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

September 9, 2014

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

William Barnett
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
Annual Long Term Monitoring Report

Dear Mr. McKenna and Mr. Barnett:

The U.S. Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) have reviewed the U.S. Army's (Army's) SWMU 40, Annual Long Term Monitoring Report (LTM), Year 3. SWMU 40 is located at the Radford Army Ammunition Plant (RFAAP) in Radford, Virginia. Based upon our review, the LTM Report is approved, and in accordance with Part II. (E)(5) of RFAAP's Corrective Action Permit, the LTM Report is considered final. If you have any questions, please call me at 410-305-2779.

Sincerely,

Erich Weissbart

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

c: James Cutler, VDEQ

From: Mckenna, James J CIV (US) [mailto:james.j.mckenna16.civ@mail.mil]
Sent: Thursday, August 07, 2014 10:44 AM
To: beth lohman (ealohman@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; Ortiz, Luis A LTC USARMY JMC (US)
Subject: RFAAP SWMU 40 Draft LTM Report Year 3 Certification Letter (UNCLASSIFIED)
Attachments: 14-0900-091 RFAAP SWMU 40 YEAR 3 GW MONITORING REPORT.PDF

Erich, Jim, Beth, All:

Attached is the certification letter for the subject report that was sent July 18, 2014.

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

Jim McKenna

Classification: UNCLASSIFIED
Caveats: FOUO

BAE SYSTEMS

ORDNANCE SYSTEMS INC.
Radford Army Ammunition Plant
7700 Peppers Ferry Road
P.O. Box 1
Radford, VA 24143
Telephone (540) 639-7631

July 30, 2014

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: LTM Year 3, Draft Final, July 2014**
EPA ID# VA1210020730

Dear Mr. Weissbart and Mr. Cutler:

Enclosed is the certification for the subject documents that were sent to you on July18, 2014. Also enclosed is the July 18, 2014 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
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U.S. Army Environmental Command
Cleanup and Munitions Response Division
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Tom Meyer
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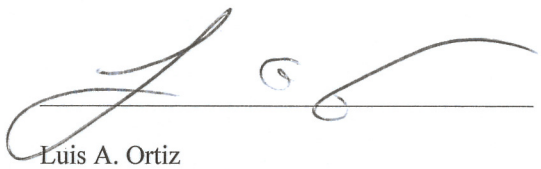
bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
Env. File

Coordination: J. McKenna

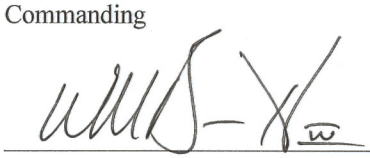
Concerning the following:

Radford Army Ammunition Plant, Radford, Virginia
Solid Waste Management Unit 40(RAAP-009)
Landfill Nitro Area
Annual Long Term Monitoring Report: LTM Year 3
Draft Final, July 2014
EPA ID#: VA1210020730

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: Luis A. Ortiz
TITLE: Lieutenant Colonel, US Army
Commanding

SIGNATURE: 

PRINTED NAME: William M. Barnett
TITLE: General Manager
BAE Systems

Alberts, Matt (US SSA)

From: Mckenna, James J CIV (US) <james.j.mckenna16.civ@mail.mil>
Sent: Friday, July 18, 2014 11:26 AM
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; Jennings, Brad
Subject: Draft Final RFAAP SWMU-40 (RAAP-009) Long Term Monitoring Report, Year 3; July 2014

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 # 7706 3403 8118

James Cutler, Virginia DEQ – 1 hard copy, 1 CD copy– FedEx Tracking # 7706 3410 3116

Elizabeth Lohman, Virginia DEQ - 1 CD copy– FedEx Tracking # 7706 3414 6704

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

Jim McKenna

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

Performance Based Acquisition
Solid Waste Management Unit 40 (RAAP-009)
Landfill Nitro Area
Annual Long Term Monitoring Report: LTM Year 3

DRAFT FINAL
As FINAL
July 2014

PREPARED BY:

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Contract No. W912DY-10-D-0027
Delivery Order Number: DA01

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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-*p*-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 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.

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 (LTM) was initiated in November 2011 and is on-going. This report provides a summary of the LTM work conducted through the March 2014 LTM event, LTM Year 3.

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).

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 ug/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 3 are contained within this LTM Report in accordance with the approved August 2011 IMWP and as outlined in the approved LTM Reports for Year 1 and Year 2.

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 TCL VOCS, SW846 Method 8260B; TCL SVOCs, SW846 Method 8270C SIM; 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
40MW05	Detection Well at edge of landfill boundary		
40MW06	Detection Well at edge of landfill boundary		
40MW07	Well downgradient of Landfill		

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 to optimize the LTM Program. The reduction of COPC's for the LTM program was approved by USEPA and VDEQ May 30, 2013. Year 2 LTM activities and results were presented in a report dated October 2013 and approved by USEPA and VDEQ January 7, 2014. This LTM report summarizes the sampling and analysis of the remaining analytes in the year three monitoring program (event six). Analytical results are summarized in tabular form, and complete laboratory analyses are presented in electronic form (e.g., CD ROM).

The groundwater data were screened in accordance with the approved IMWP. Data screening was conducted in the Year 1 and Year 2 LTM reports consistent with the IMWP to eliminate any analytes that met screening criteria outlined below to further optimize the LTM Program. Retention of analytes in the LTM monitoring and reporting are evaluated in this Year 3 LTM report and will similary be evaluated for each subsequent sampling and analysis event based upon the site specific dataset that will be included and evaluated for further optimization of the LTM Program.

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 and three data generation, and will continue to be implemented throughout the LTM program for further optimization:

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 previous landfill cap inspections are outlined in the relevant LTM reports (KEMRON 2012 and 2013). The sixth inspection was conducted during the LTM groundwater sampling event March 27, 2014. No major issues or deficiencies were noted during the most recent inspection. Prior to the March 2014 inspection, RFAAP communicated with USEPA and VDEQ regarding appropriate language to be included on signage planned for installation at RAAP-009, SWMU 40, consistent with Section 9.4 of the approved IMWP. Following agreement on the language for the sign, KEMRON prepared the appropriately sized and worded sign, and it was installed at SWMU 40 during the March 2014 LTM event. The sign installation completed the only outstanding element for the institutional controls (ICs) required at this SWMU. The completed inspection sheet and supporting photos, including photographs of the installed signage, are 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 sixth 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. Please refer to Appendix C for potentiometric surface maps of SWMU 40.

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 complete laboratory analytical reports, provided on CD-ROM. Appendix E contains analytical summarization tables.

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

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. Since initiation of LTM, sampling of monitor wells 40MW05, 40MW06 and 40MW07 has resulted in quantifiable results at or above the LOQ for only chrysene in 40MW06. The 6/12/12 sample had a reported concentration of 0.89 J µg/L in the normal sample and 0.0301 µg/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 had reportable (but J-flagged) concentrations in the normal sample taken on 6/12/12; however, these PAHs were below reportable concentrations for the field duplicate sample. The laboratory analytical results from subsequent sampling of PAHs on 9/25/12, 6/19/13, and the recent event on 3/27/14 did not show concentrations of any of the PAHs above the respective analyte LOD. In accordance with the approved IMWP, these remaining SVOC PAHs which had no detectable concentrations in groundwater samples for three consecutive monitoring events will no longer be part of the future monitoring requirements for SWMU 40 to further optimize the LTM Program. Table 1 summarizes the remaining five (5) 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 events on 6/19/13 and 3/27/14 resulted in validated nondetect data for both analytes. These two analytes will remain on the requirement list during sampling event 7 to provide sufficient data to determine if it is appropriate to remove them from the analyte list for future LTM events to further optimize the LTM Program, per the IMWP requirements and as summarized in Section 2.1 of this report. 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.

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 3

							40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01				
						Location ID																																		
						Sample ID	40LFMW01GW112111					40DUPGW030612					40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612					40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
						Sample Date	11/21/2011					3/6/2012					3/6/2012					6/12/2012					9/26/2012					6/19/2013					6/19/2013					3/27/2014				
						Sample Type	N					FD					N					N					N					FD					N					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	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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	**< 0.026**	U	0.026	0.0521	ug/L	**< 0.0258**	U	0.0258	0.0515	ug/L	**< 0.025**	U	0.025	0.05	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	ug/L

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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 3

							Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
							Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714					40DUPGW32714				
							Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014					3/27/2014				
							Sample Type	FD					N					N					N					FD					N					N					N					FD				
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	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0263	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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	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	**< 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	**< 0.026**	U	0.026	0.0521	ug/L	**< 0.026**	U	0.026	0.0521	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L

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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 3

							Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
							Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
							Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
							Sample Type	N					N					FD					N					N					N					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
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	**< 0.0287**	U	0.0287	0.0575	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	**< 0.026**	U	0.026	0.0521	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L

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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 3

							Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
							Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
							Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
							Sample Type	N					N					N					N					N					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
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	0.026	U	0.026	0.0521	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	**< 0.026**	U	0.026	0.0521	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	0.026	U	0.026	0.0521	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	0.026	U	0.026	0.0521	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	0.026	U	0.026	0.0521	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 3

							Location ID	40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01				
							Sample ID	40LFMW01GW112111					40DUPGW030612					40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612					40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
							Sample Date	11/21/2011					3/6/2012					3/6/2012					6/12/2012					9/26/2012					6/19/2013					6/19/2013					3/27/2014				
							Sample Type	N					FD					N					N					N					FD					N					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	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	< 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	2.5	UJ	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 3

							Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
							Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714					40DUPGW32714				
							Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014					3/27/2014				
							Sample Type	FD					N					N					N					FD					N					N					N					FD				
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	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	< 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	R	2.5	10	ug/L	2.5	U	2.5	10	ug/L	2.5	UJ	2.5	10	ug/L	2.5	UJ	2.5	10	ug/L

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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 asscociated 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 2
November 2011 Screening Levels for Groundwater VOC Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 3

						Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
						Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
						Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					FD					N					N					N					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	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	2.5	UJ	2.5	10	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 asscociated 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 2
November 2011 Screening Levels for Groundwater VOC Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 3

						Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
						Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
						Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					N					N					N					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
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	U	2	10	ug/L	< 2	U	2	10	ug/L
SW8260B	67-64-1	Acetone		1200		ug/L	4.38	L	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	UJ	2.5	10	ug/L	2.5	UJ	2.5	10	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 asscociated 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 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 3

