: 16-JUN-13 21:00
Column ID: F

Analyte	WG434145-08		
	CONC	RESP	RF
Benzo[a]pyrene	0.0500	5587.00000	0.9625
Benzo[a]anthracene	0.0500	5575.00000	0.8572
Benzo[b]fluoranthene	0.0500	5743.00000	0.9893
Benzo[k]fluoranthene	0.0500	6369.00000	1.097
Chrysene	0.0500	7316.00000	1.125

INT_CAL - Modified 03/06/2008
PDF File ID: 2952852
Report generated 07/02/2013 11:33



Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L13060982 Run Date: 06/16/2013 Sample ID: WG434145-09
Instrument ID: HPMS15 Run Time: 21:26 Method: 8270C
File ID: 15M09387 Analyst: MES/MDC QC Key: D0D4
ICal Workgroup: WG434145 Cal ID: HPMS15 - 16-JUN-13

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Benzo[a]pyrene	CCC	1000	996	ug/L	1.10	0.500	30	
Benzo[a]anthracene		1000	947	ug/L	0.922	5.30	30	
Benzo[b]fluoranthene		1000	950	ug/L	1.08	5.00	30	
Benzo[k]fluoranthene		1000	943	ug/L	1.09	5.70	30	
Chrysene		1000	953	ug/L	1.03	4.70	30	

* Exceeds %D Limit

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 2952855
Report generated 07/02/2013 11:34



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435377-02
Instrument ID: HPMS15 Run Time: 12:14 Method: 8270C
File ID: 15M09558 Analyst: MES/MDC QC Key: D0D4
Workgroup (AAB#): WG435197 Cal ID: HPMS15 - 16-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Acenaphthene	CCC	1000	973	ug/L	1.24	2.68	20	
Fluoranthene	CCC	1000	982	ug/L	1.29	1.83	20	
Benzo[a]pyrene	CCC	1000	1020	ug/L	1.13	2.46	20	
Benzo[a]anthracene		1000	1060	ug/L	1.03	5.53	20	
Benzo[b]fluoranthene		1000	1030	ug/L	1.17	2.79	20	
Benzo[k]fluoranthene		1000	1040	ug/L	1.21	4.45	20	
Chrysene		1000	989	ug/L	1.07	1.08	20	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

CCV - Modified 03/05/2008
PDF File ID: 2952857
Report generated 07/02/2013 11:34



Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L13060982
Instrument ID: HPMS15
Workgroup (AAB#): WG435197

ICAL CCV Number: WG434145-02
CAL ID: HPMS15 - 16-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3	IS-4	IS-5
WG434145-02	NA	NA	86578	164044	152199	146998	145437
Upper Limit	NA	NA	173156	328088	304398	293996	290874
Lower Limit	NA	NA	43289	82022	76100	73499	72719
L13060982-01	1.00	01	99739	182945	177324	171877	175157
L13060982-02	1.00	01	99811	183489	178769	172094	172313
L13060982-03	1.00	01	89231	164139	160625	151918	153196
L13060982-05	1.00	01	89572	163397	159973	154180	156440
L13060982-06	1.00	01	96659	177347	171090	164620	168913
L13060982-07	1.00	01	89909	162149	160720	155085	158283
L13060982-08	1.00	01	88410	160039	157194	149839	152131
L13060982-10	1.00	01	86702	161110	153615	151893	150356
L13060982-12	1.00	01	95017	174593	175371	168834	166352
WG435152-01	1.00	01	95657	178801	170805	164210	163446
WG435152-02	1.00	01	104402	193083	185806	182310	179032

IS-1 - Acenaphthene-d10
IS-2 - Chrysene-d12
IS-3 - Naphthalene-d8
IS-4 - Perylene-d12
IS-5 - Phenanthrene-d10

Underline = Response outside limits

INTERNAL_STD_ICAL - Modified 03/06/2008
PDF File ID: 2952858
Report generated 07/02/2013 11:34



Microbac Laboratories Inc.
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO MIDPOINT OF ICAL)

Login Number: L13060982
Instrument ID: HPMS15
Workgroup (AAB#): WG435197

ICAL CCV Number: WG434145-02
CAL ID: HPMS15 - 16-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3	IS-4	IS-5
WG434145-02	NA	NA	8.19	13.47	5.97	15.73	10.07
Upper Limit	NA	NA	8.69	13.97	6.47	16.23	10.57
Lower Limit	NA	NA	7.69	12.97	5.47	15.23	9.57
L13060982-01	1.00	01	8.178	13.463	5.955	15.712	10.063
L13060982-02	1.00	01	8.176	13.463	5.955	15.712	10.063
L13060982-03	1.00	01	8.178	13.463	5.955	15.712	10.063
L13060982-05	1.00	01	8.176	13.463	5.955	15.712	10.063
L13060982-06	1.00	01	8.178	13.463	5.955	15.712	10.063
L13060982-07	1.00	01	8.176	13.463	5.955	15.712	10.063
L13060982-08	1.00	01	8.178	13.463	5.955	15.718	10.063
L13060982-10	1.00	01	8.178	13.463	5.955	15.718	10.063
L13060982-12	1.00	01	8.178	13.463	5.955	15.718	10.063
WG435152-01	1.00	01	8.178	13.463	5.955	15.712	10.063
WG435152-02	1.00	01	8.173	13.463	5.955	15.707	10.058

IS-1 - Acenaphthene-d10
IS-2 - Chrysene-d12
IS-3 - Naphthalene-d8
IS-4 - Perylene-d12
IS-5 - Phenanthrene-d10

Underline = Response outside limits





Login Number: L13060982
Department: General Chromatography
Analyst: John W. Richards Jr.

METHOD

Analysis SW-846 6850

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: For all compounds that yielded a %RSD greater than 15%, linear or higher order equations were applied. All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration and Tune: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Matrix Spikes: All acceptance criteria were met.

SAMPLES

Samples: Samples 08 and 10 were analyzed at dilutions based on historical results.

Internal Standards: All acceptance criteria were met.

Manual Integration Reason Codes

Reason #1: Data System Fails to Select Correct Peak In some cases the chromatography system selects and integrates the 'wrong peak'. In this case the analyst must correct the selection and force the system to integrate the proper peak. Other times the system may miss the peak completely.

Reason #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak This phenomena is common at low concentrations where the signal:noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low area counts for the target compound.

Reason #3: Improperly Integrated Isomers and/or coeluting compounds. This system often fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations are wrong, and they must be corrected by manual integration. Prime examples are benzo(k)fluoranthene and benzo(b)fluoranthene which are often unresolved and integrated improperly when both are present at low concentrations in standards or samples.

Reason #4: System Establishes Incorrect Baseline There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and should be corrected via manual procedures.

Reason #5: Miscellaneous Other situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the laboratory management. If the form of manual integration is not clearly covered by these four cases, then review and approval by the Laboratory Director or the QA/QC Supervisor will be required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Narrative ID: 66822

Approved By: Mike Cochran



METHOD BLANK REPORT

Login Number: L13060982 Prep Date: 06/24/13 16:30 Sample ID: WG435251-02
Instrument ID: LCMS1 Run Date: 06/24/13 18:04 Prep Method: 6850
File ID: 1LM.LM21600 Analyst: JWR Method: 6850
Workgroup (AAB#): WG435251 Matrix: Water Units: ug/L
Contract #: _____ Cal ID: LCMS1 - 08-JUN-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.200	0.100	1	U

LOD Method Detection Limit

LOQ Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > 1/2 RL

Report Name: BLANK

PDF ID: 2948366

28-JUN-2013 16:35



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435251-03
Instrument ID: LCMS1 Run Time: 18:23 Prep Method: 6850
File ID: 1LM.LM21601 Analyst: JWR Method: 6850
Workgroup (AAB#): WG435251 Matrix: Water Units: ug/L
QC Key: D0D4 Lot#: STD58352 Cal ID: LCMS1 - 08-JUN-13

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.218	109	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 2948367
Report generated: 06/28/2013 16:35



MS/MSD REPORT

Loginum: <u>L13060982</u>	Cal ID: <u>LCMS1- 08-JUN-13</u>	Worknum: <u>WG435251</u>
Instrument ID: <u>LCMS1</u>	Contract #: _____	Prep Method: <u>6850</u>
Parent ID: <u>L13060982-05</u>	File ID: <u>1LM.LM21605</u>	Dil: <u>1</u>
Sample ID: <u>L13060982-06 MS</u>	File ID: <u>1LM.LM21606</u>	Dil: <u>1</u>
Sample ID: <u>L13060982-07 MSD</u>	File ID: <u>1LM.LM21607</u>	Dil: <u>1</u>
		Method: <u>6850</u>
		Matrix: <u>Water</u>
		Units: <u>ug/L</u>

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	0.850	0.200	1.03	90	0.200	1.06	105	2.87	80 - 120	15	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 2948368
 Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L13060982
Analytical Method: 6850
ICAL Workgroup: WG433392

Instrument ID: LCMS1
Initial Calibration Date: 08-JUN-13 02:05
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R ²)
Perchlorate		1.243	3.64	1.00000	

R = Correlation coefficient; 0.995 minimum
R² = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 2954499
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L13060982
Analytical Method: 6850

Instrument ID: LCMS1
Initial Calibration Date: 08-JUN-13 02:05
Column ID: F

Analyte	WG433392-02			WG433392-03			WG433392-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	7630.00000	1.332	0.200	14900.0000	1.274	0.500	36800.0000	1.279

INT_CAL - Modified 03/06/2008
PDF File ID: 2954499
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L13060982
Analytical Method: 6850

Instrument ID: LCMS1
Initial Calibration Date: 08-JUN-13 02:05
Column ID: F

Analyte	WG433392-05			WG433392-06			WG433392-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	70900.0000	1.210	2.00	141000.000	1.211	5.00	350000.000	1.186

INT_CAL - Modified 03/06/2008
PDF File ID: 2954499
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L13060982
Analytical Method: 6850

Instrument ID: LCMS1
Initial Calibration Date: 08-JUN-13 02:05
Column ID: F

Analyte	WG433392-08		
	CONC	RESP	RF
Perchlorate	10.0	694000.000	1.211

INT_CAL - Modified 03/06/2008
PDF File ID: 2954499
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L13060982 Run Date: 06/08/2013 Sample ID: WG433392-09
Instrument ID: LCMS1 Run Time: 02:24 Method: 6850
File ID: 1LM.LM21345 Analyst: JWR QC Key: D0D4
ICal Workgroup: WG433392 Cal ID: LCMS1 - 08-JUN-13

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.981	ug/L	1.19	1.90	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 2954504
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435255-01
Instrument ID: LCMS1 Run Time: 16:48 Method: 6850
File ID: 1LM.LM21596 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG435251 Cal ID: LCMS1 - 08-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.200	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2948371
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435255-04
Instrument ID: LCMS1 Run Time: 21:51 Method: 6850
File ID: 1LM.LM21612 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG435251 Cal ID: LCMS1 - 08-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.200	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2948371
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435255-06
Instrument ID: LCMS1 Run Time: 02:16 Method: 6850
File ID: 1LM.LM21626 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG435251 Cal ID: LCMS1 - 08-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.200	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2948371
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435255-02
Instrument ID: LCMS1 Run Time: 17:07 Method: 6850
File ID: 1LM.LM21597 Analyst: JWR QC Key: D0D4
Workgroup (AAB#): WG435251 Cal ID: LCMS1 - 08-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.07	ug/L	1.31	7.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 2948370
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435255-03
Instrument ID: LCMS1 Run Time: 21:13 Method: 6850
File ID: 1LM.LM21610 Analyst: JWR QC Key: D0D4
Workgroup (AAB#): WG435251 Cal ID: LCMS1 - 08-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.23	1.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 2948370
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435255-05
Instrument ID: LCMS1 Run Time: 01:38 Method: 6850
File ID: 1LM.LM21624 Analyst: JWR QC Key: D0D4
Workgroup (AAB#): WG435251 Cal ID: LCMS1 - 08-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.05	ug/L	1.28	5.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 2948370
Report generated 06/28/2013 16:35



Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435251-07
Instrument ID: LCMS1 Run Time: 17:26 Prep Method: 6850
File ID: 1LM.LM21598 Analyst: JWR Method: 6850
Workgroup (AAB#): WG435251 Matrix: Water Units: ug/L
Contract #: _____ Cal ID: LCMS1 - 08-JUN-13

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.204	102	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 2948369
Report generated 06/28/2013 16:35



Login Number: L13060982 Run Date: 06/24/2013 Sample ID: WG435251-08
Instrument ID: LCMS1 Run Time: 21:32 Prep Method: 6850
File ID: 1LM.LM21611 Analyst: JWR Method: 6850
Workgroup (AAB#): WG435251 Matrix: Water Units: ug/L
Contract #: _____ Cal ID: LCMS1 - 08-JUN-13

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 2948369
Report generated 06/28/2013 16:35



Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435251-09
Instrument ID: LCMS1 Run Time: 01:57 Prep Method: 6850
File ID: 1LM.LM21625 Analyst: JWR Method: 6850
Workgroup (AAB#): WG435251 Matrix: Water Units: ug/L
Contract #: _____ Cal ID: LCMS1 - 08-JUN-13

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.201	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 2948369
Report generated 06/28/2013 16:35



Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L13060982
Instrument ID: LCMS1
Workgroup (AAB#): WG435251

