

RADFORD ARMY AMMUNITION PLANT, VIRGINIA

SWMU 54 (RAAP-14) Interim Measures Completion Report



Prepared for:
USACE, Baltimore District
10 South. Howard St.
Baltimore, MD 21201



Prepared by:
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Contract No. W912QR-04-D-
0027-DA04

Draft Document

April 2011



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

July 11, 2011

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

P.W. Holt
Environmental Manager
Alliant Techsystems, 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 54
Interim Measures Completion Report

Dear Mr. McKenna and Ms. Holt:

The U.S. Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) have reviewed the U.S. Army's (Army's) SWMU 54 Interim Measures Completion Report for Solid Waste Management Unit 54, located at the Radford Army Ammunition Plant (RFAAP) in Radford, Virginia. Based upon our review, the Report is approved, and in accordance with Part II. (E)(5) of RFAAP's Corrective Action Permit, the Report is considered final. If you have any questions, please call me at 215-814-3284.

Sincerely,

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

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

c: James Cutler, VDEQ





DEPARTMENT OF THE ARMY
US ARMY INSTITUTE OF PUBLIC HEALTH
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MCHB-IP-REH

3 AUG 2011

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

SUBJECT: Review of Draft Interim Measures Completion Report, SWMU 54, Radford Army Ammunition Plant, Virginia, April 2011

1. The Army Institute of Public Health reviewed the subject document on behalf of the Office of The Surgeon General pursuant to Army Regulation 200-1 (Environmental Protection and Enhancement). We appreciate the opportunity to review this report.
2. We concur that the completed interim measures are protective of human health and the environment.
3. This document was reviewed by Mr. Jeffrey Leach, Environmental Health Risk Assessment Program. He can be reached at DSN 584-2953, commercial (410) 436-2953 or electronic mail, Jeff.Leach@us.army.mil.

FOR THE DIRECTOR:

A handwritten signature in black ink, reading "Jeffrey S. Kirkpatrick".

JEFFREY S. KIRKPATRICK
Portfolio Director, Health Risk Management

CF:
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PHCR-North



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April 18, 2011

Mr. Erich Weissbart and Mr. William Geiger
RCRA General Operations Branch, Mail Code: 3WC23
Waste and Chemicals Management Division
U. S. Environmental Protection Agency, Region III
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 54 (RAAP-014) Interim Measures Completion Report,
Draft Document, April 2011
EPA ID# VA1 210020730

Dear Mr. Weissbart, Mr. Geiger and Mr. Cutler:

Enclosed is the certification for the subject document that was sent to you on April 14, 2011. Also enclosed is the 14 April 2011 transmittal email.

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

Sincerely,

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

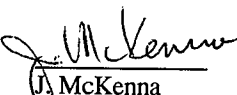
c: Karen Sismour
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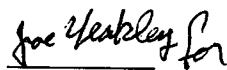
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bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
P.W. Holt
J. J. Redder
Env. File

Coordination: 
J. McKenna


M. A. Miano

Concerning the following:

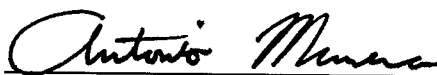
Radford Army Ammunition Plant
SWMU 54 (RAAP-014)
Interim Measures Completion Report
Draft Document, April 2011

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

SIGNATURE:

PRINTED NAME:

TITLE:



Antonio Munera

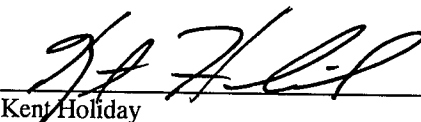
LTC, CM

Commanding

SIGNATURE:

PRINTED NAME:

TITLE:



Kent Holiday

Vice President and General Manager

ATK Energetics Systems

Greene, Anne

From: McKenna, Jim
Sent: Thursday, April 14, 2011 2:07 PM
To: Weissbart.Erich@epamail.epa.gov
Cc: Flint, Jeremy; Redder, Jerome; Meyer, Tom NAB02; Timothy.Leahy@shawgrp.com; Parks, Jeffrey N; Cutler,Jim; Geiger.William@epamail.epa.gov; Mendoza, Richard R Mr CIV USA IMCOM AEC; Davie, Robert; Holt, Paige
Subject: Draft SWMU 54 Interim Measures Completion Report (UNCLASSIFIED)
Importance: High