							Location ID	40LFMW01					40LFMW01				
							Sample ID	40LFMW01GW112111					40DUPGW030612				
							Sample Date	11/21/2011					3/6/2012				
							Sample Type	N					FD				
Method	CAS	Chemical	fraction	CSL	T-NCSL	MCL	Units	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
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	50	U	50	100	ug/L	NS				
SW6010B	7439-89-6	Iron	T		1100		ug/L	**21800**	L	50	100	ug/L	87.5	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	102		50	100	ug/L	NS				
SW6010B	7439-95-4	Magnesium	T				ug/L	74800		250	500	ug/L	27800		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	33100		250	500	ug/L	NS				
SW6010B	7440-09-7	Potassium	T				ug/L	5920		500	1000	ug/L	943	J	500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	1620		500	1000	ug/L	NS				
SW6010B	7440-23-5	Sodium	T				ug/L	8230		250	500	ug/L	7860		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	8480		250	500	ug/L	NS				
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	**32.5**		5	10	ug/L	5	U	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	5	U	5	10	ug/L	NS				
SW6010B	7440-70-2	Calcium	T				ug/L	142000		100	200	ug/L	71300	J	100	200	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	81500		100	200	ug/L	NS				
SW6020	7439-92-1	Lead	T			15	ug/L	11		1	2	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				
SW6020	7439-96-5	Manganese	T		32		ug/L	**125**		2	4	ug/L	1.25	J	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	3.95	B	2	4	ug/L	NS				
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
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	**< 1**	U	1	2	ug/L	NS				
SW6020	7440-39-3	Barium	T		290	2000	ug/L	133		3	6	ug/L	94.7		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	90.2		3	6	ug/L	NS				
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	**5.54**		1	2	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				
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
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	1	U	1	2	ug/L	NS				

Location ID		40LFMW01					40LFMW01					40LFMW01				
Sample ID		40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612				
Sample Date		3/6/2012					6/12/2012					9/26/2012				
Sample Type		N					N					N				
Chemical	fraction	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
Aluminum	T	123		50	100	ug/L	74.8	J	50	100	ug/L	**9150**		50	100	ug/L
Aluminum	D	NS					50	U	50	100	ug/L	92.9	J	50	100	ug/L
Iron	T	93	J	50	100	ug/L	120		50	100	ug/L	**8950**		50	100	ug/L
Iron	D	NS					50	U	50	100	ug/L	74.1	J	50	100	ug/L
Magnesium	T	28100		250	500	ug/L	33800		2500	5000	ug/L	51100		250	500	ug/L
Magnesium	D	NS					32700		2500	5000	ug/L	35400		250	500	ug/L
Potassium	T	885	J	500	1000	ug/L	1740		500	1000	ug/L	3700		500	1000	ug/L
Potassium	D	NS					1630		500	1000	ug/L	1690		500	1000	ug/L
Sodium	T	7690		250	500	ug/L	8450		250	500	ug/L	6640		250	500	ug/L
Sodium	D	NS					8120		250	500	ug/L	7100		250	500	ug/L
Vanadium	T	5	U	5	10	ug/L	5	U	5	10	ug/L	**18.1**		5	10	ug/L
Vanadium	D	NS					5	U	5	10	ug/L	5	U	5	10	ug/L
Calcium	T	71400	J	100	200	ug/L	82800		1000	2000	ug/L	105000		100	200	ug/L
Calcium	D	NS					82000		1000	2000	ug/L	85700		100	200	ug/L
Lead	T	0.5	U	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	5.46		0.5	1	ug/L
Lead	D	NS					0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L
Manganese	T	1.52	J	1	2	ug/L	2.18	L	1	2	ug/L	**52.6**		1	2	ug/L
Manganese	D	NS					1	UL	1	2	ug/L	1	U	1	2	ug/L
Arsenic	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**1.43**		0.5	1	ug/L
Arsenic	D	NS					**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L
Barium	T	94.1		1.5	3	ug/L	65.7	L	1.5	3	ug/L	125		1.5	3	ug/L
Barium	D	NS					63.4		1.5	3	ug/L	92.6		1.5	3	ug/L
Cobalt	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**3.14**		0.5	1	ug/L
Cobalt	D	NS					**< 0.5**	U	0.5	1	ug/L	**0.903**	J	0.5	1	ug/L
Selenium	T	0.5	UL	0.5	1	ug/L	0.726	K	0.5	1	ug/L	1.18		0.5	1	ug/L
Selenium	D	NS					0.7	J	0.5	1	ug/L	1.06		0.5	1	ug/L

Location ID		40LFMW01					40LFMW01					40LFMW01				
Sample ID		40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
Sample Date		6/19/2013					6/19/2013					3/27/2014				
Sample Type		FD					N					N				
Chemical	fraction	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
Aluminum	T	127	J	100	200	ug/L	145	J	100	200	ug/L	124	J	100	200	ug/L
Aluminum	D	< 100	U	100	200	ug/L	100	U	100	200	ug/L	NS				
Iron	T	290		50	100	ug/L	311		50	100	ug/L	172	J	50	100	ug/L
Iron	D	50	U	50	100	ug/L	50	U	50	100	ug/L	NS				
Magnesium	T	30300		250	500	ug/L	29200		250	500	ug/L	34600		250	500	ug/L
Magnesium	D	29300		250	500	ug/L	29800		250	500	ug/L	NS				
Potassium	T	1740		500	1000	ug/L	1660		500	1000	ug/L	1730		500	1000	ug/L
Potassium	D	1620		500	1000	ug/L	1690		500	1000	ug/L	NS				
Sodium	T	8410		250	500	ug/L	8180		250	500	ug/L	5260		250	500	ug/L
Sodium	D	8490		250	500	ug/L	8540		250	500	ug/L	NS				
Vanadium	T	**8.64**	J	5	10	ug/L	**9.29**	J	5	10	ug/L	5	U	5	10	ug/L
Vanadium	D	**10.9**		5	10	ug/L	**10.8**		5	10	ug/L	NS				
Calcium	T	75800		250	500	ug/L	75900		250	500	ug/L	92400		2500	5000	ug/L
Calcium	D	78100		250	500	ug/L	77700		250	500	ug/L	NS				
Lead	T	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L
Lead	D	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	NS				
Manganese	T	2.48		1	2	ug/L	2.89		1	2	ug/L	2.75	B	1	2	ug/L
Manganese	D	1	U	1	2	ug/L	1	U	1	2	ug/L	NS				
Arsenic	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
Arsenic	D	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	NS				
Barium	T	61.9		1.5	3	ug/L	62.3		1.5	3	ug/L	69.8		1.5	3	ug/L
Barium	D	61.4		1.5	3	ug/L	57.5		1.5	3	ug/L	NS				
Cobalt	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
Cobalt	D	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	NS				
Selenium	T	0.676	J	0.5	1	ug/L	0.928	J	0.5	1	ug/L	1.49		0.5	1	ug/L
Selenium	D	0.523	J	0.5	1	ug/L	1.71	J	0.5	1	ug/L	NS				

Notes:

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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 asscociated 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 Turbidty was stable at less than or equl 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 3

								Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
								Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714					40DUPGW32714				
								Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014					3/27/2014				
								Sample Type	FD					N					N					N					FD					N					N					N					FD				
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	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	169	J	100	200	ug/L	366		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					NS					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	125	J	50	100	ug/L	339	J	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	U	50	100	ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L	NS					NS					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	19000		250	500	ug/L	19500		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					NS					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	946	J	500	1000	ug/L	1020		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					NS					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	5370		250	500	ug/L	5640		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					NS					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	5	U	5	10	ug/L	5	U	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					NS					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	68300		2500	5000	ug/L	72700		2500	5000	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					NS					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	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					NS					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	1.06	B	1	2	ug/L	1.57	B	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					NS					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	**< 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					NS					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	34.1		1.5	3	ug/L	33.2		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					56.3	L	1.5	3	ug/L	58.7		1.5	3	ug/L	NS					NS					NS					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	**< 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					NS					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	0.5	U	0.5	1	ug/L	0.5	U	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					NS					NS				

Notes:

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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 asscociated 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 Turbidty was stable at less than or equl 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 3

								Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
								Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
								Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
								Sample Type	N					N					FD					N					N					N					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	288		100	200	ug/L
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	NS					NS					NS					NS					50	U	50	100	ug/L	NS					NS				
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	292	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	NS					NS					NS					NS					50	U	50	100	ug/L	NS					NS				
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	7560		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	NS					NS					NS					NS					33500		250	500	ug/L	NS					NS				
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	738	J	500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	NS					NS					NS					NS					1140		500	1000	ug/L	NS					NS				
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	7740	B	250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	NS					NS					NS					NS					5180		250	500	ug/L	NS					NS				
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	5	U	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	NS					NS					NS					NS					5	U	5	10	ug/L	NS					NS				
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	23500		250	500	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	NS					NS					NS					NS					89400		100	200	ug/L	NS					NS				
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	0.5	U	0.5	1	ug/L
SW6020	7439-92-1	Lead	D			15	ug/L	NS					NS					NS					NS					0.5	U	0.5	1	ug/L	NS					NS				
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	1.66	B	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	NS					NS					NS					NS					1.07	B	1	2	ug/L	NS					NS				
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	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	NS					NS					NS					**< 0.5**	U	0.5	1	ug/L	NS					NS					NS				
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	12.7		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	NS					NS					NS					51.5		1.5	3	ug/L	NS					NS					NS				
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	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
SW6020	7440-48-4	Cobalt	D		0.47		ug/L	NS					NS					NS					**< 0.5**	U	0.5	1	ug/L	NS					NS					NS				
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	0.5	U	0.5	1	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	NS					NS					NS					NS					1.11		0.5	1	ug/L	NS					NS				

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= 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 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 3

								Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
								Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
								Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
								Sample Type	N					N					N					N					N					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
SW6010B	7429-90-5	Aluminum	T		1600		ug/L	**8290**		50	100	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	100	U	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	NS					NS				
SW6010B	7439-89-6	Iron	T		1100		ug/L	**7950**	L	50	100	ug/L	263		50	100	ug/L	149		50	100	ug/L	**1620**		50	100	ug/L	55.3	J	50	100	ug/L	213	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	73.1	J	50	100	ug/L	NS					NS					50	U	50	100	ug/L	NS					NS				
SW6010B	7439-95-4	Magnesium	T				ug/L	61900		250	500	ug/L	36100		250	500	ug/L	36400		2500	5000	ug/L	41100		250	500	ug/L	32200		250	500	ug/L	32600		2500	5000	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	32500		250	500	ug/L	NS					NS					36100		250	500	ug/L	NS					NS				
SW6010B	7440-09-7	Potassium	T				ug/L	4250		500	1000	ug/L	1720		500	1000	ug/L	1670		500	1000	ug/L	2130		500	1000	ug/L	1550		500	1000	ug/L	1570		500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	2300		500	1000	ug/L	NS					NS					1770		500	1000	ug/L	NS					NS				
SW6010B	7440-23-5	Sodium	T				ug/L	66700		250	500	ug/L	8540		250	500	ug/L	4030		250	500	ug/L	3510		250	500	ug/L	3990		250	500	ug/L	3660		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	78300		250	500	ug/L	NS					NS					3360		250	500	ug/L	NS					NS				
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	**9.26**	J	5	10	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	5	U	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	NS					NS				
SW6010B	7440-70-2	Calcium	T				ug/L	190000		100	200	ug/L	80600	J	100	200	ug/L	77800		1000	2000	ug/L	101000		100	200	ug/L	71300		250	500	ug/L	81500		2500	5000	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	70600		100	200	ug/L	NS					NS					77700		100	200	ug/L	NS					NS				
SW6020	7439-92-1	Lead	T			15	ug/L	9.37		1	2	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	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	NS					NS				
SW6020	7439-96-5	Manganese	T		32		ug/L	**181**		2	4	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	1.88	B	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	23.9	B	2	4	ug/L	NS					NS					3.77	B	1	2	ug/L	NS					NS				
SW6020	7440-38-2	Arsenic	T	0.045	0.47	10	ug/L	**2**	K	1	2	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	**< 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	NS					NS				
SW6020	7440-39-3	Barium	T		290	2000	ug/L	252		3	6	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	118		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	75.8		3	6	ug/L	NS					NS					170		1.5	3	ug/L	NS					NS				
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	**3.04**		1	2	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	**< 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					**0.825**	J	0.5	1	ug/L	NS					NS				
SW6020	7782-49-2	Selenium	T		7.8	50	ug/L	1.86	K	1	2	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	0.5	U	0.5	1	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	1.81	K	1	2	ug/L	NS					NS					0.913	J	0.5	1	ug/L	NS					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 asscociated 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 Turbidty was stable at less than or equl to 10 NTUs
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 3

						Location ID	40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01				
						Sample ID	40LFMW01GW112111					40DUPGW030612					40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612					40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
						Sample Date	11/21/2011					3/6/2012					3/6/2012					6/12/2012					9/26/2012					6/19/2013					6/19/2013					3/27/2014				
						Sample Type	N					FD					N					N					N					FD					N					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	Result	VQ	LOD	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	**7.47**		0.1	0.2	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 asscociated 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.

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 3

						Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
						Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714				
						Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	FD					N					N					N					FD					N					N					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	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	0.721		0.1	0.2	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 asscociated 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.

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 3

						Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
						Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
						Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					FD					N					N					N					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	0.506		0.1	0.2	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 asscociated 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.

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 3

						Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
						Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
						Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					N					N					N					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	Int Qual	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6850	14797-73-0	PERCHLORATE	1.1	15	ug/L	**4.5**	J	0.1	0.2	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	**3.74**		0.1	0.2	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 asscociated 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.

Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

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 and was completed to further optimize the LTM Program.

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.
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 event seven (7), currently scheduled to occur in December 2014.

3.1 Groundwater Statistics

The IWMP for SWMU 40 indicated that the initial annual LTM report would 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 to further optimize the LTM Program.

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. Following the background comparison of remaining analytes it is anticipated that the LTM Program will be further optimized as to reduce COPCs for the LTM Program. It is currently anticipated that a remedy review will be conducted during Federal Fiscal Year (FFY) 2015; additional information regarding the review will be provided in correspondence between RFAAP and the regulatory personnel.

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, LTM event 7 will be conducted and the data will be further evaluated at that time to further optimize the LTM Program. The next LTM report 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.

Installation of the signage at SWMU 40 has completed the requirements for the ICs established by the IMWP. An inspection of the landfill will be included in the next LTM event, consistent with past events. No deficiencies were noted during the March 2014 inspection that require action.

No additional LTM activities are necessary prior to the next LTM event, which is currently anticipated to occur in December 2014. It is currently anticipated that a remedy effectiveness evaluation will be conducted during FFY 2015.

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.

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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.

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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

N

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	SITE LOCATION MAP	
DETAILED	DRP	SWMU 40 LTM REPORT	
CHECKED	JA	LOCATION: RADFORD ARMY AMMUNITION PLANT, RADFORD, VIRGINIA	FIGURE: 1

PLOTTED: August 25, 2010 – 3:25 PM, BY: Karen Grigoryan

FILE PATH: (LOVETON) M:\MARIETTA\0 MR 0669 003-001\200\MR0669. FIG. 2. SWMU 40. SITE LAYOUT.DWG [FIG. 2] 8/24/10

40MW3

LANDFILL NORTH ROAD

1850

1860

1870

1880

1890

40MW6

40MW5

EROSION FEATURES

Containerized Asbestos Storage Area

40MW7

SWMU 40

1900

LANDFILL EAST ROAD

LANDFILL SOUTH ROAD

1910

1920

LANDFILL SOUTHEAST ROAD

LFMW01

17MW3

LEGEND

- BUILDINGS
- VEGETATION
- APPROXIMATE SWMU BOUNDARY
- ABOVEGROUND PIPING
- 40MW6 MONITORING WELL LOCATION
- OVERHEAD ELECTRIC POLE
- TOPOGRAPHIC CONTOUR
- FENCE LINE

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

UXB Kemron Remediation Services, LLC

0 60 120

SCALE 1"=120'
(Approximate)

DRAWN BY: KG		DATE 17 JAN 2013	FIGURE 2
REVIEWED: JA	R 5	PROJECT NO. MR0669	
APPROVED:		DWG. FILE NO. SWMU 40. SITE MAP	

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

APPENDIX A
Inspection Sheets and Site Photographs

1. View of SWMU 40 to the East

2. Institutional Control Sign for SWMU 40

3. View of SWMU 40 Looking South

4. View of SWMU 40 Looking West

5. View of SWMU 40 to the Southeast

6. Setting Up on 40 MW-5 for Ground Water Sampling

APPENDIX B
Field Documentation

0945 - ONSITE (JA) TO MEET MATT ARBERIS & JIM McKENNA FOR PASSES AND PERMITS, * VERY WINDY, 22°F

1010 - SAFETY & MAST COMPLETED PERMITS
SAFETY (540) 505-8585

- TOM MAYNOR - 540-838-1005 FOR AREA ENTRY TO BURNING GROUND

1025 - RICH MENDOZA & JIM McKENNA INDICATED THE AREA FOR SIGN LOCATIONS AND DISCUSSED THE EVENT STRATEGY.

1100 - OFF SITE (JA)

NOTE: WENT TO RADFORD OFFICE IN MORNING FOR VEHICLE PASSES.

Location RADFORD, VA Date 3-27-14

Project / Client SWMU 40, RFAAP

0630 - CALIBRATED YSI
0800 - ONSITE (JA, JC) SUNNY 27°F
0815 - COMPLETED H&S MEETING
0830 - INSTALLED ~~SLEEVE~~ SIGN AT SWMU 40
0900 - SETTING UP ON 40MW7 WL = 100.60'
0957 - COLLECTED SAMPLE 40MW7GW32714
1015 - DECONED PUMP
1045 - COLLECTED EQUIPMENT RINSE 40EQA32714
1100 - COLLECTED FIELD BLANK 40FB32714
1310 - SETTING UP ON 40MW5 WL = 65.85'
1402 - COLLECTED SAMPLE 40MW5GW32714 & 40DUPGW32714
1430 - DECONED PUMP
1455 - SETTING UP ON 40MW46 WL = 51.35'
1515 - JIM MCKENNA ARRIVED AND APPROVED SITE PHOTOS & SIGN PLACEMENT OFFSITE 1540
- COMPLETED SITE INSPECTION, NO DEFICIENCIES

Location RADFORD, VA Date 3-27-14

Project / Client SWMU 40, RFAAP

1542 - COLLECTED SAMPLE 40MW4GW32714
1600 - DECONED PUMP
1630 - 40MW3 WL = 64.37'
1710 - SETTING UP ON LFMW01
1750 - COLLECTED SAMPLE (WL = 28.10') LFMW01GW32714
1815 - COLLECTED MS & MSD AT LFMW01
1830 - CONTAMINATED PURGE & DECON WATER ~ 80 gallons & TRANSPORTED TO ONSITE BIOPLANT
1900 - JC OFFSITE
1910 - SIGNED IN W/ BIOPLANT OPERATION & DISCHARGED ~ 80 gallons of WATER @ LIFT STATION

JA OFFSITE @ 2000

FIELD CALIBRATION FORM

INITIAL CALIBRATION	FINAL CALIBRATION
DATE: 3-27-14	DATE: 3-27-14
TIME: 0630	TIME: 0700

pH METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: —

METER ID —

pH STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
7.0	6.97	7.01	7.01
10.0	10.01	10.00	10.00
4.0	3.98	4.00	4.00

CONDUCTIVITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: _____

METER ID _____

COND. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
1.413	1.402	1.413	1.413

DISSOLVED OXYGEN METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: —

METER ID —

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
TAP	94.98%	99.7%	99.7%

FIELD CALIBRATION FORM

TURBIDITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO: —

METER ID —

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
124	121.3	126.0	126.0
0	0.7	0.1	0.1

ORD METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:

METER ID

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
254	243	254.1	254.1

PID CALIBRATION

CALIBRATION STANDARD REFERENCE NO:

METER ID —

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
100 ppm	—	98.7	98.7

COMMENTS

SIGNATURE

Daily Safety Meeting

Project Name: SWMU 40 **Date:** 3-27-14

Location: RFAAP **Presented by:** JA

Check the Topics/Information Reviewed:

- ☑ 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
- ☑ 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
James Cole		UXB Intl

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.