ICAL CCV Number: WG433392-05
CAL ID: LCMS1 - 08-JUN-13
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG433392	NA	NA	290000
Upper Limit	NA	NA	435000
Lower Limit	NA	NA	145000
L13060982-01	1.00	01	333000
L13060982-02	1.00	01	326000
L13060982-03	1.00	01	335000
L13060982-05	1.00	01	230000
L13060982-06	1.00	01	257000
L13060982-07	1.00	01	249000
L13060982-08	2.00	DL01	270000
L13060982-10	2.00	DL01	270000
L13060982-12	1.00	01	272000
WG435251-02	1.00	01	335000
WG435251-03	1.00	01	332000

IS-1 - 018LP

Underline = Response outside limits



Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 18:42

Samplenum: L13060982-01
File ID: 1LM.LM21602
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	329000	107000	3.07	2.3	3.8	

Login #: L13060982	Prep Method: 6850	Samplenum: L13060982-02
Instrument: LCMS1	Prep Date: 06/24/2013 16:30	File ID: 1LM.LM21603
Analyst: JWR	Anal Method: 6850	Matrix: Water
Worknum: WG435251	Analysis Date: 06/24/2013 19:01	Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	818	0.000	0.000	2.3	3.8	*

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 19:20

Samplenum: L13060982-03
File ID: 1LM.LM21604
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	399	208	1.92	2.3	3.8	*

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 19:39

Samplenum: L13060982-05
File ID: 1LM.LM21605
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	47700	16300	2.93	2.3	3.8	

Login #: L13060982	Prep Method: 6850	Samplenum: L13060982-06
Instrument: LCMS1	Prep Date: 06/24/2013 16:30	File ID: 1LM.LM21606
Analyst: JWR	Anal Method: 6850	Matrix: Water
Worknum: WG435251	Analysis Date: 06/24/2013 19:58	Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	64700	22400	2.89	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 20:17

Samplenum: L13060982-07
File ID: 1LM.LM21607
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	64500	21200	3.04	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 20:35

Samplenum: L13060982-08
File ID: 1LM.LM21608
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	143000	45600	3.14	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 20:54

Samplenum: L13060982-10
File ID: 1LM.LM21609
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	145000	48300	3.00	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 22:10

Samplenum: L13060982-12
File ID: 1LM.LM21613
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	35800	12100	2.96	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method:
Prep Date:
Anal Method: 6850
Analysis Date: 06/08/2013 00:11

Samplenum: WG433392-02
File ID: 1LM.LM21338
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	7630	2370	3.22	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method:
Prep Date:
Anal Method: 6850
Analysis Date: 06/08/2013 00:30

Samplenum: WG433392-03
File ID: 1LM.LM21339
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	14900	4670	3.19	2.3	3.8	

Login #:	L13060982	Prep Method:		Samplenum:	WG433392-04
Instrument:	LCMS1	Prep Date:		File ID:	1LM.LM21340
Analyst:	JWR	Anal Method:	6850	Matrix:	Water
Worknum:	WG435251	Analysis Date:	06/08/2013 00:49	Units:	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36800	12000	3.07	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method:
Prep Date:
Anal Method: 6850
Analysis Date: 06/08/2013 01:08

Samplenum: WG433392-05
File ID: 1LM.LM21341
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	70900	24100	2.94	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/08/2013 01:27

Samplenum: WG433392-06
File ID: 1LM.LM21342
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	141000	46900	3.01	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/08/2013 01:46

Samplenum: WG433392-07
File ID: 1LM.LM21343
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	350000	118000	2.97	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/08/2013 02:05

Samplenum: WG433392-08
File ID: 1LM.LM21344
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	694000	228000	3.04	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/08/2013 02:24

Samplenum: WG433392-09
File ID: 1LM.LM21345
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	70800	22600	3.13	2.3	3.8	

Login #: L13060982	Prep Method: 6850	Samplenum: WG435251-01
Instrument: LCMS1	Prep Date: 06/24/2013 16:30	File ID: 1LM.LM21599
Analyst: JWR	Anal Method: 6850	Matrix: Water
Worknum: WG435251	Analysis Date: 06/24/2013 17:45	Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17400	5660	3.07	2.3	3.8	

Login #:	L13060982	Prep Method:	6850	Samplenum:	WG435251-02
Instrument:	LCMS1	Prep Date:	06/24/2013 16:30	File ID:	1LM.LM21600
Analyst:	JWR	Anal Method:	6850	Matrix:	Water
Worknum:	WG435251	Analysis Date:	06/24/2013 18:04	Units:	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	328	0.000	2.3	3.8	*

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 18:23

Samplenum: WG435251-03
File ID: 1LM.LM21601
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	18500	6270	2.95	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 17:26

Samplenum: WG435251-07
File ID: 1LM.LM21598
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17400	5990	2.90	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/24/2013 21:32

Samplenum: WG435251-08
File ID: 1LM.LM21611
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	16700	5870	2.84	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: 6850
Prep Date: 06/24/2013 16:30
Anal Method: 6850
Analysis Date: 06/25/2013 01:57

Samplenum: WG435251-09
File ID: 1LM.LM21625
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	18300	7050	2.60	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method:
Prep Date:
Anal Method: 6850
Analysis Date: 06/24/2013 16:48

Samplenum: WG435255-01
File ID: 1LM.LM21596
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	75.7	0.000	2.3	3.8	*

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/24/2013 17:07

Samplenum: WG435255-02
File ID: 1LM.LM21597
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	86600	28200	3.07	2.3	3.8	

Login #:	L13060982	Prep Method:		Samplenum:	WG435255-03
Instrument:	LCMS1	Prep Date:		File ID:	1LM.LM21610
Analyst:	JWR	Anal Method:	6850	Matrix:	Water
Worknum:	WG435251	Analysis Date:	06/24/2013 21:13	Units:	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	78100	26600	2.94	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/24/2013 21:51

Samplenum: WG435255-04
File ID: 1LM.LM21612
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	299	223	1.34	2.3	3.8	*

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/25/2013 01:38

Samplenum: WG435255-05
File ID: 1LM.LM21624
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	87500	28600	3.06	2.3	3.8	

Login #: L13060982
Instrument: LCMS1
Analyst: JWR
Worknum: WG435251

Prep Method: _____
Prep Date: _____
Anal Method: 6850
Analysis Date: 06/25/2013 02:16

Samplenum: WG435255-06
File ID: 1LM.LM21626
Matrix: Water
Units: ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	79.3	0.000	2.3	3.8	*



Login Number: L13060982
Department: Metals
Analyst: Kim Rhodes

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6010

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration Verification: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG435260 - All acceptance criteria were met.

Matrix Spikes: WG435260 - Sample 05 was chosen by the client for MS/MSD analysis. Samples 06(MS) and 07(MSD) yielded noncompliant recoveries for two analytes.

SAMPLES

Samples: All acceptance criteria were met.

Narrative ID: 66933

Approved By: Sheri Pfalzgraf



METHOD BLANK REPORT

Login Number: L13060982 Prep Date: 06/23/13 09:17 Sample ID: WG435148-03
 Instrument ID: PE-ICP2 Run Date: 07/01/13 11:56 Prep Method: 3015
 File ID: P2.070113.115627 Analyst: KHR Method: 6010B
 Workgroup (AAB#): WG435260 Matrix: Water Units: mg/L
 Contract #: _____ Cal ID: PE-ICP - 01-JUL-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Aluminum, Total	0.100	0.200	0.100	1	U
Calcium, Total	0.250	0.500	0.250	1	U
Iron, Total	0.0500	0.100	0.0500	1	U
Magnesium, Total	0.250	0.500	0.250	1	U
Potassium, Total	0.500	1.00	0.500	1	U
Sodium, Total	0.250	0.500	0.250	1	U
Vanadium, Total	0.00500	0.0100	0.00500	1	U

LOD Method Detection Limit
 LOQ Reporting/Practical Quantitation Limit
 ND Analyte Not detected at or above reporting limit
 * |Analyte concentration| > 1/2 RL

Report Name: BLANK
 PDF ID: 2957211
 02-JUL-2013 08:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: <u>L13060982</u>	Run Date: <u>07/01/2013</u>	Sample ID: <u>WG435148-04</u>
Instrument ID: <u>PE-ICP2</u>	Run Time: <u>11:59</u>	Prep Method: <u>3015</u>
File ID: <u>P2.070113.115927</u>	Analyst: <u>KHR</u>	Method: <u>6010B</u>
Workgroup (AAB#): <u>WG435260</u>	Matrix: <u>Water</u>	Units: <u>mg/L</u>
QC Key: <u>DOD4</u>	Lot#: <u>STD58415</u>	Cal ID: <u>PE-ICP - 01-JUL-13</u>

Analytes	Expected	Found	% Rec	LCS Limits	Q
Aluminum, Total	6.25	5.86	93.7	80 - 120	
Calcium, Total	6.25	5.89	94.2	80 - 120	
Iron, Total	2.50	2.38	95.2	80 - 120	
Magnesium, Total	6.25	6.05	96.8	80 - 120	
Potassium, Total	31.3	29.5	94.3	80 - 120	
Sodium, Total	31.3	29.3	93.8	80 - 120	
Vanadium, Total	0.625	0.580	92.8	80 - 120	

LCS - Modified 03/06/2008
 PDF File ID: 2957212
 Report generated: 07/02/2013 08:50



MS/MSD REPORT

Loginnum: L13060982Cal ID: PE-ICP2- 01-JUL-13Worknum: WG435260Instrument ID: PE-ICP2

Contract #:

Prep Method: 3015Parent ID: L13060982-05File ID: P2.070113.123555Dil: 1Method: 6010BSample ID: L13060982-06 MSFile ID: P2.070113.124359Dil: 1Matrix: WaterSample ID: L13060982-07 MSDFile ID: P2.070113.124603Dil: 1Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Total	U	6.25	5.65	90.4	6.25	6.05	96.8	6.82	80 - 120	20	
Calcium, Total	91.6	6.25	99.9	133	6.25	103	184	3.13	80 - 120	20	*
Iron, Total	0.137	2.50	2.33	87.9	2.50	2.40	90.5	2.69	80 - 120	20	
Magnesium, Total	32.5	6.25	36.5	65	6.25	37.3	77.8	2.18	80 - 120	20	*
Potassium, Total	1.10	31.3	28.7	88.4	31.3	31.1	96.1	8.06	80 - 120	20	
Sodium, Total	4.59	31.3	32.3	88.6	31.3	35.0	97.3	8.03	80 - 120	20	
Vanadium, Total	0.0105	0.625	0.586	92.1	0.625	0.603	94.8	2.84	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008

PDF File ID: 2957213

Report generated 07/02/2013 08:50



Microbac Laboratories Inc.
Serial Dilution Report

Login: L13060982 Worknum: WG435260
Instrument: PE-ICP2 Method: 6010B
Serial Dil: WG435260-02 File ID: P2.070113.122653 Dil: 5 Units: mg/L
Sample: L13060982-01 File ID: P2.070113.122148 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Aluminum	ND	U	ND	U		
Calcium	57.1		56.8		0.41	
Iron	0.0443	F	ND	U		
Magnesium	25.8		25.7		0.26	
Potassium	1.24	X	ND	U		
Sodium	3.19	X	3.43	X	7.32	
Vanadium	0.00784	F	ND	U		

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 50 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 50 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 2957207

07/02/2013 08:49



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L13060982
Instrument ID: PE-ICP2
Post Spike ID: WG435260-01
Sample ID: L13060982-01

Worknum: WG435260
Method: 6010B
Units: mg/L
Matrix: Water
File ID: P2.070113.122449 Dil: 1
File ID: P2.070113.122148 Dil: 1

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ALUMINUM	4.88		0	U	5	97.7	75 - 125	
CALCIUM	61.0		57.1		5	193.3	75 - 125	N
IRON	1.92		0.0443	F	2	94.1	75 - 125	
MAGNESIUM	27.2		25.8		5	80.5	75 - 125	
POTASSIUM	25.8		1.24		25	98.9	75 - 125	
SODIUM	28.0		3.19		25	100.5	75 - 125	
VANADIUM	0.510		0.00784	F	.5	100.6	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 2957208
Report generated: 07/02/2013 08:49



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L13060982</u>	Workgroup (AAB#):	<u>WG435260</u>
Analytical Method:	<u>6010B</u>	Instrument ID:	<u>PE-ICP2</u>
ICAL Worknum:	<u>WG435992</u>	Initial Calibration Date:	<u>01-JUL-2013 08:36</u>

	WG435992-01		WG435992-02		WG435992-03		WG435992-04		WG435992-05			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ALUMINUM	0	55.5	.1	244	.2	473	10	28400	20	57100	.999996	
CALCIUM	0	-63.5	NA	NA	.2	35.4	10	2000	20	4070	.999949	
IRON	0	-10.8	.04	113	.08	229	4	14000	8	28200	.999998	
MAGNESIUM	0	29.1	.1	102	.2	210	10	12300	20	24900	.999999	
POTASSIUM	0	-23.1	.5	521	1	1060	50	63100	100	127000	1	
SODIUM	0	1080	.5	4230	1	8410	50	532000	100	1050000	1	
VANADIUM	0	7480	.01	1670	.02	3240	1	187000	2	366000	.999944	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 2957216
Report generated: 02-JUL-2013 08:49