Classification: UNCLASSIFIED
Caveats: FOUO

All:

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

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

Jim McKenna

Jim McKenna	1Z63V8840197835572
Tom Meyer	1Z63V8840196529182
Jeffrey Leach	1Z63V8840196200393
Rich Mendoza	1Z63V8840198265203
Susan Ryan	1Z63V8840195699616
Erich Weissbart	1Z63V8840197639623
Jim Cutler	1Z63V8840199981231
Beth Lohman	1Z63V8840196980443

Classification: UNCLASSIFIED
Caveats: FOUO

SWMU 54 is a former disposal area along the New River downstream from the Open Burning Ground. A RCRA Facility Investigation and Corrective Measures Study was approved by the stakeholders (RFAAP/Army, EPA & DEQ) in September 2008. The approved RFI/CMS report recommended source removal and monitored natural attenuation (MNA). Source removal has been performed and a separate close out report has been prepared.

The subject document is the source removal/close out completion report that was conducted IAW the recommendation from the approved RFI/CMS report.

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Appendix F Health and Safety Forms

LIST OF ACRONYMS AND ABBREVIATIONS

2,4-DNT	2,4-Dinitrotoluene
ATK	Alliant TechSystems, Inc.
bgs	below ground surface
CMS	Corrective Measures Study
ft	foot or feet
GPS	Global Positioning System
IDW	Investigation-Derived Waste
IMWP	Interim Measures Work Plan
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSE	Millennium Science and Engineering
msl	mean sea level
NELAC	National Environmental Laboratory Accreditation Conference
NG	Nitroglycerin
Parsons	Parsons Engineering Science, Inc.
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
RFAAP	Radford Army Ammunition Plant
RFI	RCRA Facility Investigation
RG	Remedial Goal
r-SL	Residential Screening Level
Shaw	Shaw Environmental, Inc.
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TCLPRL	TCLP Regulatory Limit
TEQ	Toxicity Equivalent
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
XRF	X-Ray Fluorescence

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) has been contracted by the U.S. Army Corps of Engineers (USACE) to perform excavation activities at Solid Waste Management Unit (SWMU) 54 (RAAP-001), the Propellant Burning Ash Disposal Area, at Radford Army Ammunition Plant (RFAAP), Radford, Virginia. This work was performed under Contract number W912QR-04-D-0027, Delivery Order DA04. Specific elements of the project included: development of a work plan; delineation sampling of the area to determine the extent of contamination; the excavation and disposal of contaminated soils; restoration of the site; and, development of a final report. Work was performed in accordance with the approved *Draft SWMU 54 Interim Measures Work Plan (IMWP)* (Shaw, 2010), the *Radford Army Ammunition Plant, Radford, Virginia, Final Master Work Plan* (URS, 2003), and the *U.S. Environmental Protection Agency (USEPA) Permit for Corrective Action and Waste Minimization* (USEPA, 2000).

1.1 Site Description and Location

SWMU 54 is located within the easternmost portion of the Horseshoe Area at RFAAP (**Figure 1-1**). SWMU 54 consists of two non-contiguous disposal areas; Area A is an approximately 0.58-acre triangular shaped area in the southern portion of SWMU 54 and Area B is an approximately 1.09-acre area in the northern portion of SWMU 54 (**Figure 1-2**). SWMU 54 was reportedly used as a disposal area in the late 1970s for ash from propellant burning activities located at the Waste Propellant Burning Grounds. The site is currently undeveloped. The RFAAP Installation security fence is located along the northern and eastern boundaries of SWMU 54.

As illustrated on **Figure 1-2**, SWMU 54 is situated on a gently sloping terrace ranging from approximately 1,716 to 1,696 feet (ft) mean sea level (msl) from east to west, respectively. The SWMU is positioned within the 100-year floodplain on a terrace feature of the New River. East of the site, the ground surface slopes steeply towards the New River (approximately 1,676 ft msl).