COC No. A 5625

2343-A State Route 821
Marietta, OH 45750

KEMRON
ENVIRONMENTAL SERVICES

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4308
Fax: 740-376-2536

Company Name: UXB - KEMRON

Project Contact: MARY LOU ROCHOTTE | Contact Phone #: 740-373-4308

Turn Around Requirements: 14-DAY | Location: RADFORD, VA

Project ID: MR01669-300-003 SWMU 40 (RFAAP) LTM YR 3

Sampler (print): JONATH ANDERSON | Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	VOC-8260 * UNPRESERVED	SVOC - PAH	PERCHLORATE	METALS - (TOTAL)	TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
40TB32714			3-27-14		W	2		2					* PER QAPP
40MW7GW32714		X	3-27-14	957	W	7		3	2	1	1		SWMU 40
40EQR32714		X	3-27-14	1045	W	7		3	2	1	1		RFAAP *
40FB32714		X	3-27-14	1100	W	7		3	2	1	1		
40MW5GW32714		X	3-27-14	1402	W	7		3	2	1	1		SEE ATTACHED
40DUPGW32714		X	3-27-14	1402	W	7		3	2	1	1		LIST FOR
40MW6GW32714		X	3-27-14	1542	W	7		3	2	1	1		SPECIFIC
LFMW01GW32714		X	3-27-14	1750	W	7		3	2	1	1		ANALYTE LIST
LFMW01MSGW32714		X	3-27-14	1815	W	7		3	2	1	1		
LFMW01MSDGW32714		X	3-27-14	1815	W	7		3	2	1	1		

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	3-28-14	1253					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:
			Cara Stuecker	3/28/14	1258	

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

(6)

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: RFAAP

Location: SWMU 40

Sample Matrix: Ground Water

Sample Point ID: 40MW7

Field Representatives: JA/JC

Lab Sample #: 40MW7GW32714

PURGE INFORMATION:

Method of Well Purge: Low Flow

Dedicated: Y or (N)

Date/Time Initiated 3-27-14 0900

Well Volume of Standing Water (gal) N/A

Initial Water Level (ft) 100.60

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) 104.56

Casing Diameter, (inches) 2

Date/Time Completed 3-27-14 0957

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)
930	105.52	420	11.43	7.06	0.596	2.4	276.0	8.33
933	104.65	350	11.05	7.08	0.592	4.2	275.8	7.82
936	104.61	280	11.35	7.13	0.608	8.9	275.9	6.51
939	104.75	250	11.40	7.08	0.605	7.8	275.7	5.49
942	104.11	140	11.11	7.10	0.607	7.5	275.3	4.31
945	104.31	310	10.87	7.09	0.602	8.1	276.2	3.47
948	104.54	310	11.13	7.08	0.597	7.6	276.1	3.32
951	104.56	240	11.36	7.09	0.595	6.3	276.2	3.16
954	104.57	250	11.38	7.09	6.594	4.0	276.1	3.08
957	104.56	240	11.34	7.09	0.594	3.7	276.1	3.14
			726					

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: 40MW7 **Method of Sampling:** Low Flow

Dedicated?: NO

Water Level at time of Sample Collection: 104.56

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

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (^{0}C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
957	104.56	240	11.34	7.09	0.594	3.7	276.1	3.14

GENERAL INFORMATION:

Weather conditions at time of sample collection: 35°F Sunny

Sample Characteristics: CLEAR, NO ODOR

COMMENTS AND OBSERVATIONS:

DATE: 3-27-14 **DATE:** 3-27-14

SAMPLER: **QC Check By:**

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: RFAAP

Location: SWMU 40

Sample Matrix: Ground Water

Sample Point ID: 40MW5

Field Representatives: JA/JC

Lab Sample #: 40MW5GW32714

PURGE INFORMATION:

Method of Well Purge: Low Flow

Dedicated: Y or (N)

Date/Time Initiated 3-27-14 1310

Well Volume of Standing Water (gal) N/A

Initial Water Level (ft) 65.85

Total Volume Purged (gal) 3

Mid-screen Depth (ft) 148

Was well purged to dryness? NO

Well Total Depth (ft) 158

Water Level After Purge (ft) 67.52

Casing Diameter, (inches) 2

Date/Time Completed 3-27-14 1402

Sand Pack Diameter, (inches) N/A

PURGE DATA:

Time	Depth to Water	Flow Rate (mL/min)	Temp (^{0}C)	pH (su)	Specific Cond. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1338	67.91	500	12.57	7.78	0.430	32.4	230.9	6.97
1341	67.79	270	12.30	7.51	0.425	27.6	236.8	6.13
1344	67.90	330	12.20	7.39	0.424	21.4	238.5	5.87
1347	68.04	320	12.19	7.39	0.424	19.1	238.5	5.01
1350	67.83	280	12.19	7.37	0.429	18.7	238.7	4.65
1353	67.56	210	12.13	7.35	0.432	13.7	239.3	4.03
1356	67.59	350	12.25	7.33	0.436	9.2	239.8	3.71
1359	67.41	170	12.23	7.33	0.438	8.8	240.7	3.65
1402	67.52	320	12.22	7.32	0.438	8.3	241.2	3.64

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: 40mw5 **Method of Sampling:** Low Flow

Dedicated?: NO

Water Level at time of Sample Collection: 67.52

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

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (^{0}C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1402	67.52	320	12.22	7.32	0.438	8.3	241.2	3.46

GENERAL INFORMATION:

Weather conditions at time of sample collection: 45°F SUNNY

Sample Characteristics: CLEAR / NO ODOR

COMMENTS AND OBSERVATIONS:

DATE: 3-27-14 **DATE:** 3-27-14

SAMPLER: **QC Check By:**

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: RFAAP

Location: SWMU 40

Sample Matrix: Ground Water

Sample Point ID: 40MW6

Field Representatives: SA/JC

Lab Sample #: 40MW6GW32714

PURGE INFORMATION:

Method of Well Purge: Low Flow

Date/Time Initiated 3-27-14 1455

Initial Water Level (ft) 51.35

Mid-screen Depth (ft) 127

Well Total Depth (ft) 137

Casing Diameter, (inches) 2

Sand Pack Diameter, (inches) N/A

Dedicated: Y or (N)

Well Volume of Standing Water (gal) N/A

Total Volume Purged (gal) 4.5

Was well purged to dryness? NO

Water Level After Purge (ft) 52.11

Date/Time Completed 3-27-14 1542

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)
1515	52.54	310	13.44	7.89	0.214	32.8	213.2	6.89
1518	52.39	330	13.40	7.84	0.214	21.7	217.5	6.23
1521	52.46	260	13.42	7.80	0.213	12.3	221.6	5.31
1524	52.27	270	13.00	7.77	0.213	5.2	236.6	5.13
1527	52.24	270	13.15	7.77	0.214	6.8	236.8	4.89
1530	52.21	280	13.16	7.76	0.213	5.4	237.1	4.56
1533	52.17	270	13.19	7.77	0.213	5.2	237.2	4.21
1536	52.13	290	13.21	7.78	0.214	5.4	237.4	3.96
1539	52.12	280	13.19	7.78	0.213	4.8	237.8	3.84
1542	52.11	270	13.18	7.78	0.213	3.1	237.9	3.81

GROUNDWATER SAMPLING FIELD DATA SHEET (continued)

SAMPLING INFORMATION:

Sample Point ID: 40 MW 6 **Method of Sampling:** Low Flow

Dedicated?: NO

Water Level at time of Sample Collection: 52.11

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

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (^{0}C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1542	52.11	270	13.18	7.78	0.213	3.1	237.9	3.81

GENERAL INFORMATION:

Weather conditions at time of sample collection: 50°F Sunny

Sample Characteristics: Clear, no odor

COMMENTS AND OBSERVATIONS:

DATE: 3-27-14 **DATE:** 3-27-14

SAMPLER: **QC Check By:**

GROUNDWATER SAMPLING FIELD DATA SHEET

Facility: RFHAP

Location: SWMU 40

Sample Matrix: Ground Water

Sample Point ID: LFMW01

Field Representatives: JA/JC

Lab Sample #: LFMW01GW32714

PURGE INFORMATION:

Method of Well Purge: Low-Flow

Date/Time Initiated 3-27-14 1710

Initial Water Level (ft) 28.10

Mid-screen Depth (ft) ≈ 98-93

Well Total Depth (ft) 103

Casing Diameter, (inches) 2

Sand Pack Diameter, (inches) N/A

Dedicated: Y or (N)

Well Volume of Standing Water (gal) ~/1

Total Volume Purged (gal) 2.5

Was well purged to dryness? NO

Water Level After Purge (ft) 28.15

Date/Time Completed 3-27-14 1750

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)
1735	28.21	290	13.58	7.04	0.619	21.8	249.7	4.37
1738	28.15	310	13.33	7.02	0.618	16.8	249.6	4.09
1741	28.15	300	13.19	7.02	0.614	15.4	249.8	3.10
1744	28.15	290	13.28	7.03	0.609	8.8	250.0	2.87
1747	28.14	300	13.33	7.04	0.610	9.1	249.9	2.88
1750	28.15	300	13.16	7.04	0.604	7.3	251.3	2.79

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: 28.15

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

SAMPLING DATA:

Sample Time	Depth to Water (ft)	Sample Rate (ml/min)	Temp. (^{0}C)	pH (su)	Specific Conduct. (mS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
1750	28.15	300	13.16	7.04	0.604	7.3	251.3	2.79

GENERAL INFORMATION:

Weather conditions at time of sample collection: 55°F Sunny

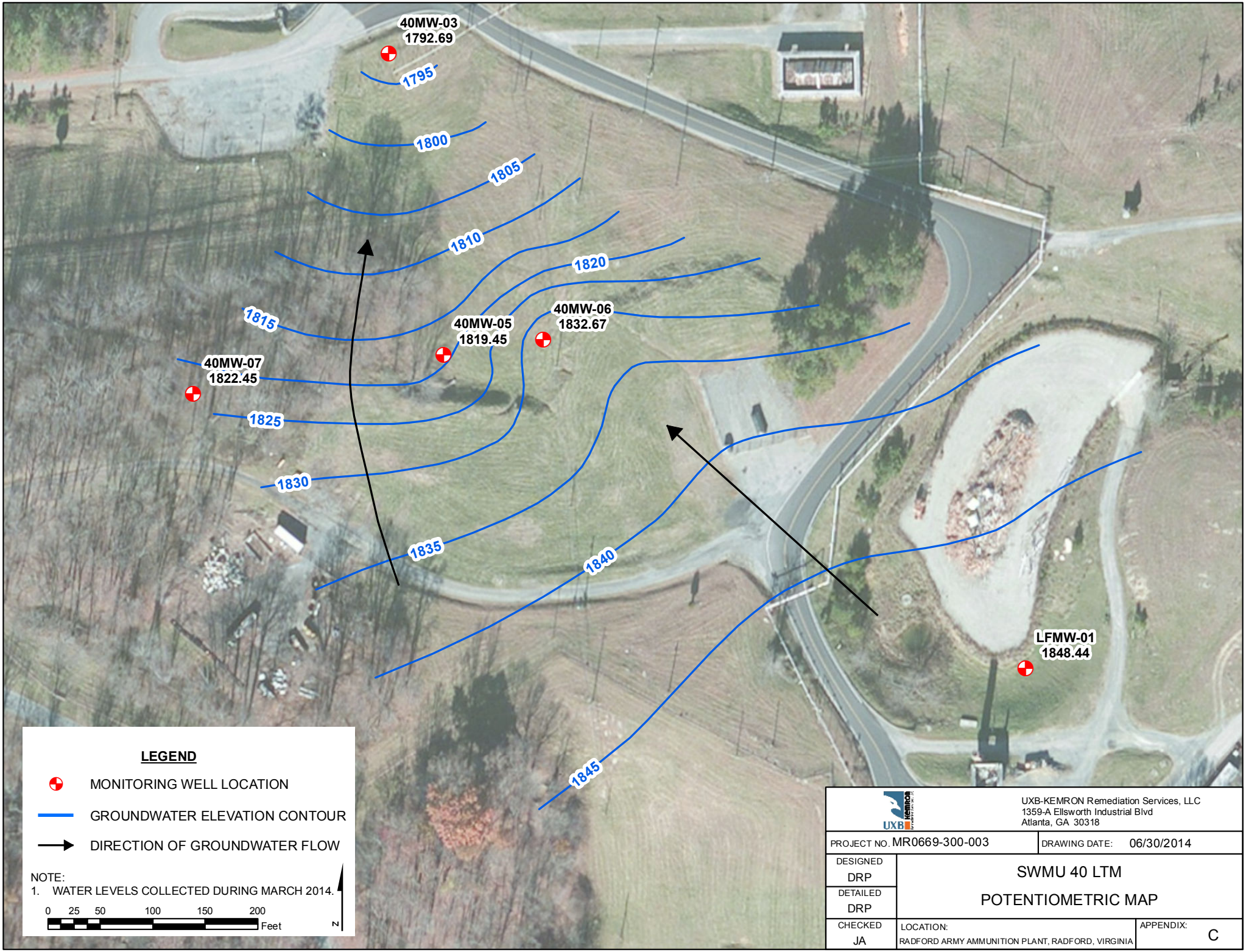
Sample Characteristics: Clear, no odor

COMMENTS AND OBSERVATIONS:

DATE: 3-27-14 **DATE:** 3-27-14

SAMPLER: **QC Check By:**

APPENDIX C
Potentiometric Maps



UXB-KEMRON Remediation Services, LLC
1359-A Ellsworth Industrial Blvd
Atlanta, GA 30318

PROJECT NO. MR0669-300-003	DRAWING DATE: 06/30/2014
DESIGNED DRP	SWMU 40 LTM
DETAILED DRP	POTENTIOMETRIC MAP
CHECKED JA	LOCATION: RADFORD ARMY AMMUNITION PLANT, RADFORD, VIRGINIA
	APPENDIX: C

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

APPENDIX E
Analytical Data Tables

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 3

							40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01				
						Location ID																																		
						Sample ID	40LFMW01GW112111					40DUPGW030612					40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612					40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
						Sample Date	11/21/2011					3/6/2012					3/6/2012					6/12/2012					9/26/2012					6/19/2013					6/19/2013					3/27/2014				
						Sample Type	N					FD					N					N					N					FD					N					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	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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	**< 0.026**	U	0.026	0.0521	ug/L	**< 0.0258**	U	0.0258	0.0515	ug/L	**< 0.025**	U	0.025	0.05	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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	0.026	U	0.026	0.0521	ug/L	0.0258	U	0.0258	0.0515	ug/L	0.025	U	0.025	0.05	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 3

							Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
							Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714					40DUPGW32714				
							Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014					3/27/2014				
							Sample Type	FD					N					N					N					FD					N					N					N					FD				
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	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0263	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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	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	**< 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	**< 0.026**	U	0.026	0.0521	ug/L	**< 0.026**	U	0.026	0.0521	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			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	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	0.026	U	0.026	0.0521	ug/L	0.026	U	0.026	0.0521	ug/L

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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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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 3

							Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
							Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
							Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
							Sample Type	N					N					FD					N					N					N					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
SW8270C PAHL	56-55-3	Benzo(a)anthracene	0.029			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	50-32-8	Benzo(a)pyrene	0.0029		0.20	ug/L	**< 0.0287**	U	0.0287	0.0575	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	**< 0.026**	U	0.026	0.0521	ug/L
SW8270C PAHL	205-99-2	Benzo(b)fluoranthene	0.029			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	207-08-9	Benzo(k)fluoranthene	0.29			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L
SW8270C PAHL	218-01-9	Chrysene	2.9			ug/L	0.0287	U	0.0287	0.0575	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	0.026	U	0.026	0.0521	ug/L

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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 3

							Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
							Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
							Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
							Sample Type	N					N					N					N					N					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
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	0.026	U	0.026	0.0521	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	**< 0.026**	U	0.026	0.0521	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	0.026	U	0.026	0.0521	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	0.026	U	0.026	0.0521	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	0.026	U	0.026	0.0521	ug/L

Notes:

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ug/L = Microgram Per Liter
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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.

U = Not Detected. The associated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
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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 3

							Location ID	40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01				
							Sample ID	40LFMW01GW112111					40DUPGW030612					40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612					40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
							Sample Date	11/21/2011					3/6/2012					3/6/2012					6/12/2012					9/26/2012					6/19/2013					6/19/2013					3/27/2014				
							Sample Type	N					FD					N					N					N					FD					N					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	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	< 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	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
LOD = Limit of Detection
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N = Normal
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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 3

							Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
							Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714					40DUPGW32714				
							Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014					3/27/2014				
							Sample Type	FD					N					N					N					FD					N					N					N					FD				
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	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	< 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	R	2.5	10	ug/L	2.5	U	2.5	10	ug/L	2.5	UJ	2.5	10	ug/L	2.5	UJ	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 3

						Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
						Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
						Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					FD					N					N					N					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	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	2.5	UJ	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 3

						Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
						Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
						Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					N					N					N					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
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	U	2	10	ug/L	< 2	U	2	10	ug/L
SW8260B	67-64-1	Acetone		1200		ug/L	4.38	L	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	UJ	2.5	10	ug/L	2.5	UJ	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
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 asscociated 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 3
November 2011 Screening Levels for Groundwater Metals Data - Residential Tapwater Pathway
SWMU 40 (RAAP-009)
Radford Army Ammunition Plant
Longterm Monitoring Data Year 3

							Location ID / Sample ID / Sample Date / Sample Type	40LFMW01 / 40LFMW01GW112111 / 11/21/2011 / N					40LFMW01 / 40DUPGW030612 / 3/6/2012 / FD				
Method	CAS	Chemical	fraction	CSL	T-NCSL	MCL	Units	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
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	50	U	50	100	ug/L	NS				
SW6010B	7439-89-6	Iron	T		1100		ug/L	**21800**	L	50	100	ug/L	87.5	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	102		50	100	ug/L	NS				
SW6010B	7439-95-4	Magnesium	T				ug/L	74800		250	500	ug/L	27800		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	33100		250	500	ug/L	NS				
SW6010B	7440-09-7	Potassium	T				ug/L	5920		500	1000	ug/L	943	J	500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	1620		500	1000	ug/L	NS				
SW6010B	7440-23-5	Sodium	T				ug/L	8230		250	500	ug/L	7860		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	8480		250	500	ug/L	NS				
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	**32.5**		5	10	ug/L	5	U	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	5	U	5	10	ug/L	NS				
SW6010B	7440-70-2	Calcium	T				ug/L	142000		100	200	ug/L	71300	J	100	200	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	81500		100	200	ug/L	NS				
SW6020	7439-92-1	Lead	T			15	ug/L	11		1	2	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				
SW6020	7439-96-5	Manganese	T		32		ug/L	**125**		2	4	ug/L	1.25	J	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	3.95	B	2	4	ug/L	NS				
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
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	**< 1**	U	1	2	ug/L	NS				
SW6020	7440-39-3	Barium	T		290	2000	ug/L	133		3	6	ug/L	94.7		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	90.2		3	6	ug/L	NS				
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	**5.54**		1	2	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				
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
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	1	U	1	2	ug/L	NS				