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-07
Instrument ID: PE-ICP2 Run Time: 08:40 Method: 6010B
File ID: P2.070113.084048 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP2 - 01-JUL-13
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ALUMINUM	.08	.16	.08	U
CALCIUM	.2	.4	.2	U
IRON	.04	.08	.04	U
MAGNESIUM	.2	.4	.2	U
POTASSIUM	.4	.8	.4	U
SODIUM	.2	.4	.2	U
VANADIUM	.004	.008	.004	U

U = Result is less than 2 x MDL

F = Result is between MDL and 2 x MDL

* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 2957218
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-13
Instrument ID: PE-ICP2 Run Time: 08:55 Method: 6010B
File ID: P2.070113.085555 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Potassium	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U
Vanadium	0.00400	0.00800	0.00400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2957221
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-23
Instrument ID: PE-ICP2 Run Time: 11:53 Method: 6010B
File ID: P2.070113.115327 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Potassium	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U
Vanadium	0.00400	0.00800	0.00400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2957221
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-25
Instrument ID: PE-ICP2 Run Time: 12:06 Method: 6010B
File ID: P2.070113.120635 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Potassium	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U
Vanadium	0.00400	0.00800	0.00400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2957221
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-27
Instrument ID: PE-ICP2 Run Time: 12:41 Method: 6010B
File ID: P2.070113.124100 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Potassium	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U
Vanadium	0.00400	0.00800	0.00400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2957221
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-29
Instrument ID: PE-ICP2 Run Time: 13:17 Method: 6010B
File ID: P2.070113.131707 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Potassium	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U
Vanadium	0.00400	0.00800	0.00400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2957221
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-32
Instrument ID: PE-ICP2 Run Time: 13:31 Method: 6010B
File ID: P2.070113.133114 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Aluminum	0.0800	0.160	0.0800	U
Calcium	0.200	0.400	0.200	U
Iron	0.0400	0.0800	0.0400	U
Magnesium	0.200	0.400	0.200	U
Potassium	0.400	0.800	0.400	U
Sodium	0.200	0.400	0.200	U
Vanadium	0.00400	0.00800	0.00400	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2957221
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-06
Instrument ID: PE-ICP2 Run Time: 08:38 Method: 6010B
File ID: P2.070113.083845 Analyst: KHR Units: mg/L
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
QC Key: DOD4

Analyte	Expected	Found	%REC	LIMITS	Q
Aluminum	10	9.90	99.0	90 - 110	
Calcium	10	10.2	102	90 - 110	
Iron	4	3.96	99.0	90 - 110	
Magnesium	10	9.97	99.7	90 - 110	
Potassium	50	51.0	102	90 - 110	
Sodium	50	51.5	103	90 - 110	
Vanadium	1	0.993	99.3	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 2957217
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992-12
Instrument ID: PE-ICP2 Run Time: 08:53 Method: 6010B
File ID: P2.070113.085350 Analyst: KHR QC Key: D0D4
Workgroup (AAB#): WG435260 Cal ID: PE-ICP - 01-JUL-13
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.4	mg/L	104	90 - 110		
Calcium		10.0	10.5	mg/L	105	90 - 110		
Iron		4.00	4.16	mg/L	104	90 - 110		
Magnesium		10.0	10.5	mg/L	105	90 - 110		
Potassium		50.0	51.8	mg/L	104	90 - 110		
Sodium		50.0	50.4	mg/L	101	90 - 110		
Vanadium		1.00	1.03	mg/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2957220
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>07/01/2013</u>	Sample ID: <u>WG435992-22</u>
Instrument ID: <u>PE-ICP2</u>	Run Time: <u>11:51</u>	Method: <u>6010B</u>
File ID: <u>P2.070113.115122</u>	Analyst: <u>KHR</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435260</u>	Cal ID: <u>PE-ICP - 01-JUL-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	9.94	mg/L	99.4	90 - 110		
Calcium		10.0	10.1	mg/L	101	90 - 110		
Iron		4.00	3.91	mg/L	97.7	90 - 110		
Magnesium		10.0	9.75	mg/L	97.5	90 - 110		
Potassium		50.0	50.2	mg/L	100	90 - 110		
Sodium		50.0	50.2	mg/L	100	90 - 110		
Vanadium		1.00	0.983	mg/L	98.3	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2957220
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>07/01/2013</u>	Sample ID: <u>WG435992-24</u>
Instrument ID: <u>PE-ICP2</u>	Run Time: <u>12:04</u>	Method: <u>6010B</u>
File ID: <u>P2.070113.120430</u>	Analyst: <u>KHR</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435260</u>	Cal ID: <u>PE-ICP - 01-JUL-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	9.87	mg/L	98.7	90 - 110		
Calcium		10.0	10.2	mg/L	102	90 - 110		
Iron		4.00	3.90	mg/L	97.6	90 - 110		
Magnesium		10.0	9.70	mg/L	97.0	90 - 110		
Potassium		50.0	49.6	mg/L	99.1	90 - 110		
Sodium		50.0	50.0	mg/L	100	90 - 110		
Vanadium		1.00	0.980	mg/L	98.0	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2957220
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>07/01/2013</u>	Sample ID: <u>WG435992-26</u>
Instrument ID: <u>PE-ICP2</u>	Run Time: <u>12:38</u>	Method: <u>6010B</u>
File ID: <u>P2.070113.123855</u>	Analyst: <u>KHR</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435260</u>	Cal ID: <u>PE-ICP - 01-JUL-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	9.81	mg/L	98.1	90 - 110		
Calcium		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	3.89	mg/L	97.2	90 - 110		
Magnesium		10.0	9.61	mg/L	96.1	90 - 110		
Potassium		50.0	49.6	mg/L	99.3	90 - 110		
Sodium		50.0	49.8	mg/L	99.6	90 - 110		
Vanadium		1.00	0.999	mg/L	99.9	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2957220
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>07/01/2013</u>	Sample ID: <u>WG435992-28</u>
Instrument ID: <u>PE-ICP2</u>	Run Time: <u>13:15</u>	Method: <u>6010B</u>
File ID: <u>P2.070113.131501</u>	Analyst: <u>KHR</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435260</u>	Cal ID: <u>PE-ICP - 01-JUL-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	10.0	mg/L	100	90 - 110		
Calcium		10.0	10.5	mg/L	105	90 - 110		
Iron		4.00	4.05	mg/L	101	90 - 110		
Magnesium		10.0	9.95	mg/L	99.5	90 - 110		
Potassium		50.0	49.1	mg/L	98.1	90 - 110		
Sodium		50.0	53.5	mg/L	107	90 - 110		
Vanadium		1.00	0.975	mg/L	97.5	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2957220
Report generated 07/02/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: <u>L13060982</u>	Run Date: <u>07/01/2013</u>	Sample ID: <u>WG435992-31</u>
Instrument ID: <u>PE-ICP2</u>	Run Time: <u>13:29</u>	Method: <u>6010B</u>
File ID: <u>P2.070113.132909</u>	Analyst: <u>KHR</u>	QC Key: <u>D0D4</u>
Workgroup (AAB#): <u>WG435260</u>	Cal ID: <u>PE-ICP - 01-JUL-13</u>	
Matrix: <u>WATER</u>		

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Aluminum		10.0	9.83	mg/L	98.3	90 - 110		
Calcium		10.0	10.3	mg/L	103	90 - 110		
Iron		4.00	3.92	mg/L	98.0	90 - 110		
Magnesium		10.0	9.77	mg/L	97.7	90 - 110		
Potassium		50.0	49.4	mg/L	98.8	90 - 110		
Sodium		50.0	49.9	mg/L	99.9	90 - 110		
Vanadium		1.00	0.983	mg/L	98.3	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2957220
Report generated 07/02/2013 08:49



**Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES**

Login number: L13060982
Instrument ID: PE-ICP2
Sol. A : WG435992-10
Sol. AB : WG435992-11

File ID: P2.070113.084946
File ID: P2.070113.085149

Workgroup (AAB#): WG435260
Method: 6010B
Units: mg/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Aluminum	250	252	101	250	247	98.8	
Calcium	250	265	106	250	271	108	
Iron	100	99.8	99.8	100	98.4	98.4	
Magnesium	250	260	104	250	256	102	
Potassium	NS	-0.0588	NS	5.00	4.92	98.4	
Sodium	NS	0.0286	NS	5.00	4.98	99.6	
Vanadium	NS	-0.00262	NS	0.250	0.244	97.6	

NS = Not spiked

*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
 PDF File ID: 2957219
 Report generated 07/02/2013 08:49



LRC SAMPLE

Login Number: L13060982 Run Date: 07/01/2013 Sample ID: WG435992
Instrument ID: PE-ICP2 Run Time: 08:36 Prep Method: 3015
Analyst: KHR Method: 6010B
Workgroup (AAB#): WG435260 Matrix: Water Units: mg/L
Cal ID: 01-JUL-13 - 01-JUL-2013 08:36

Analytes	Expected	Found	% Rec	Limits	Q
Calcium	500	527	105	90 - 110	
Magnesium	500	461	92.2	90 - 110	

KEMRON FORMS - Modified 08/28/2006
Version 1.5 PDF File ID: 2957235
Report generated 07/02/2013 09:02

Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 12/29/2012
Method: 6010B

Analyte	Wave Length	AG	AL	AS	B	BA
ALUMINUM	396.15	0	0	0.0681	0	0
ANTIMONY	206.84	0	0	0	0	0
ARSENIC	188.98	0	0.206	0	0	0
BARIUM	233.53	0	0	0	0	0
BERYLLIUM	234.86	0	0	0	0	0
BORON	249.68	0	0	0	0	0
CADMIUM	228.80	0	0	0	24.1	0
CALCIUM	227.55	0	0	0	0	0
CHROMIUM	267.72	0	0	-0.490	1.50	0
COBALT	228.62	0	0	0	5.90	-0.192
COPPER	327.39	0.0717	0	0	0	0
IRON	239.56	-0.460	-0.119	-0.241	0.430	0.0546
LEAD	220.35	0	0	0	0	0
LITHIUM	670.78	0	0	0	0	0
MAGNESIUM	279.08	0	0	0	0	0
MANGANESE	257.61	0.130	0	0	0	0
MOLYBDENUM	202.03	0	69.0	5.34	-1.00	-0.750
NICKEL	231.60	0	0	0	0	0
POTASSIUM	766.49	0	0	0	0	0
SELENIUM	196.03	0	0	0	0	0
SILICON	251.61	0	0	0	0	0
SILVER	328.07	0	0	0	0	0
SODIUM	589.59	0	0	0	0	0
STRONTIUM	407.77	0.200	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.93	0	0	0	0	0
TITANIUM	334.94	0	0	0	0	0
VANADIUM	290.88	-2.05	0	0.0990	0	0.360
ZINC	206.20	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 2957215
Report generated: 07/02/2013 08:49



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 12/29/2012
Method: 6010B

Analyte	Wave Length	BE	CA	CD	CO	CR
ALUMINUM	396.15	0	-0.158	0	0	-0.0238
ANTIMONY	206.84	0	0	0	0	0
ARSENIC	188.98	0	10.0	0	5.00	0
BARIUM	233.53	0	0	0	0.337	0
BERYLLIUM	234.86	0	0	0	0	0
BORON	249.68	0	0	0	0	0
CADMIUM	228.80	0	0	0	0	0
CALCIUM	227.55	0	0	0	0	0
CHROMIUM	267.72	-0.0220	0	0	-0.200	0
COBALT	228.62	0	180	-3.64	0	0
COPPER	327.39	0	0	0	0	0
IRON	239.56	0.215	-24.0	0.000840	0.0262	0.0722
LEAD	220.35	0	0	0	0	0
LITHIUM	670.78	0	0	0	0	0
MAGNESIUM	279.08	0	0.104	0	0	0
MANGANESE	257.61	-0.100	0	0	0	0
MOLYBDENUM	202.03	-0.376	10.6	0.0420	-1.80	0.170
NICKEL	231.60	-0.00974	-831	-0.0400	0.129	0
POTASSIUM	766.49	0	0	0	0	0
SELENIUM	196.03	0	0	0	0	0
SILICON	251.61	0	0	0	0	0
SILVER	328.07	0	0	0	0	0
SODIUM	589.59	0	0	0	0	0
STRONTIUM	407.77	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.93	0	0	0	0	0
TITANIUM	334.94	0	3.00	0	2.21	0
VANADIUM	290.88	0	0	0.0800	0	-0.567
ZINC	206.20	0	0	0	0	-0.0400

CORR_FACTORS - Modified 03/05/2008
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Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 12/29/2012
Method: 6010B

Analyte	Wave Length	CU	FE	K	LI	MG
ALUMINUM	396.15	0	0	0	0	0
ANTIMONY	206.84	0	0	0	0	0
ARSENIC	188.98	0	0	0	0	0
BARIUM	233.53	0	0	0	0	0
BERYLLIUM	234.86	0	0	0	0	0
BORON	249.68	0	0	0	0	0
CADMIUM	228.80	0	0	0	0	0
CALCIUM	227.55	0	0	0	0	0
CHROMIUM	267.72	-0.0400	0	0	0	0
COBALT	228.62	0.280	2.77	0	0	0
COPPER	327.39	0	0	0	0	0
IRON	239.56	-0.0800	0	0	0	0.540
LEAD	220.35	0	0	0	0	0
LITHIUM	670.78	0.154	0	0	0	0
MAGNESIUM	279.08	0	0.0200	0	0	0
MANGANESE	257.61	0	0	0	0	0
MOLYBDENUM	202.03	-0.0774	0	0	0	-18.0
NICKEL	231.60	0.150	0	0	0	0
POTASSIUM	766.49	0	0	0	0	0
SELENIUM	196.03	0.0700	0	0	0	0
SILICON	251.61	0	0	0	0	0
SILVER	328.07	0	0	0	0	0
SODIUM	589.59	0	0	1.00	0	0
STRONTIUM	407.77	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.93	0	0	0	0	0
TITANIUM	334.94	-1.05	0	0	0	0
VANADIUM	290.88	-0.440	0	0	0	0
ZINC	206.20	-0.0613	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
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 Report generated: 07/02/2013 08:49