1.2 Site History

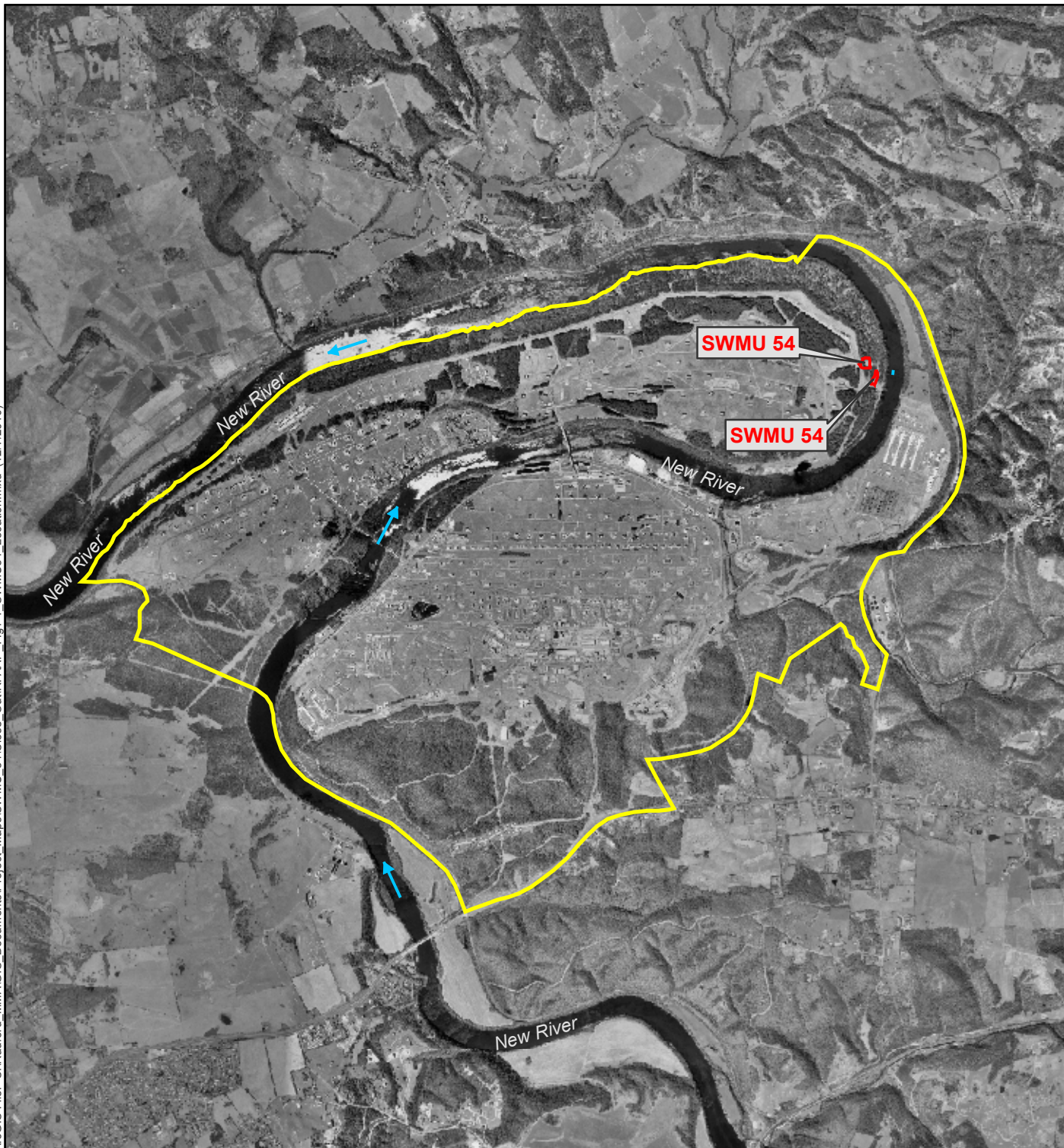
In the late 1970s ash from propellant burning operations was reportedly disposed of at the site. The propellant ash consists of a residue resulting from the burning of waste explosives, propellants, and laboratory waste. The actual disposal practices at the site are unknown, as conflicting information describing the practices exists. The Resource Conservation and Recovery Act (RCRA) Facility Assessment (USEPA, 1987) indicated that, according to plant personnel, disposal occurred on the surface, with no routine disposal in pits or trenches. In 1998, Millennium Science and Engineering (MSE) reported that ash was buried up to 17 ft below ground surface (bgs) in Area A and up to 7 ft bgs in Area B (MSE, 1998). The quantity of ash disposed at SWMU 54 is estimated at 10 tons (USEPA, 1987; USATHAMA, 1976). A sample of ash was collected for laboratory analysis from the site during an investigation conducted by Parsons Engineering Science, Inc. in 1996 (Parsons, 1996). Analytical results of the sample indicated a concentration of lead above the Toxicity Characteristic Leaching Procedure (TCLP) limit of 5 milligrams per liter (mg/L).