		40LFMW01 / 40LFMW01GW030612 / 3/6/2012 / N					40LFMW01 / LFMW01GW061212 / 6/12/2012 / N					40LFMW01 / LFMW01GW92612 / 9/26/2012 / N				
Chemical	fraction	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
Aluminum	T	123		50	100	ug/L	74.8	J	50	100	ug/L	**9150**		50	100	ug/L
Aluminum	D	NS					50	U	50	100	ug/L	92.9	J	50	100	ug/L
Iron	T	93	J	50	100	ug/L	120		50	100	ug/L	**8950**		50	100	ug/L
Iron	D	NS					50	U	50	100	ug/L	74.1	J	50	100	ug/L
Magnesium	T	28100		250	500	ug/L	33800		2500	5000	ug/L	51100		250	500	ug/L
Magnesium	D	NS					32700		2500	5000	ug/L	35400		250	500	ug/L
Potassium	T	885	J	500	1000	ug/L	1740		500	1000	ug/L	3700		500	1000	ug/L
Potassium	D	NS					1630		500	1000	ug/L	1690		500	1000	ug/L
Sodium	T	7690		250	500	ug/L	8450		250	500	ug/L	6640		250	500	ug/L
Sodium	D	NS					8120		250	500	ug/L	7100		250	500	ug/L
Vanadium	T	5	U	5	10	ug/L	5	U	5	10	ug/L	**18.1**		5	10	ug/L
Vanadium	D	NS					5	U	5	10	ug/L	5	U	5	10	ug/L
Calcium	T	71400	J	100	200	ug/L	82800		1000	2000	ug/L	105000		100	200	ug/L
Calcium	D	NS					82000		1000	2000	ug/L	85700		100	200	ug/L
Lead	T	0.5	U	0.5	1	ug/L	0.5	UL	0.5	1	ug/L	5.46		0.5	1	ug/L
Lead	D	NS					0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L
Manganese	T	1.52	J	1	2	ug/L	2.18	L	1	2	ug/L	**52.6**		1	2	ug/L
Manganese	D	NS					1	UL	1	2	ug/L	1	U	1	2	ug/L
Arsenic	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**1.43**		0.5	1	ug/L
Arsenic	D	NS					**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L
Barium	T	94.1		1.5	3	ug/L	65.7	L	1.5	3	ug/L	125		1.5	3	ug/L
Barium	D	NS					63.4		1.5	3	ug/L	92.6		1.5	3	ug/L
Cobalt	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**3.14**		0.5	1	ug/L
Cobalt	D	NS					**< 0.5**	U	0.5	1	ug/L	**0.903**	J	0.5	1	ug/L
Selenium	T	0.5	UL	0.5	1	ug/L	0.726	K	0.5	1	ug/L	1.18		0.5	1	ug/L
Selenium	D	NS					0.7	J	0.5	1	ug/L	1.06		0.5	1	ug/L

		40LFMW01 / 40DUPGW61913 / 6/19/2013 / FD					40LFMW01 / LFMW01GW61913 / 6/19/2013 / N					40LFMW01 / LFMW01GW32714 / 3/27/2014 / N				
Chemical	fraction	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
Aluminum	T	127	J	100	200	ug/L	145	J	100	200	ug/L	124	J	100	200	ug/L
Aluminum	D	< 100	U	100	200	ug/L	100	U	100	200	ug/L	NS				
Iron	T	290		50	100	ug/L	311		50	100	ug/L	172	J	50	100	ug/L
Iron	D	50	U	50	100	ug/L	50	U	50	100	ug/L	NS				
Magnesium	T	30300		250	500	ug/L	29200		250	500	ug/L	34600		250	500	ug/L
Magnesium	D	29300		250	500	ug/L	29800		250	500	ug/L	NS				
Potassium	T	1740		500	1000	ug/L	1660		500	1000	ug/L	1730		500	1000	ug/L
Potassium	D	1620		500	1000	ug/L	1690		500	1000	ug/L	NS				
Sodium	T	8410		250	500	ug/L	8180		250	500	ug/L	5260		250	500	ug/L
Sodium	D	8490		250	500	ug/L	8540		250	500	ug/L	NS				
Vanadium	T	**8.64**	J	5	10	ug/L	**9.29**	J	5	10	ug/L	5	U	5	10	ug/L
Vanadium	D	**10.9**		5	10	ug/L	**10.8**		5	10	ug/L	NS				
Calcium	T	75800		250	500	ug/L	75900		250	500	ug/L	92400		2500	5000	ug/L
Calcium	D	78100		250	500	ug/L	77700		250	500	ug/L	NS				
Lead	T	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L
Lead	D	0.5	U	0.5	1	ug/L	0.5	U	0.5	1	ug/L	NS				
Manganese	T	2.48		1	2	ug/L	2.89		1	2	ug/L	2.75	B	1	2	ug/L
Manganese	D	1	U	1	2	ug/L	1	U	1	2	ug/L	NS				
Arsenic	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
Arsenic	D	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	NS				
Barium	T	61.9		1.5	3	ug/L	62.3		1.5	3	ug/L	69.8		1.5	3	ug/L
Barium	D	61.4		1.5	3	ug/L	57.5		1.5	3	ug/L	NS				
Cobalt	T	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
Cobalt	D	**< 0.5**	U	0.5	1	ug/L	**< 0.5**	U	0.5	1	ug/L	NS				
Selenium	T	0.676	J	0.5	1	ug/L	0.928	J	0.5	1	ug/L	1.49		0.5	1	ug/L
Selenium	D	0.523	J	0.5	1	ug/L	1.71	J	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 asscociated 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 Turbidty was stable at less than or equl 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 3

								Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
								Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714					40DUPGW32714				
								Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014					3/27/2014				
								Sample Type	FD					N					N					N					FD					N					N					N					FD				
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	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	169	J	100	200	ug/L	366		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					NS					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	125	J	50	100	ug/L	339	J	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	U	50	100	ug/L	50	U	50	100	ug/L	50	U	50	100	ug/L	NS					NS					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	19000		250	500	ug/L	19500		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					NS					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	946	J	500	1000	ug/L	1020		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					NS					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	5370		250	500	ug/L	5640		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					NS					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	5	U	5	10	ug/L	5	U	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					NS					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	68300		2500	5000	ug/L	72700		2500	5000	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					NS					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	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					NS					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	1.06	B	1	2	ug/L	1.57	B	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					NS					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	**< 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					NS					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	34.1		1.5	3	ug/L	33.2		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					56.3	L	1.5	3	ug/L	58.7		1.5	3	ug/L	NS					NS					NS					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	**< 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					NS					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	0.5	U	0.5	1	ug/L	0.5	U	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					NS					NS				

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
LOD = Limit of Detection
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N = Normal
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U = Not Detected. The asscociated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
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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 3

								Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
								Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
								Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
								Sample Type	N					N					FD					N					N					N					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	288		100	200	ug/L
SW6010B	7429-90-5	Aluminum	D		1600		ug/L	NS					NS					NS					NS					50	U	50	100	ug/L	NS					NS				
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	292	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	NS					NS					NS					NS					50	U	50	100	ug/L	NS					NS				
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	7560		250	500	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	NS					NS					NS					NS					33500		250	500	ug/L	NS					NS				
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	738	J	500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	NS					NS					NS					NS					1140		500	1000	ug/L	NS					NS				
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	7740	B	250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	NS					NS					NS					NS					5180		250	500	ug/L	NS					NS				
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	5	U	5	10	ug/L
SW6010B	7440-62-2	Vanadium	D		7.8		ug/L	NS					NS					NS					NS					5	U	5	10	ug/L	NS					NS				
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	23500		250	500	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	NS					NS					NS					NS					89400		100	200	ug/L	NS					NS				
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	0.5	U	0.5	1	ug/L
SW6020	7439-92-1	Lead	D			15	ug/L	NS					NS					NS					NS					0.5	U	0.5	1	ug/L	NS					NS				
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	1.66	B	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	NS					NS					NS					NS					1.07	B	1	2	ug/L	NS					NS				
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	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
SW6020	7440-38-2	Arsenic	D	0.045	0.47	10	ug/L	NS					NS					NS					**< 0.5**	U	0.5	1	ug/L	NS					NS					NS				
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	12.7		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	NS					NS					NS					51.5		1.5	3	ug/L	NS					NS					NS				
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	**< 0.5**	**U**	**0.5**	**1**	**ug/L**
SW6020	7440-48-4	Cobalt	D		0.47		ug/L	NS					NS					NS					**< 0.5**	U	0.5	1	ug/L	NS					NS					NS				
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	0.5	U	0.5	1	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	NS					NS					NS					NS					1.11		0.5	1	ug/L	NS					NS				

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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 3

								Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
								Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
								Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
								Sample Type	N					N					N					N					N					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
SW6010B	7429-90-5	Aluminum	T		1600		ug/L	**8290**		50	100	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	100	U	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	NS					NS				
SW6010B	7439-89-6	Iron	T		1100		ug/L	**7950**	L	50	100	ug/L	263		50	100	ug/L	149		50	100	ug/L	**1620**		50	100	ug/L	55.3	J	50	100	ug/L	213	J	50	100	ug/L
SW6010B	7439-89-6	Iron	D		1100		ug/L	73.1	J	50	100	ug/L	NS					NS					50	U	50	100	ug/L	NS					NS				
SW6010B	7439-95-4	Magnesium	T				ug/L	61900		250	500	ug/L	36100		250	500	ug/L	36400		2500	5000	ug/L	41100		250	500	ug/L	32200		250	500	ug/L	32600		2500	5000	ug/L
SW6010B	7439-95-4	Magnesium	D				ug/L	32500		250	500	ug/L	NS					NS					36100		250	500	ug/L	NS					NS				
SW6010B	7440-09-7	Potassium	T				ug/L	4250		500	1000	ug/L	1720		500	1000	ug/L	1670		500	1000	ug/L	2130		500	1000	ug/L	1550		500	1000	ug/L	1570		500	1000	ug/L
SW6010B	7440-09-7	Potassium	D				ug/L	2300		500	1000	ug/L	NS					NS					1770		500	1000	ug/L	NS					NS				
SW6010B	7440-23-5	Sodium	T				ug/L	66700		250	500	ug/L	8540		250	500	ug/L	4030		250	500	ug/L	3510		250	500	ug/L	3990		250	500	ug/L	3660		250	500	ug/L
SW6010B	7440-23-5	Sodium	D				ug/L	78300		250	500	ug/L	NS					NS					3360		250	500	ug/L	NS					NS				
SW6010B	7440-62-2	Vanadium	T		7.8		ug/L	**9.26**	J	5	10	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	5	U	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	NS					NS				
SW6010B	7440-70-2	Calcium	T				ug/L	190000		100	200	ug/L	80600	J	100	200	ug/L	77800		1000	2000	ug/L	101000		100	200	ug/L	71300		250	500	ug/L	81500		2500	5000	ug/L
SW6010B	7440-70-2	Calcium	D				ug/L	70600		100	200	ug/L	NS					NS					77700		100	200	ug/L	NS					NS				
SW6020	7439-92-1	Lead	T			15	ug/L	9.37		1	2	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	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	NS					NS				
SW6020	7439-96-5	Manganese	T		32		ug/L	**181**		2	4	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	1.88	B	1	2	ug/L
SW6020	7439-96-5	Manganese	D		32		ug/L	23.9	B	2	4	ug/L	NS					NS					3.77	B	1	2	ug/L	NS					NS				
SW6020	7440-38-2	Arsenic	T	0.045	0.47	10	ug/L	**2**	K	1	2	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	**< 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	NS					NS				
SW6020	7440-39-3	Barium	T		290	2000	ug/L	252		3	6	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	118		1.5	3	ug/L
SW6020	7440-39-3	Barium	D		290	2000	ug/L	75.8		3	6	ug/L	NS					NS					170		1.5	3	ug/L	NS					NS				
SW6020	7440-48-4	Cobalt	T		0.47		ug/L	**3.04**		1	2	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	**< 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					**0.825**	J	0.5	1	ug/L	NS					NS				
SW6020	7782-49-2	Selenium	T		7.8	50	ug/L	1.86	K	1	2	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	0.5	U	0.5	1	ug/L
SW6020	7782-49-2	Selenium	D		7.8	50	ug/L	1.81	K	1	2	ug/L	NS					NS					0.913	J	0.5	1	ug/L	NS					NS				