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 12/29/2012
Method: 6010B

Analyte	Wave Length	MN	MO	NA	NI	PB
ALUMINUM	396.15	0	0	0	0	-0.166
ANTIMONY	206.84	0	0	0	-0.0500	-0.0100
ARSENIC	188.98	0	0	0	0	0
BARIUM	233.53	0	0	0	0	0
BERYLLIUM	234.86	0	0	0	0	0
BORON	249.68	0	0	0	0	0
CADMIUM	228.80	0	0	0	0	0
CALCIUM	227.55	0	0	0	0	0
CHROMIUM	267.72	-0.110	0	0	0	0.0550
COBALT	228.62	0	0	0	1.05	0.462
COPPER	327.39	0	0	0	0	1.00
IRON	239.56	-0.0445	-0.0490	0	0	0.0327
LEAD	220.35	0	0	0	0	0
LITHIUM	670.78	0	0	0	0	0
MAGNESIUM	279.08	0	0	0	0	0
MANGANESE	257.61	0	-0.209	0	0	0.600
MOLYBDENUM	202.03	-0.197	0	0	0	-0.500
NICKEL	231.60	0	0	0	0	-0.190
POTASSIUM	766.49	0	0	0	0	0
SELENIUM	196.03	0	0	0	0	0
SILICON	251.61	0	0	0	0	0
SILVER	328.07	0	0	0	0	0
SODIUM	589.59	0	0	0	0	0
STRONTIUM	407.77	0	0	0	0	0
THALLIUM	190.80	0	0	0	0.400	0
TIN	189.93	0	0	0	0	0
TITANIUM	334.94	0	0	0	0	0
VANADIUM	290.88	-0.200	-0.480	0	0	-0.224
ZINC	206.20	-0.0553	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
PDF File ID: 2957215
Report generated: 07/02/2013 08:49



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 12/29/2012
Method: 6010B

Analyte	Wave Length	SB	SE	SI	SN	SR
ALUMINUM	396.15	0	0.000612	0	0	0
ANTIMONY	206.84	0	0	0	0	0
ARSENIC	188.98	-0.740	0	0	0	0
BARIUM	233.53	0	0	0	0	0
BERYLLIUM	234.86	0	0	0	0	0
BORON	249.68	0	0	0	0	0
CADMIUM	228.80	0	0	0	0	0
CALCIUM	227.55	0	0	0	0	0.0223
CHROMIUM	267.72	8.46	0	0	0	0
COBALT	228.62	0.730	-0.250	0	0	0
COPPER	327.39	0	0	0	0	0
IRON	239.56	-0.0366	-0.210	0	0	0
LEAD	220.35	0	0	0	0	0
LITHIUM	670.78	0	0	0	0	0
MAGNESIUM	279.08	0	0	0	0	0
MANGANESE	257.61	0	0.300	0	0	0
MOLYBDENUM	202.03	-1.46	0	11.1	0	0
NICKEL	231.60	-0.745	-0.376	0	0	0
POTASSIUM	766.49	0	0	0	0	0
SELENIUM	196.03	0	0	0	0	0
SILICON	251.61	0	0	0	0	0
SILVER	328.07	0	0	0	0	0
SODIUM	589.59	0	0	0	0	0
STRONTIUM	407.77	0	0	0	0	0
THALLIUM	190.80	0	0	0	0	0
TIN	189.93	0	0	0	0	0
TITANIUM	334.94	0	-0.220	0	0	0
VANADIUM	290.88	-0.920	-0.100	0	0	0
ZINC	206.20	0	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
 PDF File ID: 2957215
 Report generated: 07/02/2013 08:49



Microbac Laboratories Inc.
INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 12/29/2012
Method: 6010B

Analyte	Wave Length	TI	TL	V	ZN
ALUMINUM	396.15	0	-0.0270	0	0
ANTIMONY	206.84	0	0	0	-0.300
ARSENIC	188.98	0	0	0.200	0
BARIUM	233.53	0	0	0.0400	0
BERYLLIUM	234.86	0	0	0	0
BORON	249.68	0	0	0	0
CADMIUM	228.80	0	0	0	0
CALCIUM	227.55	-0.150	0	0	0
CHROMIUM	267.72	0.297	0	0	-8.16
COBALT	228.62	0	1.00	0	0
COPPER	327.39	0	0	0	-0.200
IRON	239.56	0	0	-0.00351	0.000100
LEAD	220.35	0	0	0	-0.100
LITHIUM	670.78	0	0	0	0
MAGNESIUM	279.08	0	0	0.0260	0
MANGANESE	257.61	0	1.00	0	0
MOLYBDENUM	202.03	0	-0.120	0.178	0
NICKEL	231.60	0	0	0	-0.200
POTASSIUM	766.49	0	0	0	0
SELENIUM	196.03	0	0	0	0
SILICON	251.61	0	0	0	0
SILVER	328.07	0	0	0	0
SODIUM	589.59	0	0	0	0
STRONTIUM	407.77	0	0	0	0
THALLIUM	190.80	0	0	0	0
TIN	189.93	0	0	0	0
TITANIUM	334.94	0	-12.0	0	0
VANADIUM	290.88	0	-2.76	0	-0.100
ZINC	206.20	0	0	0	0

CORR_FACTORS - Modified 03/05/2008
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Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L13060982
Instrument ID: PE-ICP2

Date: 04/01/2013
Method: 6010B

Analyte	Integration Time (Sec.)	Concentration (mg/L)
Aluminum	10.00	450.0
Antimony	10.00	45.0
Arsenic	10.00	9.0
Barium	10.00	9.0
Beryllium	10.00	4.5
Boron	10.00	45.0
Cadmium	10.00	4.5
Calcium	10.00	450.0
Chromium	10.00	45.0
Cobalt	10.00	45.0
Copper	10.00	45.0
Iron	10.00	450.0
Lead	10.00	90.0
Lithium	10.00	0.9
Magnesium	10.00	450.0
Manganese	10.00	27.0
Molybdenum	10.00	45.0
Nickel	10.00	45.0
Potassium	10.00	80.0
Selenium	10.00	45.0
Silicon	10.00	36.0
Silver	10.00	4.5
Sodium	10.00	180.0
Strontium	10.00	2.7
Thallium	10.00	45.0
Tin	10.00	45.0
Titanium	10.00	18.0
Vanadium	10.00	45.0
Zinc	10.00	45.0

Comments:

All analytes passed acceptance criteria at the specified concentration.

LINEAR_RANGE - Modified 03/06/2008
PDF File ID: 2957214
Report generated: 07/02/2013 08:49





Login Number: L13060982
Department: Metals
Analyst: Ji Hu

METHOD

Preparation: SW-846 3015

Analysis: SW-846 6020

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Interference Check Standards: All acceptance criteria were met.

Continuing Calibration: All acceptance criteria were met.

Continuing Calibration Blank: All acceptance criteria were met.

Low Level Check: All acceptance criteria were met.

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Serial Dilution/Post Digestion Spikes: WG435288 - All acceptance criteria were met.

Matrix Spikes: WG435288 - Sample 05 was chosen by the client for MS/MSD analysis. Samples 06(MS) and 07(MSD) met all acceptance criteria.

SAMPLES

Samples: All acceptance criteria were met.

Narrative ID: 66540

Approved By: Sheri Pfalzgraf



METHOD BLANK REPORT

Login Number: L13060982 Prep Date: 06/24/13 06:38 Sample ID: WG435156-02
Instrument ID: ICP-MS2 Run Date: 06/25/13 13:17 Prep Method: 3015
File ID: NI.062513.131716 Analyst: JYH Method: 6020
Workgroup (AAB#): WG435288 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: ICP-MS - 25-JUN-13

Analytes	LOD	LOQ	Concentration	Dilution	Qualifier
Arsenic, Total	0.000500	0.00100	0.000500	1	U
Barium, Total	0.00150	0.00300	0.00150	1	U
Cobalt, Total	0.000500	0.00100	0.000500	1	U
Lead, Total	0.000500	0.00100	0.000500	1	U
Manganese, Total	0.00100	0.00200	0.00100	1	U
Selenium, Total	0.000500	0.00100	0.000500	1	U

LOD Method Detection Limit

LOQ Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > 1/2 RL

Report Name: BLANK

PDF ID: 2946961

26-JUN-2013 08:49



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: <u>L13060982</u>	Run Date: <u>06/25/2013</u>	Sample ID: <u>WG435156-03</u>
Instrument ID: <u>ICP-MS2</u>	Run Time: <u>13:21</u>	Prep Method: <u>3015</u>
File ID: <u>NI.062513.132102</u>	Analyst: <u>JYH</u>	Method: <u>6020</u>
Workgroup (AAB#): <u>WG435288</u>	Matrix: <u>Water</u>	Units: <u>mg/L</u>
QC Key: <u>DOD4</u>	Lot#: <u>STD57131</u>	Cal ID: <u>ICP-MS - 25-JUN-13</u>

Analytes	Expected	Found	% Rec	LCS Limits		Q
Arsenic, Total	0.0625	0.0634	102	80	- 120	
Barium, Total	0.0625	0.0624	99.8	80	- 120	
Cobalt, Total	0.0625	0.0623	99.7	80	- 120	
Lead, Total	0.0625	0.0644	103	80	- 120	
Manganese, Total	0.0625	0.0636	102	80	- 120	
Selenium, Total	0.0625	0.0646	103	80	- 120	

LCS - Modified 03/06/2008
 PDF File ID: 2946962
 Report generated: 06/26/2013 08:49



MS/MSD REPORT

Loginnum: L13060982 Cal ID: ICP-MS2- 25-JUN-13
 Instrument ID: ICP-MS2 Contract #: _____
 Parent ID: L13060982-05 File ID: NI.062513.132448 Dil: 1
 Sample ID: L13060982-06 MS File ID: NI.062513.132834 Dil: 1
 Sample ID: L13060982-07 MSD File ID: NI.062513.133220 Dil: 1

Worknum: WG435288
 Prep Method: 3015
 Method: 6020
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Arsenic, Total	U	0.0625	0.0643	103	0.0625	0.0642	103	0.226	80 - 120	20	
Barium, Total	0.0569	0.0625	0.117	96.5	0.0625	0.118	97.6	0.584	80 - 120	20	
Cobalt, Total	U	0.0625	0.0611	97.8	0.0625	0.0610	97.6	0.215	80 - 120	20	
Lead, Total	U	0.0625	0.0643	103	0.0625	0.0649	104	0.891	80 - 120	20	
Manganese, Total	0.00180	0.0625	0.0629	97.7	0.0625	0.0624	96.9	0.841	80 - 120	20	
Selenium, Total	0.000943	0.0625	0.0659	104	0.0625	0.0661	104	0.330	80 - 120	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008
 PDF File ID: 2946963
 Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
Serial Dilution Report

Login: L13060982 Worknum: WG435288
Instrument: ICP-MS2 Method: 6020
Serial Dil: WG435288-02 File ID: NI.062513.134725 Dil: 5 Units: ug/L
Sample: L13060982-02 File ID: NI.062513.133953 Dil: 1

Analyte	Sample	Qual	Serial Dil	Qual	% Diff	Q
Arsenic	ND	U	ND	U		
Barium	ND	U	ND	U		
Cobalt	ND	U	ND	U		
Lead	ND	U	ND	U		
Manganese	ND	U	ND	U		
Selenium	ND	U	ND	U		

U = Result is below MDL.

F = Result is greater than or equal to MDL and less than the RL.

X = Result is greater than or equal to RL and less than 100 times the MDL.

E = %D exceeds control limit of 10% and initial sample result is greater than or equal to 100 times the MDL.

SERIAL_DIL - Modified 09/22/2008

PDF File ID: 2946957

06/26/2013 08:48



Microbac Laboratories Inc.
POST SPIKE REPORT

Sample Login ID: L13060982
Instrument ID: ICP-MS2
Post Spike ID: WG435288-01
Sample ID: L13060982-02

Worknum: WG435288
Method: 6020
Units: ug/L
Matrix: Water
File ID: NI.062513.134339 Dil: 1
File ID: NI.062513.133953 Dil: 1

Analyte	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Control Limit %R	Q
ARSENIC	51.7		0	U	50	103.4	75 - 125	
BARIUM	51.5		0	U	50	103.1	75 - 125	
COBALT	52.0		0	U	50	103.9	75 - 125	
LEAD	53.8		0	U	50	107.7	75 - 125	
MANGANESE	52.1		0	U	50	104.2	75 - 125	
SELENIUM	51.6		0	U	50	103.3	75 - 125	

N = % Recovery exceeds control limits

F = Result is between MDL and RL

U = Sample result is below MDL. A value of zero is used in the calculation

POST_SPIKE - Modified 03/06/2008
PDF File ID: 2946958
Report generated: 06/26/2013 08:48



Microbac Laboratories Inc.
Initial Calibration Summary

Login:	<u>L13060982</u>	Workgroup (AAB#):	<u>WG435288</u>
Analytical Method:	<u>6020</u>	Instrument ID:	<u>ICP-MS2</u>
ICAL Worknum:	<u>WG435379</u>	Initial Calibration Date:	<u>25-JUN-2013 09:20</u>

	WG435379-01		WG435379-02		WG435379-03		WG435379-04			
	Conc	INT	Conc	INT	Conc	INT	Conc	INT	R	Q
ARSENIC	0	-223	.4	-148	50	58800	100	116000	.999976	
BARIUM	0	28.7	.4	154	50	96500	100	192000	.999988	
COBALT	0	165	.4	408	50	197000	100	385000	.999898	
LEAD	0	318	.4	718	50	338000	100	668000	.999997	
MANGANESE	0	809	.4	1240	50	301000	100	582000	.999842	
SELENIUM	0	6.90	.4	15.3	50	5850	100	11700	.999998	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

INT_CAL_ICP - Modified 03/06/2008
PDF File ID: 2946966
Report generated: 26-JUN-2013 08:49



Microbac Laboratories Inc.
INITIAL CALIBRATION BLANK (ICB)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-06
Instrument ID: ICP-MS2 Run Time: 09:28 Method: 6020
File ID: NI.062513.092828 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG435288 Cal ID: ICP-MS2 - 25-JUN-13
Matrix: WATER

Analytes	MDL	RDL	Concentration	Qualifier
ARSENIC	.2	.4	.2	U
BARIIUM	.6	1.2	.6	U
COBALT	.2	.4	.2	U
MANGANESE	.4	.8	.4	U
LEAD	.2	.4	.2	U
SELENIUM	.2	.4	.2	U

U = Result is less than 2 x MDL
F = Result is between MDL and 2 x MDL
* = Result is above 2 x MDL

ICB - Modified 07/14/2009
PDF File ID: 2946968
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-11
Instrument ID: ICP-MS2 Run Time: 09:47 Method: 6020
File ID: NI.062513.094724 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2946971
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-21
Instrument ID: ICP-MS2 Run Time: 13:08 Method: 6020
File ID: NI.062513.130849 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2946971
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-24
Instrument ID: ICP-MS2 Run Time: 13:58 Method: 6020
File ID: NI.062513.135847 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2946971
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-26
Instrument ID: ICP-MS2 Run Time: 14:44 Method: 6020
File ID: NI.062513.144409 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Arsenic	0.200	0.400	0.200	U
Barium	0.600	1.20	0.600	U
Cobalt	0.200	0.400	0.200	U
Lead	0.200	0.400	0.200	U
Manganese	0.400	0.800	0.400	U
Selenium	0.200	0.400	0.200	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 2946971
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
INITIAL CALIBRATION VERIFICATION (ICV)
(Alternate Source)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-05
Instrument ID: ICP-MS2 Run Time: 09:24 Method: 6020
File ID: NI.062513.092434 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
QC Key: DOD4

Analyte	Expected	Found	%REC	LIMITS	Q
Arsenic	50	49.7	99.4	90 - 110	
Barium	50	49.7	99.5	90 - 110	
Cobalt	50	50.1	100	90 - 110	
Lead	50	50.0	99.9	90 - 110	
Manganese	50	49.6	99.2	90 - 110	
Selenium	50	49.9	99.9	90 - 110	

* Exceeds LIMITS Limit

ICV - Modified 03/06/2008
PDF File ID: 2946967
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-10
Instrument ID: ICP-MS2 Run Time: 09:43 Method: 6020
File ID: NI.062513.094337 Analyst: JYH QC Key: D0D4
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		50.0	50.4	ug/L	101	90 - 110		
Barium		50.0	49.7	ug/L	99.5	90 - 110		
Cobalt		50.0	50.5	ug/L	101	90 - 110		
Lead		50.0	51.4	ug/L	103	90 - 110		
Manganese		50.0	50.3	ug/L	101	90 - 110		
Selenium		50.0	51.7	ug/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2946970
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-20
Instrument ID: ICP-MS2 Run Time: 13:05 Method: 6020
File ID: NI.062513.130503 Analyst: JYH QC Key: D0D4
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		50.0	50.7	ug/L	101	90 - 110		
Barium		50.0	48.7	ug/L	97.3	90 - 110		
Cobalt		50.0	49.9	ug/L	99.8	90 - 110		
Lead		50.0	52.0	ug/L	104	90 - 110		
Manganese		50.0	49.4	ug/L	98.8	90 - 110		
Selenium		50.0	51.7	ug/L	103	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2946970
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-23
Instrument ID: ICP-MS2 Run Time: 13:55 Method: 6020
File ID: NI.062513.135501 Analyst: JYH QC Key: D0D4
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		50.0	50.0	ug/L	100	90 - 110		
Barium		50.0	49.1	ug/L	98.2	90 - 110		
Cobalt		50.0	49.3	ug/L	98.5	90 - 110		
Lead		50.0	50.9	ug/L	102	90 - 110		
Manganese		50.0	49.5	ug/L	99.0	90 - 110		
Selenium		50.0	50.4	ug/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
PDF File ID: 2946970
Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L13060982 Run Date: 06/25/2013 Sample ID: WG435379-25
Instrument ID: ICP-MS2 Run Time: 14:40 Method: 6020
File ID: NI.062513.144023 Analyst: JYH QC Key: D0D4
Workgroup (AAB#): WG435288 Cal ID: ICP-MS - 25-JUN-13
Matrix: WATER

Analyte		Expected	Found	UNITS	%REC	LIMITS		Q
Arsenic		50.0	50.7	ug/L	101	90 - 110		
Barium		50.0	49.9	ug/L	99.7	90 - 110		
Cobalt		50.0	49.5	ug/L	98.9	90 - 110		
Lead		50.0	51.8	ug/L	104	90 - 110		
Manganese		50.0	49.7	ug/L	99.5	90 - 110		
Selenium		50.0	50.7	ug/L	101	90 - 110		

* Exceeds LIMITS Criteria

CCV - Modified 03/05/2008
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Report generated 06/26/2013 08:49



Microbac Laboratories Inc.
INTERFERENCE CHECK SAMPLES

Login number: L13060982
Instrument ID: ICP-MS2
Sol. A : WG435379-08
Sol. AB : WG435379-09

File ID: NI.062513.093602
File ID: NI.062513.093948

Workgroup (AAB#): WG435288
Method: 6020
Units: ug/L
Matrix: Water

ANALYTE	Sol. A			Sol. AB			Q
	True	Found	%Recovery	True	Found	%Recovery	
Arsenic	NS	-0.0269	NS	100	103	103	
Barium	NS	0.00920	NS	100	100	100	
Cobalt	NS	0.0374	NS	100	101	101	
Lead	NS	0.0165	NS	100	104	104	
Manganese	NS	0.0401	NS	100	99.0	99.0	
Selenium	NS	0.0331	NS	100	105	105	

NS = Not spiked

* = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.

= Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

+ = Result for unspiked element is outside the acceptance limits of (+/-) 2 times the project method detection limit (MDL). This criteria is only applicable to specific QAPPs.

ICS - Modified 03/06/2008
PDF File ID: 2946969
Report generated 06/26/2013 08:49



INTERNAL STANDARD REPORT

Login: L13060982 Analytical Method: 6020
 Analytical Workgroup: WG435288 Matrix: 1
 Instrument: ICP-MS2 Analyst: JYH
 ICAL Date: 25-JUN-2013 09:09

Sample	Type	Run Date	BISMUTH	GERMANIUM	INDIUM	LITHIUM
			% Rec	% Rec	% Rec	% Rec
L13060982-01	SAMP	25-JUN-2013 13:36	95.848	94.465	96.825	105.296
L13060982-02	SAMP	25-JUN-2013 13:39	98.454	93.715	96.956	103.485
L13060982-03	SAMP	25-JUN-2013 14:06	97.536	93.071	97.772	103.412
L13060982-05	SAMP	25-JUN-2013 13:24	97.477	93.942	98.021	105.918
L13060982-06	SAMP	25-JUN-2013 13:28	96.584	94.815	98.005	105.493
L13060982-07	SAMP	25-JUN-2013 13:32	96.433	95.417	98.364	105.933
L13060982-08	SAMP	25-JUN-2013 14:10	93.591	90.985	94.888	102.078
L13060982-09	SAMP	25-JUN-2013 14:13	94.358	92.188	95.409	102.252
L13060982-10	SAMP	25-JUN-2013 14:17	91.885	89.901	93.382	100.042
L13060982-11	SAMP	25-JUN-2013 14:21	93.067	90.099	92.832	100.889
L13060982-12	SAMP	25-JUN-2013 14:25	91.616	89.812	92.389	98.676
WG435156-02	BLANK	25-JUN-2013 13:17	91.602	83.906	88.179	90.123
WG435156-03	LCS	25-JUN-2013 13:21	99.103	94.747	99.39	103.534
WG435288-01	PSPK	25-JUN-2013 13:43	100.268	97.973	101.622	107.867
WG435288-02	SERIAL	25-JUN-2013 13:47	91.373	85.206	87.9	91.508
WG435379-05	ICV	25-JUN-2013 09:24	100.096	100.505	100.772	101.853
WG435379-06	ICB	25-JUN-2013 09:28	101.379	100.802	101.191	103.774
WG435379-07	LLICV	25-JUN-2013 09:32	102.02	100.961	102.215	103.65
WG435379-08	ICS	25-JUN-2013 09:36	96.362	93.967	95.495	96.591
WG435379-09	ICS	25-JUN-2013 09:39	102.955	103.984	104.854	110.435
WG435379-10	CCV	25-JUN-2013 09:43	103.337	104.293	105.916	109.13
WG435379-11	CCB	25-JUN-2013 09:47	102.646	100.902	103.975	106.461
WG435379-20	CCV	25-JUN-2013 13:05	97.982	93.905	100.318	104.189
WG435379-21	CCB	25-JUN-2013 13:08	98.962	92.532	98.825	103.664
WG435379-22	LLCCV	25-JUN-2013 13:12	98.206	94.096	98.876	101.895
WG435379-23	CCV	25-JUN-2013 13:55	96.185	94.536	97.348	101.324
WG435379-24	CCB	25-JUN-2013 13:58	95.902	92.576	95.245	97.88
WG435379-25	CCV	25-JUN-2013 14:40	94.235	90.59	94.318	97.877
WG435379-26	CCB	25-JUN-2013 14:44	94.595	89.449	93.945	95.729
WG435379-29	LLCCV	25-JUN-2013 15:22	93.132	89.158	91.697	95.667

Acceptance criteria: 30% - 120% Underlined recoveries are out of range
 Acceptance criteria for CCVs and CCBs for method SW846-6020: 80% - 120%

INT_STD_ICPMS - Modified 07/28/2010
 PDF File ID: 2946965
 Report generated: 06/26/2013 08:49



Microbac Laboratories Inc.
LINEAR RANGE (QUARTERLY)

Login Number: L13060982

Date: 03/12/2013

Instrument ID: ICP-MS2

Method: 6020

Analyte	Integration Time (Sec.)	Concentration (ug/L)
Antimony	1.00	100.0
Arsenic	1.00	100.0
Barium	1.00	100.0
Cadmium	1.00	100.0
Chromium	1.00	100.0
Cobalt	1.00	100.0
Copper	1.00	100.0
Lead	1.00	100.0
Manganese	1.00	100.0
Nickel	1.00	100.0
Selenium	1.00	100.0
Silver	1.00	100.0
Thallium	1.00	100.0
Uranium	1.00	100.0
Vanadium	1.00	100.0
Zinc	1.00	100.0

Comments:

All analytes passed acceptance criteria at the specified concentration.

LINEAR_RANGE - Modified 03/06/2008
PDF File ID: 2946964
Report generated: 06/26/2013 08:49



Kemron–Radford Army Ammunition Plant Data Validation Summary Worksheet

SDG#: L13060982	Laboratory: Microbac	Validator: Linda Thal	Validation Start Date: 08/08/2013
Site: Radford	AR/COC#: 50**	Validation Level: ☐ III ☒ IV	
Matrix: Water	# of Samples: 12*	Tracking docs present: See sample receipt and log-in documentation	
COCs present: yes	COCs signed: yes	COCs dated: yes	Sample Container Integrity: OK

Analyses:

☒ VOCs
 ☐ SVOCs
 ☒ PAHs
 ☐ GRO
 ☐ DRO
 ☐ Pests
 ☐ PCBs
 ☒ Metals
 ☐ Gen Chem

☒ Other: CLO4

Requested Analyses Not Reported		
Client Sample ID	Lab Sample ID	Analysis
None		

Hold Time/Preservation Outliers					
Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date

Comments: Sampled 06/19/2013, **illegible due to poor copyquality; *(4 normal water samples, 1 field duplicate water sample, 1 matrix spike pair, 1 equipment blank, 1 field blank, and 1 trip blank).