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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 3

						Location ID	40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01					40LFMW01				
						Sample ID	40LFMW01GW112111					40DUPGW030612					40LFMW01GW030612					LFMW01GW061212					LFMW01GW92612					40DUPGW61913					LFMW01GW61913					LFMW01GW32714				
						Sample Date	11/21/2011					3/6/2012					3/6/2012					6/12/2012					9/26/2012					6/19/2013					6/19/2013					3/27/2014				
						Sample Type	N					FD					N					N					N					FD					N					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	Result	VQ	LOD	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	**7.47**		0.1	0.2	ug/L

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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 3

						Location ID	40MW5					40MW5					40MW5					40MW5					40MW5					40MW5					40MW5				
						Sample ID	40DUPGW112011					40MW5GW112011					40MW5GW030712					40MW5GW061212					40DUPGW92512					40MW5GW92512					40MW5GW61913					40MW5GW32714				
						Sample Date	11/20/2011					11/20/2011					3/7/2012					6/12/2012					9/25/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	FD					N					N					N					FD					N					N					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	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	0.721		0.1	0.2	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 asscociated 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.

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 3

						Location ID	40MW6					40MW6					40MW6					40MW6					40MW6					40MW6					40MW6				
						Sample ID	40MW6GW112111					40MW6GW030712					40DUPGW061212					40MW6GW061212					40MW6GW92512					40MW6GW61913					40MW6GW32714				
						Sample Date	11/21/2011					3/7/2012					6/12/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					FD					N					N					N					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	0.506		0.1	0.2	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 asscociated 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.

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 3

						Location ID	40MW7					40MW7					40MW7					40MW7					40MW7					40MW7				
						Sample ID	40MW7GW112011					40MW7GW030612					40MW7GW601212					40MW7GW92512					40MW7GW61913					40MW7GW32714				
						Sample Date	11/20/2011					3/6/2012					6/12/2012					9/25/2012					6/19/2013					3/27/2014				
						Sample Type	N					N					N					N					N					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	Int Qual	LOD	LOQ	DL Unit	Result	VQ	LOD	LOQ	DL Unit
SW6850	14797-73-0	PERCHLORATE	1.1	15	ug/L	**4.5**	J	0.1	0.2	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	**3.74**		0.1	0.2	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

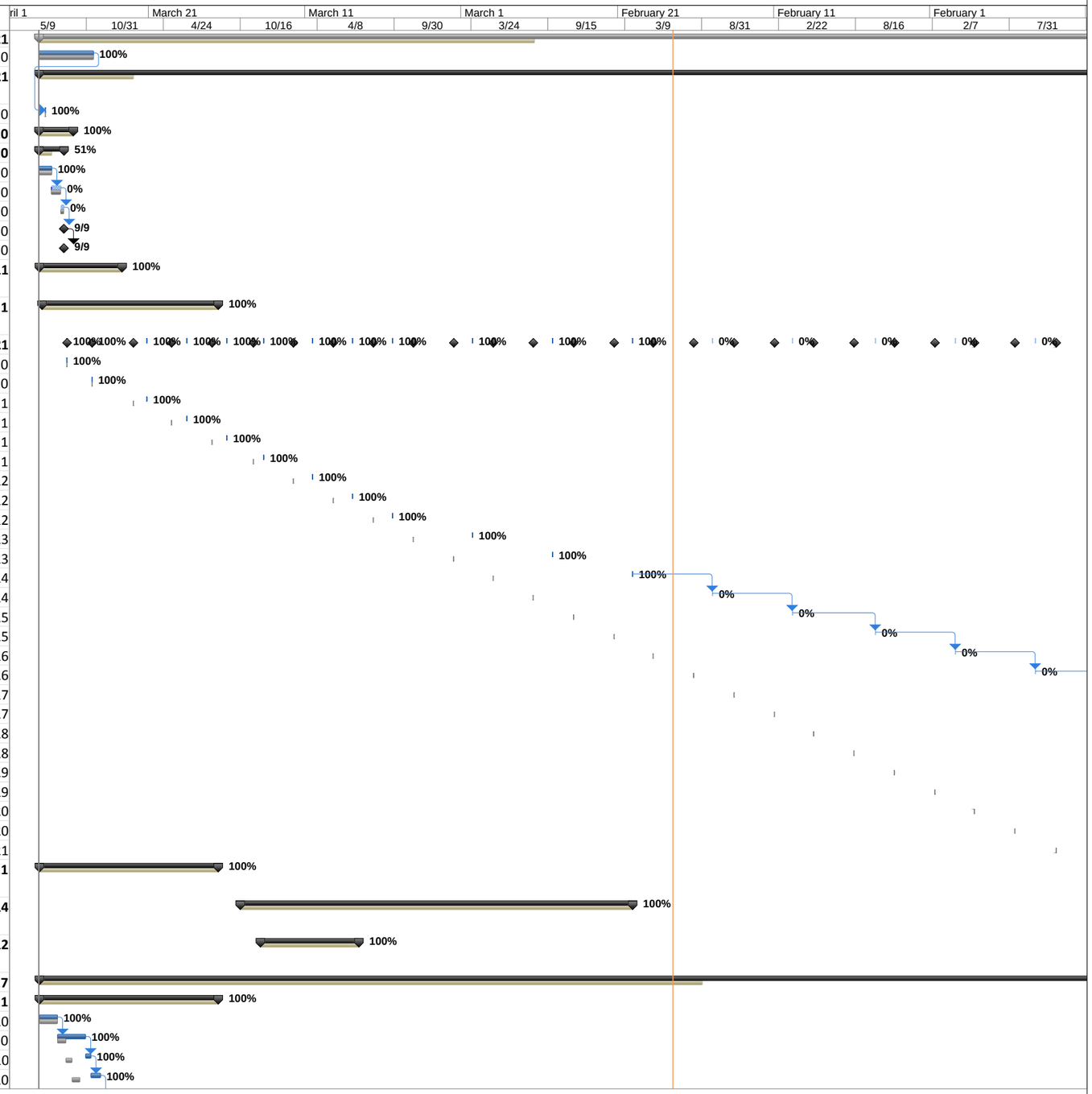
U = Not Detected. The asscociated number indicates the approximate sample concentration
B = Not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result. Analyte may or may not be present in the sample.
J = Analyte present. Reported value may or may not be accurate 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.

Screening Levels are based on USEPA Region III Risk-Based Concentration values from the November, 2011 RBC Table.

APPENDIX F
Schedule

Radford Schedule (Revision 6-27-14)