Revised 12/2010

Kemron-Radford Army Ammunition Plant Organic Worksheet (LCMS)

SDG: L13060982	Method: 6850	Matrix: Water	Level III Lab Sample IDs: NA
Batch #s: WG435251			Level IV Lab Sample IDs: L13060982-01, -02, -03, -05, -06, -07, -08, -10 and -012

[illegible]

Comments: HTs OK; RLs OK; -08 and -010 diluted 2X; Daily calibration not required as per QAPP; No tune data supplied; CRI at RL not 2X the RL as listed in QAPP;

¹Or method-specified limits, whichever is more stringent

Revised 12/2010

Kemron-Radford Army Ammunition Plant Inorganic Metals Worksheet

SDG: L13060982	Matrix: Water	Level III Lab Sample IDs: NA			
Method/Batch #s: 6010B/WG435260/WG435148(pre); 6020/WG435288;					
ICPMS Mass Cal: ☒ Pass ☐ Fail ☐ NA	ICPMS Resolution: ☒ Pass ☐ Fail ☐ NA	ICPMS %RSD: ☒ Pass ☐ Fail ☐ NA	Level IV Lab Sample IDs: L13060982-01 thru -12 (excl -04)		

[illegible]

IS Outliers ³ (60-120%)				IS Outliers ³ (60-120%)			
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
None				None			

Comments: HTs OK.; LOD and/or LOQ slightly > QAPP for Al, Ca, Fe, K, As, Ba, Co, Pb, Mn; *>4X spike amount PS and SD performed on -01 (6010B) and -02 (6020-EQR**); No CRIs but low standard at RL; also LLICV with no results reported; ICS only run at beginning NA since results for Al, Ca, Mg and Fe are < ICS spiked amounts: -02 EQR and -03FB ND,**only sample result >50X the MDL = Ba sample -01

THE 6010B RAW DATA SAMPLE IDS AND TIMES DO NOT MATCH THE REPORTED DATA AND RUN LOG ✓

²For sample results <5X RL, $\pm$ RL

APPENDIX E
Analytical Data Tables
(CD-ROM)

Table 1
November 2011 Screening Levels for Groundwater SVOC PAH Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40LFMW01 40LFMW01GW112111 11/21/2011 N					40LFMW01 40DUPGW030612 3/6/2012 FD					40LFMW01 40LFMW01GW030612 3/6/2012 N					40LFMW01 LFMW01GW061212 6/12/2012 N					40LFMW01 LFMW01GW92612 9/26/2012 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0281	U	0.0281	0.0562	ug/L	0.026	U	0.026	0.0521	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	< 0.0281	U	0.0281	0.0562	ug/L	< 0.026	U	0.026	0.0521	ug/L	< 0.0269	U	0.0269	0.0538	ug/L	< 0.0281	U	0.0281	0.0562	ug/L	< 0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.0281	U	0.0281	0.0562	ug/L	0.026	U	0.026	0.0521	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.0281	U	0.0281	0.0562	ug/L	0.026	U	0.026	0.0521	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.0281	U	0.0281	0.0562	ug/L	0.026	U	0.026	0.0521	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0308	J	0.0281	0.0562	ug/L	0.0255	U	0.0255	0.051	ug/L

Notes:

CAS = Chemical Abstracts Service
ug/L = Microgram Per Liter
T = Total
D = Dissolved
CSL = Carcinogenic Screening Level
T-NCSL = Adjusted Noncarcinogenic Screening Level
MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate
Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.



Table 1
November 2011 Screening Levels for Groundwater SVOC PAH Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40LFMW01 40DUPGW61913 6/19/2013 FD					40LFMW01 LFMW01GW61913 6/19/2013 N					40MW5 40DUPGW112011 11/20/2011 FD					40MW5 40MW5GW112011 11/20/2011 N					40MW5 40MW5GW030712 3/7/2012 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.0263	U	0.0263	0.0526	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	< 0.026	U	0.026	0.0521	ug/L	< 0.0258	U	0.0258	0.0515	ug/L	< 0.0263	U	0.0263	0.0526	ug/L	< 0.0269	U	0.0269	0.0538	ug/L	< 0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.0263	U	0.0263	0.0526	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.0263	U	0.0263	0.0526	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255	U	0.0255	0.051	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.0263	U	0.0263	0.0526	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255	U	0.0255	0.051	ug/L

Notes:
CAS = Chemical Abstracts Service
ug/L = Microgram Per Liter
T = Total
D = Dissolved
CSL = Carcinogenic Screening Level
T-NCSL = Adjusted Noncarcinogenic Screening Level
MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate
Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

U = Not Detected. The associated number indicates the approximate sample concentration
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R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.



Table 1
November 2011 Screening Levels for Groundwater SVOC PAH Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW5 40MW5GW061212 6/12/2012 N					40MW5 40DUPGW92512 9/25/2012 FD					40MW5 40MW5GW92512 9/25/2012 N					40MW5 40MW5GW61913 6/19/2013 N					40MW6 40MW6GW112111 11/21/2011 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.026	UJ	0.026	0.0521	ug/L	0.0255	U	0.0255	0.051	ug/L	< 0.0338	U	0.0338	0.0676	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0287	U	0.0287	0.0575	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	< 0.026	UJ	0.026	0.0521	ug/L	< 0.0255	U	0.0255	0.051	ug/L	< 0.0338	U	0.0338	0.0676	ug/L	< 0.0269	U	0.0269	0.0538	ug/L	< 0.0287	U	0.0287	0.0575	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.026	UJ	0.026	0.0521	ug/L	0.0255	U	0.0255	0.051	ug/L	< 0.0338	U	0.0338	0.0676	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0287	U	0.0287	0.0575	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.026	UJ	0.026	0.0521	ug/L	0.0255	U	0.0255	0.051	ug/L	0.0338	U	0.0338	0.0676	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0287	U	0.0287	0.0575	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.026	UJ	0.026	0.0521	ug/L	0.0255	U	0.0255	0.051	ug/L	0.0338	U	0.0338	0.0676	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0287	U	0.0287	0.0575	ug/L

Notes:

CAS = Chemical Abstracts Service
ug/L = Microgram Per Liter
T = Total
D = Dissolved
CSL = Carcinogenic Screening Level
T-NCSL = Adjusted Noncarcinogenic Screening Level
MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate
Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.



Table 1
November 2011 Screening Levels for Groundwater SVOC PAH Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW6 40MW6GW030712 3/7/2012 N					40MW6 40DUPGW061212 6/12/2012 FD					40MW6 40MW6GW061212 6/12/2012 N					40MW6 40MW6GW92512 9/25/2012 N					40MW6 40MW6GW61913 6/19/2013 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255		0.0255	0.051	ug/L	0.211	J	0.0281	0.0562	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0258	U	0.0258	0.0515	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	< 0.0269	U	0.0269	0.0538	ug/L	< 0.0255		0.0255	0.051	ug/L	0.0793	J	0.0281	0.0562	ug/L	< 0.0281	U	0.0281	0.0562	ug/L	< 0.0258	U	0.0258	0.0515	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255		0.0255	0.051	ug/L	0.261	J	0.0281	0.0562	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0258	U	0.0258	0.0515	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0255		0.0255	0.051	ug/L	0.17	J	0.0281	0.0562	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0258	U	0.0258	0.0515	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0301		0.0255	0.051	ug/L	0.89	J	0.0281	0.0562	ug/L	0.0281	U	0.0281	0.0562	ug/L	0.0258	U	0.0258	0.0515	ug/L

Notes:

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CSL = Carcinogenic Screening Level
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MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate
Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

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Table 1
November 2011 Screening Levels for Groundwater SVOC PAH Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW7 40MW7GW112011 11/20/2011 N					40MW7 40MW7GW030612 3/6/2012 N					40MW7 40MW7GW601212 6/12/2012 N					40MW7 40MW7GW92512 9/25/2012 N					40MW7 40MW7GW61913 6/19/2013 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0255	U	0.0255	0.051	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0284	U	0.0284	0.0568	ug/L	0.025	U	0.025	0.05	ug/L	0.0275	U	0.0275	0.0549	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	< 0.0255	U	0.0255	0.051	ug/L	< 0.0269	U	0.0269	0.0538	ug/L	< 0.0284	U	0.0284	0.0568	ug/L	< 0.025	U	0.025	0.05	ug/L	< 0.0275	U	0.0275	0.0549	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.0255	U	0.0255	0.051	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0284	U	0.0284	0.0568	ug/L	0.025	U	0.025	0.05	ug/L	0.0275	U	0.0275	0.0549	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.0255	U	0.0255	0.051	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0284	U	0.0284	0.0568	ug/L	0.025	U	0.025	0.05	ug/L	0.0275	U	0.0275	0.0549	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.0255	U	0.0255	0.051	ug/L	0.0269	U	0.0269	0.0538	ug/L	0.0832	J	0.0284	0.0568	ug/L	0.025	U	0.025	0.05	ug/L	0.0275	U	0.0275	0.0549	ug/L

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MCL = Maximum Contaminant Level
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VQ = Validation Qualifier
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Table 2
November 2011 Screening Levels for Groundwater VOC Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40LFMW01 40LFMW01GW112111 11/21/2011 N					40LFMW01 40DUPGW030612 3/6/2012 FD					40LFMW01 40LFMW01GW030612 3/6/2012 N					40LFMW01 LFMW01GW061212 6/12/2012 N					40LFMW01 LFMW01GW92612 9/26/2012 N					40LFMW01 40DUPGW61913 6/19/2013 FD					40LFMW01 LFMW01GW61913 6/19/2013 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8260B	110-75-8	2-Chloroethyl vinyl ether				ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	U	2	10	ug/L	< 2	U	2	10	ug/L
SW8260B	67-64-1	Acetone		1200		ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	U	2.5	10	ug/L	2.5	U	2.5	10	ug/L

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MCL = Maximum Contaminant Level
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Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

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Table 2
November 2011 Screening Levels for Groundwater VOC Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW5 40DUPGW112011 11/20/2011 FD					40MW5 40MW5GW112011 11/20/2011 N					40MW5 40MW5GW030712 3/7/2012 N					40MW5 40MW5GW061212 6/12/2012 N					40MW5 40DUPGW92512 9/25/2012 FD					40MW5 40MW5GW92512 9/25/2012 N					40MW5 40MW5GW61913 6/19/2013 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8260B	110-75-8	2-Chloroethyl vinyl ether				ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	U	2	10	ug/L
SW8260B	67-64-1	Acetone		1200		ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	U	2.5	10	ug/L

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Table 2
November 2011 Screening Levels for Groundwater VOC Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW6 40MW6GW112111 11/21/2011 N					40MW6 40MW6GW030712 3/7/2012 N					40MW6 40DUPGW061212 6/12/2012 FD					40MW6 40MW6GW061212 6/12/2012 N					40MW6 40MW6GW92512 9/25/2012 N					40MW6 40MW6GW61913 6/19/2013 N					40MW7 40MW7GW112011 11/20/2011 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8260B	110-75-8	2-Chloroethyl vinyl ether				ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	U	2	10	ug/L	< 2	R	2	10	ug/L
SW8260B	67-64-1	Acetone		1200		ug/L	2.5	U	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	U	2.5	10	ug/L	4.38	L	2.5	10	ug/L

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Table 2
November 2011 Screening Levels for Groundwater VOC Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW7 40MW7GW030612 3/6/2012 N					40MW7 40MW7GW601212 6/12/2012 N					40MW7 40MW7GW92512 9/25/2012 N					40MW7 40MW7GW61913 6/19/2013 N				
Method	CAS	Chemical	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8260B	110-75-8	2-Chloroethyl vinyl ether				ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	R	2	10	ug/L	< 2	U	2	10	ug/L
SW8260B	67-64-1	Acetone		1200		ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	R	2.5	10	ug/L	2.5	UJ	2.5	10	ug/L

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MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

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L = Analyte present. Reported value may be biased low. Actual value is expected to be higher
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.

Table 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type								40LFMW01 40LFMW01GW112111 11/21/2011 N					40LFMW01 40DUPGW030612 3/6/2012 FD					40LFMW01 40LFMW01GW030612 3/6/2012 N					40LFMW01 LFMW01GW061212 6/12/2012 N					40LFMW01 LFMW01GW92612 9/26/2012 N					40LFMW01 40DUPGW61913 6/19/2013 FD					40LFMW01 LFMW01GW61913 6/19/2013 N				
Method	CAS	Chemical	fraction	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6010B	7429-90-5	Aluminum	T		1600		ug/L	17900		50	100	ug/L	112		50	100	ug/L	123		50	100	ug/L	74.8	J	50	100	ug/L	9150		50	100	ug/L	127	J	100	200	ug/L	145	J	100	200	ug/L
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	50	U	50	100	ug/L	NS					NS					50	U	50	100	ug/L	92.9	J	50	100	ug/L	< 100	U	100	200	ug/L	100	U	100	200	ug/L
SW6010B	7439-89-6	Iron	T		1100		ug/L	21800	L	50	100	ug/L	87.5	J	50	100	ug/L	93	J	50	100	ug/L	120		50	100	ug/L	8950		50	100	ug/L	290		50	100	ug/L	311		50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	102		50	100	ug/L	NS					NS					50	U	50	100	ug/L	74.1	J	50	100	ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L
SW6010B	7439-95-4	Magnesium	T				ug/L	74800		250	500	ug/L	27800		250	500	ug/L	28100		250	500	ug/L	33800		2500	5000	ug/L	51100		250	500	ug/L	30300		250	500	ug/L	29200		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	33100		250	500	ug/L	NS					NS					32700		2500	5000	ug/L	35400		250	500	ug/L	29300		250	500	ug/L	29800		250	500	ug/L
SW6010B	7440-09-7	Potassium	T				ug/L	5920		500	1000	ug/L	943	J	500	1000	ug/L	885	J	500	1000	ug/L	1740		500	1000	ug/L	3700		500	1000	ug/L	1740		500	1000	ug/L	1660		500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	1620		500	1000	ug/L	NS					NS					1630		500	1000	ug/L	1690		500	1000	ug/L	1620		500	1000	ug/L	1690		500	1000	ug/L
SW6010B	7440-23-5	Sodium	T				ug/L	8230		250	500	ug/L	7860		250	500	ug/L	7690		250	500	ug/L	8450		250	500	ug/L	6640		250	500	ug/L	8410		250	500	ug/L	8180		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	8480		250	500	ug/L	NS					NS					8120		250	500	ug/L	7100		250	500	ug/L	8490		250	500	ug/L	8540		250	500	ug/L
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	32.5		5	10	ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	18.1		5	10	ug/L	8.64	J	5	10	ug/L	9.29	J	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	5	U	5	10	ug/L	NS					NS					5	U	5	10	ug/L	5	U	5	10	ug/L	10.9		5	10	ug/L	10.8		5	10	ug/L
SW6010B	7440-70-2	Calcium	T				ug/L	142000		100	200	ug/L	71300	J	100	200	ug/L	71400	J	100	200	ug/L	82800		1000	2000	ug/L	105000		100	200	ug/L	75800		250	500	ug/L	75900		250	500	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	81500		100	200	ug/L	NS					NS					82000		1000	2000	ug/L	85700		100	200	ug/L	78100		250	500	ug/L	77700		250	500	ug/L
SW6020	7439-92-1	Lead	T			15	ug/L	11		1	2	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	5.46		0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L
SW6020	7439-92-1	Lead	D			15	ug/L	< 1	U	1	2	ug/L	NS					NS					0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L
SW6020	7439-96-5	Manganese	T		32		ug/L	125		2	4	ug/L	1.25	J	1	2	ug/L	1.52	J	1	2	ug/L	2.18	L	1	2	ug/L	52.6		1	2	ug/L	2.48		1	2	ug/L	2.89		1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	3.95	B	2	4	ug/L	NS					NS					1	UL	1	2	ug/L	1	U	1	2	ug/L	1	U	1	2	ug/L	1	U	1	2	ug/L
SW6020	7440-38-2	Arsenic	T	0.045	0.47	10	ug/L	2.68		1	2	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	1.43		0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	< 1	U	1	2	ug/L	NS					NS					< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L
SW6020	7440-39-3	Barium	T		290	2000	ug/L	133		3	6	ug/L	94.7		1.5	3	ug/L	94.1		1.5	3	ug/L	65.7	L	1.5	3	ug/L	125		1.5	3	ug/L	61.9		1.5	3	ug/L	62.3		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	90.2		3	6	ug/L	NS					NS					63.4		1.5	3	ug/L	92.6		1.5	3	ug/L	61.4		1.5	3	ug/L	57.5		1.5	3	ug/L
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	5.54		1	2	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	3.14		0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L
SW6020	7440-48-4	Cobalt	D		0.47		ug/L	< 1	U	1	2	ug/L	NS					NS					< 0.5	U	0.5	1	ug/L	0.903	J	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L
SW6020	7782-49-2	Selenium	T		7.8	50	ug/L	1	U	1	2	ug/L	0.5	UL	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	0.726	K	0.5	1	ug/L	1.18		0.5	1	ug/L	0.676	J	0.5	1	ug/L	0.928	J	0.5	1	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	1	U	1	2	ug/L	NS					NS					0.7	J	0.5	1	ug/L	1.06		0.5	1	ug/L	0.523	J	0.5	1	ug/L	1.71	J	0.5	1	ug/L

Notes:
CAS = Chemical Abstracts Service
ug/L = Microgram Per Liter
T = Total
D = Dissolved
CSL = Carcinogenic Screening Level
T-NCSL = Adjusted Noncarcinogenic Screening Level
MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.
NS=Not Sampled because Turbidity was stable at less than or equal to 10 NTUs

Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

Table 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type								40MW5 40DUPGW112011 11/20/2011 FD					40MW5 40MW5GW112011 11/20/2011 N					40MW5 40MW5GW030712 3/7/2012 N					40MW5 40MW5GW061212 6/12/2012 N					40MW5 40DUPGW92512 9/25/2012 FD					40MW5 40MW5GW92512 9/25/2012 N					40MW5 40MW5GW61913 6/19/2013 N					
Method	CAS	Chemical	fraction	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	
SW6010B	7429-90-5	Aluminum	T		1600		ug/L	1540		50	100	ug/L	1890		50	100	ug/L	221		50	100	ug/L	911		50	100	ug/L	140	J	50	100	ug/L	266	J	50	100	ug/L	100	U	100	200	ug/L	
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L	NS					50	U	50	100	ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L	NS					
SW6010B	7439-89-6	Iron	T		1100		ug/L	1580	L	50	100	ug/L	2040	L	50	100	ug/L	156			50	100	ug/L	950		50	100	ug/L	123		50	100	ug/L	217		50	100	ug/L	137		50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	82	J	50	100	ug/L	74.1	J	50	100	ug/L	NS			50	100	ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L	NS				
SW6010B	7439-95-4	Magnesium	T				ug/L	31300		250	500	ug/L	32500		250	500	ug/L	33500			250	500	ug/L	34700		2500	5000	ug/L	32500		250	500	ug/L	32000		250	500	ug/L	32500		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	29600		250	500	ug/L	29800		250	500	ug/L	NS					34600		2500	5000	ug/L	32100		250	500	ug/L	32300		250	500	ug/L	NS					
SW6010B	7440-09-7	Potassium	T				ug/L	1370		500	1000	ug/L	1370		500	1000	ug/L	1160			500	1000	ug/L	1270		500	1000	ug/L	1260		500	1000	ug/L	1300		500	1000	ug/L	1100		500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	1060		500	1000	ug/L	1080		500	1000	ug/L	NS					1240		500	1000	ug/L	1230		500	1000	ug/L	1230		500	1000	ug/L	NS					
SW6010B	7440-23-5	Sodium	T				ug/L	5480		250	500	ug/L	5220		250	500	ug/L	4790			250	500	ug/L	5280		250	500	ug/L	5270		250	500	ug/L	5730		250	500	ug/L	4590		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	5330		250	500	ug/L	5350		250	500	ug/L	NS					5170		250	500	ug/L	5420		250	500	ug/L	5430		250	500	ug/L	NS					
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	8.74	J	5	10	ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	10.5		5	10	ug/L	
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	NS					5	U	5	10	ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	NS					
SW6010B	7440-70-2	Calcium	T				ug/L	84800		100	200	ug/L	87200		100	200	ug/L	93400	J	100	200	ug/L	89900		1000	2000	ug/L	84900		100	200	ug/L	86900		100	200	ug/L	91600		250	500	ug/L	
SW6010B	7440-70-2	Calcium	D				ug/L	81700		100	200	ug/L	82800		100	200	ug/L	NS					88400		1000	2000	ug/L	86100		100	200	ug/L	89200		100	200	ug/L	NS					
SW6020	7439-92-1	Lead	T			15	ug/L	1	U	1	2	ug/L	1	U	1	2	ug/L	0.5	U	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	
SW6020	7439-92-1	Lead	D			15	ug/L	1	U	1	2	ug/L	0.5	U	0.5	1.0	ug/L	NS					0.5	UL	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	NS					
SW6020	7439-96-5	Manganese	T		32		ug/L	7.67	B	2	4	ug/L	15.2	B	2	4	ug/L	1.11	J	1	2	ug/L	4.84	L	1	2	ug/L	4	B	1	2	ug/L	2.13	B	1	2	ug/L	1.8	J	1	2	ug/L	
SW6020	7439-96-5	Manganese	D		32		ug/L	2	U	2	4	ug/L	1	U	1	2	ug/L	NS					1	UL	1	2	ug/L	1	U	1	2	ug/L	1	U	1	2	ug/L	NS					
SW6020	7440-38-2	Arsenic	T	0.045	0.47	10	ug/L	< 1	U	1	2	ug/L	< 1	U	1	2	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	< 1	U	1	2	ug/L	< 0.5	U	0.5	1.0	ug/L	NS					< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	NS					
SW6020	7440-39-3	Barium	T		290	2000	ug/L	59.9		3	6	ug/L	57.1		3	6	ug/L	57.2		1.5	3	ug/L	56.9	L	1.5	3	ug/L	58.1		1.5	3	ug/L	56.2		1.5	3	ug/L	56.9		1.5	3	ug/L	
SW6020	7440-39-3	Barium	D		290	2000	ug/L	53.2		3	6	ug/L	55.4	J	1.5	3.0	ug/L	NS					54.3	L	1.5	3	ug/L	56.3		1.5	3	ug/L	58.7		1.5	3	ug/L	NS					
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	< 1	U	1	2	ug/L	< 1	U	1	2	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	
SW6020	7440-48-4	Cobalt	D		0.47		ug/L	< 1	U	1	2	ug/L	< 0.5	U	0.5	1.0	ug/L	NS					< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	NS					
SW6020	7782-49-2	Selenium	T		7.8	50	ug/L	1.06	J	1	2	ug/L	1.31	K	1	2	ug/L	0.775	L	0.5	1	ug/L	0.784	K	0.5	1	ug/L	1.02		0.5	1	ug/L	0.845	J	0.5	1	ug/L	0.943	J	0.5	1	ug/L	
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	1.11	J	1	2	ug/L	1.19	K	0.5	1.0	ug/L	NS					0.847	K	0.5	1	ug/L	1.17		0.5	1	ug/L	1.05		0.5	1	ug/L	NS					

Notes:
CAS = Chemical Abstracts Service
ug/L = Microgram Per Liter
T = Total
D = Dissolved
CSL = Carcinogenic Screening Level
T-NCSL = Adjusted Noncarcinogenic Screening Level
MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.
NS=Not Sampled because Turbidity was stable at less than or equal to 10 NTUs
Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

Table 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type							40MW6 40MW6GW112111 11/21/2011 N					40MW6 40MW6GW030712 3/7/2012 N					40MW6 40DUPGW061212 6/12/2012 FD					40MW6 40MW6GW061212 6/12/2012 N					40MW6 40MW6GW92512 9/25/2012 N					40MW6 40MW6GW61913 6/19/2013 N					40MW7 40MW7GW112011 11/20/2011 N					
Method	CAS	Chemical	fraction	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6010B	7429-90-5	Aluminum	T		1600		ug/L	242		50	100	ug/L	210		50	100	ug/L	209		50	100	ug/L	230		50	100	ug/L	467		50	100	ug/L	378		100	200	ug/L	8290		50	100	ug/L
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	NS					NS					NS					NS	U	50	100	ug/L	NS						50	U	50	100	ug/L				
SW6010B	7439-89-6	Iron	T		1100		ug/L	323	L	50	100	ug/L	155		50	100	ug/L	238		50	100	ug/L	296		50	100	ug/L	393		50	100	ug/L	478		50	100	ug/L	7950	L	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	NS					NS					NS					NS	U	50	100	ug/L	NS						73.1	J	50	100	ug/L				
SW6010B	7439-95-4	Magnesium	T				ug/L	32000		250	500	ug/L	36100		250	500	ug/L	33100		2500	5000	ug/L	34000		2500	5000	ug/L	33700		250	500	ug/L	33900		250	500	ug/L	61900		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	NS					NS					NS					NS		250	500	ug/L	NS						32500		250	500	ug/L				
SW6010B	7440-09-7	Potassium	T				ug/L	1000		500	1000	ug/L	1020		500	1000	ug/L	1050		500	1000	ug/L	1140		500	1000	ug/L	1220		500	1000	ug/L	1240		500	1000	ug/L	4250		500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	NS					NS					NS					NS		500	1000	ug/L	NS						2300		500	1000	ug/L				
SW6010B	7440-23-5	Sodium	T				ug/L	5100		250	500	ug/L	4400		250	500	ug/L	4960		250	500	ug/L	5180		250	500	ug/L	5240		250	500	ug/L	4090		250	500	ug/L	66700		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	NS					NS					NS					NS		250	500	ug/L	NS						78300		250	500	ug/L				
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	6.42	J	5	10	ug/L	8.09	J	5	10	ug/L	5	U	5	10	ug/L	10.9		5	10	ug/L	9.26	J	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	NS					NS					NS					NS		5	10	ug/L	NS						5	U	5	10	ug/L				
SW6010B	7440-70-2	Calcium	T				ug/L	84500		100	200	ug/L	98400	J	100	200	ug/L	85000		1000	2000	ug/L	85300		1000	2000	ug/L	88200		100	200	ug/L	89800		250	500	ug/L	190000		100	200	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	NS					NS					NS					NS		100	200	ug/L	NS						70600		100	200	ug/L				
SW6020	7439-92-1	Lead	T			15	ug/L	1	U	1	2	ug/L	0.5	U	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	0.525	L	0.5	1	ug/L	0.733	J	0.5	1	ug/L	0.569	J	0.5	1	ug/L	9.37		1	2	ug/L
SW6020	7439-92-1	Lead	D			15	ug/L	NS					NS					NS					NS	U	0.5	1	ug/L	NS						1	U	1	2	ug/L				
SW6020	7439-96-5	Manganese	T		32		ug/L	2	U	2	4	ug/L	1.09	J	1	2	ug/L	1.82	J	1	2	ug/L	2.93	J	1	2	ug/L	2.41	B	1	2	ug/L	2.92		1	2	ug/L	181		2	4	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	NS					NS					NS					NS	1.07	B	1	2	ug/L	NS					23.9	B	2	4	ug/L				
SW6020	7440-38-2	Arsenic	T	0.045	0.47	10	ug/L	< 1	U	1	2	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	2	K	1	2	ug/L
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	NS					NS					NS					NS		0.5	1	ug/L	NS						< 1	U	1	2	ug/L				
SW6020	7440-39-3	Barium	T		290	2000	ug/L	49.9		3	6	ug/L	53.8		1.5	3	ug/L	48.8	L	1.5	3	ug/L	52.2	L	1.5	3	ug/L	51.4		1.5	3	ug/L	49.1		1.5	3	ug/L	252		3	6	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	NS					NS					NS					NS		1.5	3	ug/L	NS						75.8		3	6	ug/L				
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	< 1	U	1	2	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	3.04		1	2	ug/L
SW6020	7440-48-4	Cobalt	D		0.47		ug/L	NS					NS					NS					NS		0.5	1	ug/L	NS						< 1	U	1	2	ug/L				
SW6020	7782-49-2	Selenium	T		7.8	50	ug/L	1.28	J	1	2	ug/L	0.5	U	0.5	1	ug/L	0.697	J	0.5	1	ug/L	1.24	J	0.5	1	ug/L	0.943	J	0.5	1	ug/L	1.06		0.5	1	ug/L	1.86	K	1	2	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	NS					NS					NS					NS		0.5	1	ug/L	NS						1.81	K	1	2	ug/L				