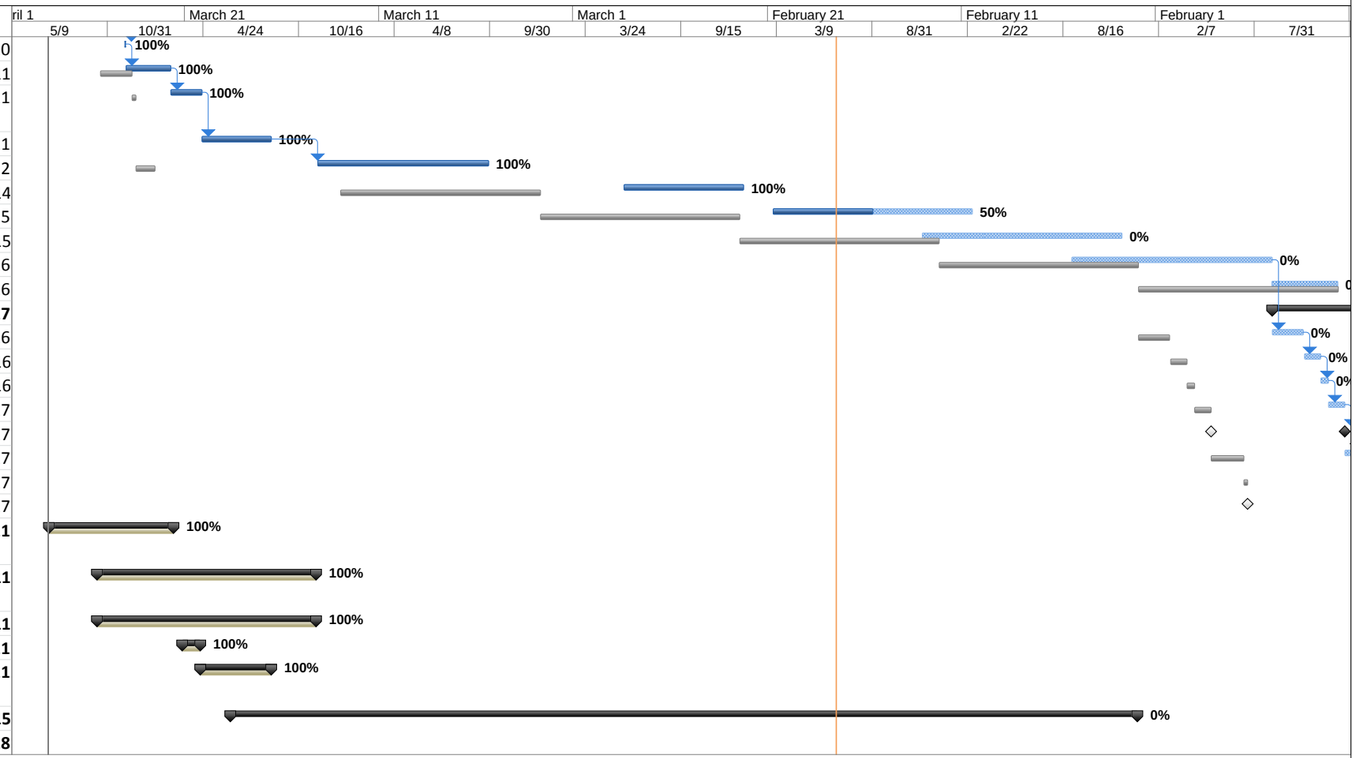
ID	Task Name	Duration	Start	Finish
0	**Radford AAP Schedule**	**2797 days?**	**Thu 7/15/10**	**Wed 3/31/21**
1	Notice to Proceed	88 days	Thu 7/15/10	Mon 11/15/10
2	**(Task 1) Project Management Plan (PMP) / Quality Assurance Surveillance Plan (QASP) / Site Wide Plans**	**2797 days?**	**Thu 7/15/10**	**Wed 3/31/21**
3	1a Kick off Meeting	1 day	Thu 7/29/10	Thu 7/29/10
4	**1b Project Management Plan (PMP)**	**56 days**	**Thu 7/15/10**	**Thu 9/30/10**
10	**1c Quality Assurance Surveillance Plan (QASP)**	**41 days**	**Thu 7/15/10**	**Thu 9/9/10**
11	Preparation of Army Draft QASP	21 days	Thu 7/15/10	Thu 8/12/10
12	Army Review	15 days	Thu 8/12/10	Thu 9/2/10
13	Incorporate Army Comments in Final QASP	5 days	Fri 9/3/10	Thu 9/9/10
14	Final QASP Approved by Army	0 days	Thu 9/9/10	Thu 9/9/10
15	Performance Objective Achieved	0 days	Thu 9/9/10	Thu 9/9/10
16	**1d Accident Prevention Plan (APP) / Site Safety and Health Plan (SSHP)**	**134 days?**	**Fri 7/16/10**	**Wed 1/19/11**
22	**1e Quality Assurance Project Plan (QAPP)/Master Work Plan Addendum**	**287 days**	**Thu 7/22/10**	**Fri 8/26/11**
29	**1F RAB Meetings/Stakeholder Communication**	**2752 days**	**Thu 9/16/10**	**Wed 3/31/21**
30	1F RAB Quarterly Meetings 1	1 day	Thu 9/16/10	Thu 9/16/10
31	1F RAB Quarterly Meetings 2	1 day	Fri 11/12/10	Fri 11/12/10
32	1F RAB Quarterly Meetings 3	1 day	Thu 3/17/11	Thu 3/17/11
33	1F RAB Quarterly Meetings 4	1 day	Thu 6/16/11	Thu 6/16/11
34	1F RAB Quarterly Meetings 5	1 day	Thu 9/15/11	Thu 9/15/11
35	1F RAB Quarterly Meetings 6	1 day	Thu 12/8/11	Thu 12/8/11
36	1F RAB Quarterly Meetings 7	1 day	Wed 3/28/12	Wed 3/28/12
37	1F RAB Quarterly Meetings 8	1 day	Wed 6/27/12	Wed 6/27/12
38	1F RAB Quarterly Meetings 9	1 day	Wed 9/26/12	Wed 9/26/12
39	1F RAB Quarterly Meetings 10	1 day	Wed 3/27/13	Wed 3/27/13
40	1F RAB Quarterly Meetings 11	1 day	Wed 9/25/13	Wed 9/25/13
41	1F RAB Quarterly Meetings 12	1 day	Wed 3/26/14	Wed 3/26/14
42	1F RAB Quarterly Meetings 13	1 day	Wed 9/24/14	Wed 9/24/14
43	1F RAB Quarterly Meetings 14	1 day	Wed 3/25/15	Wed 3/25/15
44	1F RAB Quarterly Meetings 15	1 day	Wed 9/30/15	Wed 9/30/15
45	1F RAB Quarterly Meetings 16	1 day	Wed 3/30/16	Wed 3/30/16
46	1F RAB Quarterly Meetings 17	1 day	Wed 9/28/16	Wed 9/28/16
47	1F RAB Quarterly Meetings 18	1 day	Wed 3/29/17	Wed 3/29/17
48	1F RAB Quarterly Meetings 19	1 day	Wed 9/27/17	Wed 9/27/17
49	1F RAB Quarterly Meetings 20	1 day	Wed 3/28/18	Wed 3/28/18
50	1F RAB Quarterly Meetings 21	1 day	Wed 9/26/18	Wed 9/26/18
51	1F RAB Quarterly Meetings 22	1 day	Wed 3/27/19	Wed 3/27/19
52	1F RAB Quarterly Meetings 23	1 day	Wed 9/25/19	Wed 9/25/19
53	1F RAB Quarterly Meetings 24	1 day	Wed 3/25/20	Wed 3/25/20
54	1F RAB Quarterly Meetings 25	1 day	Wed 9/30/20	Wed 9/30/20
55	1F RAB Quarterly Meetings 26	1 day	Wed 3/31/21	Wed 3/31/21
56	**(Task 2) Interim Measures Implementation Work Plan (IMI Work Plan) - RAAP-009: Landfill Nitro Area (S40)**	**291 days**	**Fri 7/16/10**	**Fri 8/26/11**
68	**(Task 3) Interim Measures Implementation - RAAP-009: Landfill Nitro Area (S40)**	**640 days**	**Sun 10/16/11**	**Wed 3/26/14**
73	**(Task 4) Interim Measures Completion Report (IMC Report) - RAAP-009: Landfill Nitro Area (S40)**	**161 days**	**Thu 12/1/11**	**Wed 7/11/12**
84	**(Task 5) Long Term Monitoring (LTM)**	**1744 days**	**Fri 7/16/10**	**Mon 3/20/17**
85	**5a LTM Plan**	**291 days**	**Fri 7/16/10**	**Fri 8/26/11**
86	Preparation of Army Draft LTM Plan	29 days	Fri 7/16/10	Wed 8/25/10
87	Army Review	46 days	Thu 8/26/10	Thu 10/28/10
88	Incorporate Army Comments into Draft Final LTM Plan	8 days	Fri 10/29/10	Tue 11/9/10
89	Army Review of Draft Final LTM Plan	16 days	Wed 11/10/10	Wed 12/1/10



Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Manual Task
Start-only
Finish-only
Duration-only
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Manual Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Deadline

Radford Schedule (Revision 6-27-14)

ID	Task Name	Duration	Start	Finish
90	Draft Final LTM Plan Approved by Army	1 day	Thu 12/2/10	Thu 12/2/10
91	Regulator Review	58 days	Sat 12/4/10	Wed 2/23/11
92	Respond to, Resolve and Incorporate Regulator Comments into Final IMC Work Plan	41 days	Thu 2/24/11	Thu 4/21/11
93	Final LTM Plan Approved by Regulator	91 days	Fri 4/22/11	Fri 8/26/11
94	5b LTM and Reporting - Year 1 (2011)	226 days	Sun 11/20/11	Thu 9/27/12
95	5c LTM and Reporting - Year 2 (2012)	157 days	Mon 6/3/13	Tue 1/7/14
96	5d LTM and Reporting - Year 3 (2013)	261 days	Mon 3/3/14	Mon 3/2/15
97	5e LTM and Reporting - Year 4 (2014)	262 days	Mon 12/1/14	Tue 12/1/15
98	5f LTM and Reporting - Year 5 (2015)	263 days	Tue 9/1/15	Thu 9/1/16
99	5g LTM and Reporting - Year 6 (2016)	87 days	Thu 9/1/16	Fri 12/30/16
100	**5h Preparation of Ramp Down Strategy**	**142 days**	**Fri 9/2/16**	**Mon 3/20/17**
101	Preparation of Army Draft Ramp Down Strategy	41 days	Fri 9/2/16	Fri 10/28/16
102	Army Review	22 days	Mon 10/31/16	Tue 11/29/16
103	Incorporate Army Comments into Draft Final Ramp Down Strategy	10 days	Wed 11/30/16	Tue 12/13/16
104	Army Review of Draft Final Ramp Down Strategy	22 days	Wed 12/14/16	Thu 1/12/17
105	Draft Final Ramp Down Strategy Approved by Army	0 days	Thu 1/12/17	Thu 1/12/17
106	Regulator Review	42 days	Fri 1/13/17	Mon 3/13/17
107	Incoporate Regulator Comments into Final Ramp Down Strategy	5 days	Tue 3/14/17	Mon 3/20/17
108	Final Ramp Down Strategy Approved by Regulator	0 days	Mon 3/20/17	Mon 3/20/17
109	**(Task 6) Interim Measures Implementation Work Plan (IMI Work Plan) - RAAP-022: Pond by Buildings 4931 and 4928**	**162 days**	**Fri 7/16/10**	**Mon 2/28/11**
121	**(Task 7) Interim Measures Implementation - RAAP-022: Pond by Buildings 4931 and 4928**	**287 days**	**Tue 10/12/10**	**Wed 11/16/11**
122	**7a Pre-excavation Sampling**	**287 days**	**Tue 10/12/10**	**Wed 11/16/11**
132	**7b Implementation of IMWP**	**23 days**	**Thu 3/17/11**	**Mon 4/18/11**
141	**(Task 8) Interim Measures Completion Report (IMC Report) - RAAP-022: Pond by Buildings 4931 and 4928**	**94 days**	**Tue 4/19/11**	**Fri 8/26/11**
152	**(Task 9) Long Term Monitoring (LTM) - RAAP-010: CAS04 TRMT/DISP (S37**	**1189 days**	**Mon 6/13/11**	**Tue 12/29/15**
176	**(Task 10) Remedy Reviews (RAAP-09)**	**142 days**	**Thu 7/6/17**	**Fri 1/19/18**



Critical		Task		Manual Task		Duration-only		Baseline Milestone	◇	Summary		External Tasks		Inactive Milestone	◇
Critical Split		Split		Start-only	⊏	Baseline		Milestone	◆	Manual Summary		External Milestone	◆	Inactive Summary	
Critical Progress		Task Progress		Finish-only	⊐	Baseline Split		Summary Progress		Project Summary		Inactive Task		Deadline	⇩