Notes:
CAS = Chemical Abstracts Service
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MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
UL = The analyte was not detected, and the reported quantitation limit is probably higher than reported.
NS=Not Sampled because Turbidity was stable at less than or equal to 10 NTUs

Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.



Table 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type								40MW7 40MW7GW030612 3/6/2012 N					40MW7 40MW7GW601212 6/12/2012 N					40MW7 40MW7GW92512 9/25/2012 N					40MW7 40MW7GW61913 6/19/2013 N				
Method	CAS	Chemical	fraction	CSL	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6010B	7429-90-5	Aluminum	T		1600		ug/L	344		50	100	ug/L	70.3	J	50	100	ug/L	1730		50	100	ug/L	100	U	100	200	ug/L
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	NS					NS					50	U	50	100	ug/L	NS				
SW6010B	7439-89-6	Iron	T		1100		ug/L	263		50	100	ug/L	149		50	100	ug/L	1620		50	100	ug/L	55.3	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	NS					NS					50	U	50	100	ug/L	NS				
SW6010B	7439-95-4	Magnesium	T				ug/L	36100		250	500	ug/L	36400		2500	5000	ug/L	41100		250	500	ug/L	32200		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	NS					NS					36100		250	500	ug/L	NS				
SW6010B	7440-09-7	Potassium	T				ug/L	1720		500	1000	ug/L	1670		500	1000	ug/L	2130		500	1000	ug/L	1550		500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	NS					NS					1770		500	1000	ug/L	NS				
SW6010B	7440-23-5	Sodium	T				ug/L	8540		250	500	ug/L	4030		250	500	ug/L	3510		250	500	ug/L	3990		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	NS					NS					3360		250	500	ug/L	NS				
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	5	U	5	10	ug/L	9.8	J	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	NS					NS					5	U	5	10	ug/L	NS				
SW6010B	7440-70-2	Calcium	T				ug/L	80600	J	100	200	ug/L	77800		1000	2000	ug/L	101000		100	200	ug/L	71300		250	500	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	NS					NS					77700		100	200	ug/L	NS				
SW6020	7439-92-1	Lead	T			15	ug/L	0.5	U	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	1.61		0.5	1	ug/L	0.5	U	0.5	1	ug/L
SW6020	7439-92-1	Lead	D			15	ug/L	NS					NS					0.5	U	0.5	1	ug/L	NS				
SW6020	7439-96-5	Manganese	T		32		ug/L	10.8		1	2	ug/L	6.47	L	1	2	ug/L	26.5		1	2	ug/L	1.76	J	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	NS					NS					3.77	B	1	2	ug/L	NS				
SW6020	7440-38-2	Arsenic	T	0.045	0.47	10	ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	0.615	J	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	NS					NS					< 0.5	U	0.5	1	ug/L	NS				
SW6020	7440-39-3	Barium	T		290	2000	ug/L	145		1.5	3	ug/L	146	L	1.5	3	ug/L	172		1.5	3	ug/L	130		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	NS					NS					170		1.5	3	ug/L	NS				
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	< 0.5	U	0.5	1	ug/L	< 0.5	U	0.5	1	ug/L	1.02		0.5	1	ug/L	< 0.5	U	0.5	1	ug/L
SW6020	7440-48-4	Cobalt	D		0.47		ug/L	NS					NS					0.825	J	0.5	1	ug/L	NS				
SW6020	7782-49-2	Selenium	T		7.8	50	ug/L	0.5	UL	0.5	1	ug/L	0.652	K	0.5	1	ug/L	0.848	J	0.5	1	ug/L	0.678	J	0.5	1	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	NS					NS					0.913	J	0.5	1	ug/L	NS				

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MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.



Table 4
November 2011 Screening Levels for Groundwater Perchlorate Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type						40LFMW01 40LFMW01GW112111 11/21/2011 N					40LFMW01 40DUPGW030612 3/6/2012 FD					40LFMW01 40LFMW01GW030612 3/6/2012 N					40LFMW01 LFMW01GW061212 6/12/2012 N					40LFMW01 LFMW01GW92612 9/26/2012 N					40LFMW01 40DUPGW61913 6/19/2013 FD					40LFMW01 LFMW01GW61913 6/19/2013 N					
Method	CAS	Chemical	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	Int Qual	VQ	LOQ	DL Unit	
SW6850	14797-73-0	PERCHLORATE	1.1	15	ug/L	9.67	J	0.1	0.2	ug/L	8.93		0.1	0.2	ug/L	8.88		0.1	0.2	ug/L	4.81		0.1	0.2	ug/L	8.75		0.1	0.2	ug/L	4.44		0.2	0.4	ug/L	4.38			0.2	0.4	ug/L

Notes:
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MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.



Table 4
November 2011 Screening Levels for Groundwater Perchlorate Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type						40MW5 40DUPGW112011 11/20/2011 FD					40MW5 40MW5GW112011 11/20/2011 N					40MW5 40MW5GW030712 3/7/2012 N					40MW5 40MW5GW061212 6/12/2012 N					40MW5 40DUPGW92512 9/25/2012 FD					40MW5 40MW5GW92512 9/25/2012 N					40MW5 40MW5GW61913 6/19/2013 N				
Method	CAS	Chemical	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6850	14797-73-0	PERCHLORATE	1.1	15	ug/L	1.55	J	0.1	0.2	ug/L	1.55	J	0.1	0.2	ug/L	0.931		0.1	0.2	ug/L	0.986		0.1	0.2	ug/L	1.81		0.1	0.2	ug/L	1.71		0.1	0.2	ug/L	0.85		0.1	0.2	ug/L

Notes:
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T-NCSL = Adjusted Noncarcinogenic Screening Level
MCL = Maximum Contaminant Level
= Lowest Value For Screening
Bold = Exceeds the Carcinogenic or Adjusted Noncarcinogenic Screening Level
VQ = Validation Qualifier
LOD = Limit of Detection
LOQ = Limit of Quantitation
DL = Detection Limit
N = Normal
FD = Field Duplicate

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate or precise.
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
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.



Table 4
November 2011 Screening Levels for Groundwater Perchlorate Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type						40MW6 40MW6GW112111 11/21/2011 N					40MW6 40MW6GW030712 3/7/2012 N					40MW6 40DUPGW061212 6/12/2012 FD					40MW6 40MW6GW061212 6/12/2012 N					40MW6 40MW6GW92512 9/25/2012 N					40MW6 40MW6GW61913 6/19/2013 N					40MW7 40MW7GW112011 11/20/2011 N				
Method	CAS	Chemical	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6850	14797-73-0	PERCHLORATE	1.1	15	ug/L	0.885	J	0.1	0.2	ug/L	0.526		0.1	0.2	ug/L	0.635		0.1	0.2	ug/L	0.647		0.1	0.2	ug/L	1.25		0.1	0.2	ug/L	0.535		0.1	0.2	ug/L	4.5	J	0.1	0.2	ug/L

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MCL = Maximum Contaminant Level
= Lowest Value For Screening
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.



Table 4
November 2011 Screening Levels for Groundwater Perchlorate Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 2

Location ID Sample ID Sample Date Sample Type						40MW7 40MW7GW030612 3/6/2012 N					40MW7 40MW7GW601212 6/12/2012 N					40MW7 40MW7GW92512 9/25/2012 N					40MW7 40MW7GW61913 6/19/2013 N				
Method	CAS	Chemical	T-NCSL	MCL	Units	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	Int Qual	LOD	LOQ	DL Unit
SW6850	14797-73-0	PERCHLORATE	1.1	15	ug/L	4.18		0.1	0.2	ug/L	3.69		0.1	0.2	ug/L	3.66		0.1	0.2	ug/L	4.1		0.1	0.2	ug/L

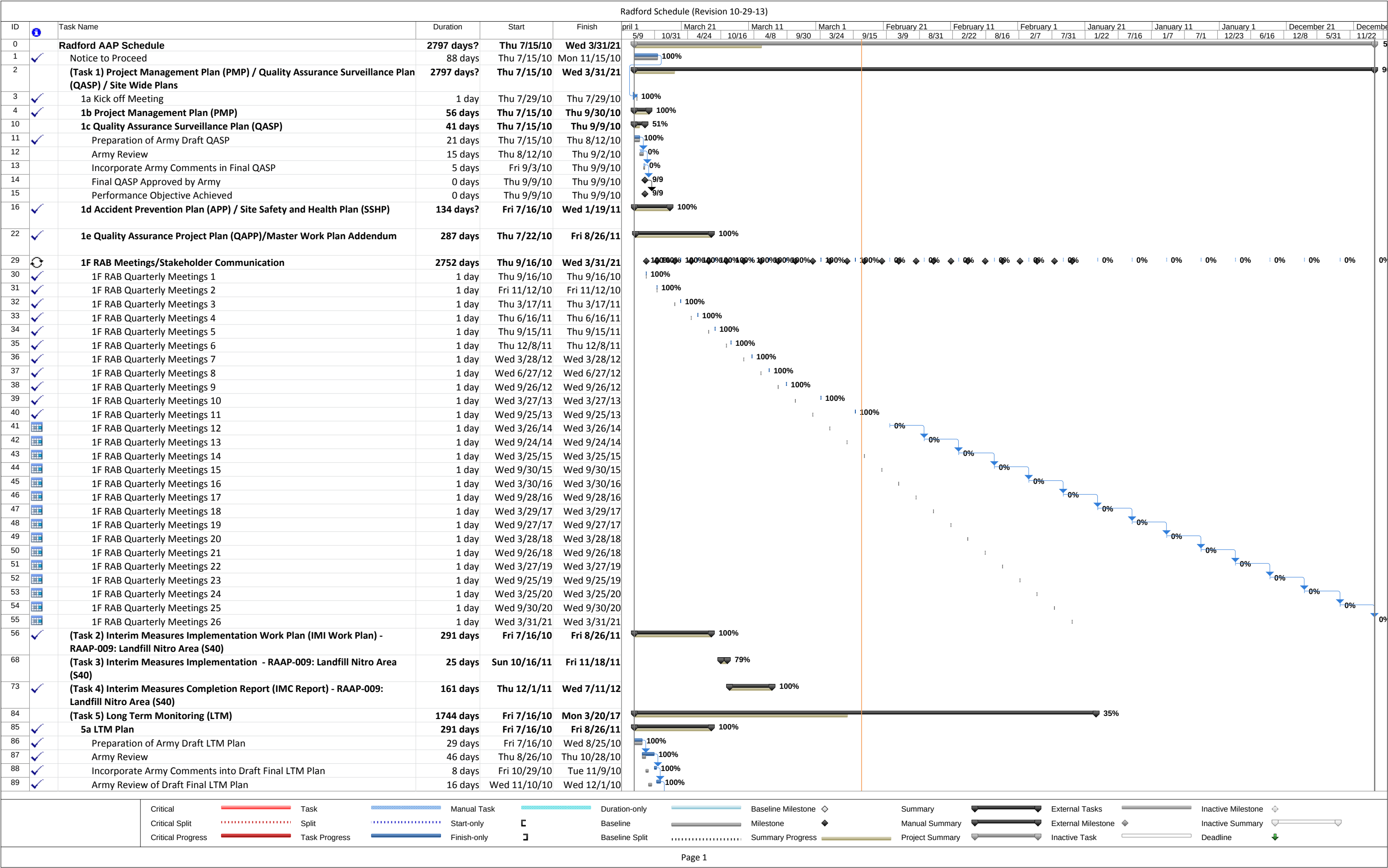
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Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.



APPENDIX F
Schedule



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