In 1998, MSE completed a supplemental RFI Report for SWMU 54 (MSE, 1998b). Based on the findings of their RFI and previous investigation results, MSE prepared a Draft CMS Report for SWMU 54 (MSE 1998). The CMS recommended final corrective measures alternative that

consisted of the excavation of lead and explosives “hot spots” in soil with offsite treatment disposal in a hazardous waste landfill followed by phytoremediation of remaining “residues in soil”.

In 1999, Parallax, Inc. completed the interim measures at Area A and Area B of SWMU 54 consisting of the excavation of selected “hot spot” areas of lead and explosives in soil. Parallax, Inc. excavated three grid cells from Area A and ten grid cells from Area B. Based on the results of the interim measures, additional investigation of both Area A and Area B was planned to confirm the effectiveness of the interim measure, as well as, evaluate and assess current conditions at the sites and provide recommendations regarding potential corrective measure requirements at the site.

In 2008, URS completed a Final RFI/CMS for SWMU 54 (URS, 2008) recommending additional excavation within Areas A and B to remove the source material related to groundwater contamination. Upon removal of the source of contamination, URS recommended long term Monitored Natural Attenuation of onsite groundwater.



LEGEND

→ New River Flow Direction

Installation Boundary

SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 25 May 2000, was obtained from the Army Topographic Engineering Center.



Scale:

0 1,750 3,500 7,000 Feet



U.S. Army Corps of Engineers

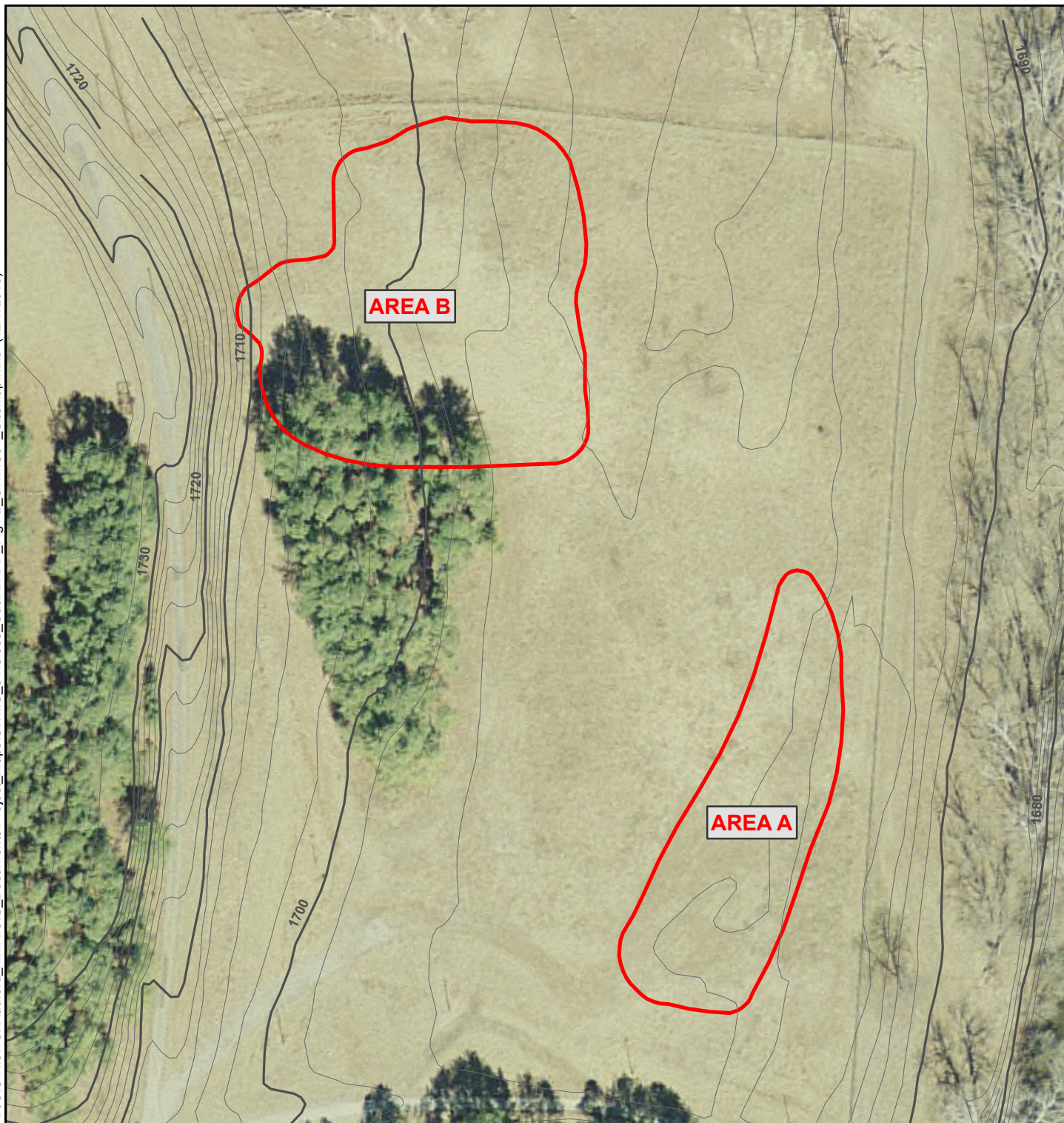


Shaw Environmental, Inc.

FIGURE 1-1

SWMU 54 Site Location Map

Radford Army Ammunition Plant,
Radford, VA



LEGEND

— 10 ft Contour Line

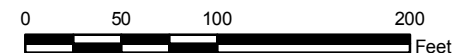
SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.
- 2) Samples were collected in April/May 2009.



Scale:



U.S. Army Corps of Engineers



Shaw Environmental, Inc.

FIGURE 1-2

SWMU 54 Site Map

Radford Army Ammunition Plant,
Radford, VA

1.3 Project Objectives

Based on the 2008 SWMU 54 RFI/CMS Report (URS, 2008), the main parameters of concern in Area A are lead, 2,4,6-TNT, DNT, RDX, amino DNTs, NG, heptachlor epoxide, and dioxins/furans. Parameters of concern in Area B soils include lead, DNT, amino DNT, NG, RDX, dieldrin, Aroclor epoxide, and dioxin/furans. The Human Health Risk Assessment (HHRA) determined that unacceptable risks to potential future residential and industrial receptors were associated with the COIs. Based on the results from the HHRS, it was concluded that based on the levels detected in the soil hot spot areas, COIs could potentially leach from soil to groundwater at levels of concern. Because the RFI demonstrated that COI contamination is present at concentrations associated with unacceptable human health concerns, a CMS was performed to address the propellant ash material and grossly-contaminated soil under the ash material at SWMU 54. The alternatives evaluated were as follows:

- Alternative One: No Further Action;
- Alternative Two: Excavation of Soil at Area A and Area B, Off-site Disposal, and MNA of Groundwater; and
- Alternative Three: Excavation of Soil at Area A and Area B, Off-site Disposal, and Enhanced *In Situ* Bioremediation of Groundwater.

The site-specific Corrective Measures Objective (CMO) for SWMU 54 is to mitigate further leaching of explosives constituents from soil to groundwater at levels that would potentially increase observed concentrations and adversely impact future beneficial use of groundwater, and to eliminate the potential threats to human health and the environment that exist within materials found in SWMU 54.

Alternative Two, which entails excavation and off-site disposal as the primary remediation process, was selected as the final alternative for SWMU 54 because it was implementable and provided a greater level of protection to human health and the environment not provided by other alternatives. By achieving the CMOs, allowing unrestricted use after the remedy completion, the selected interim measures would accomplish the Army's goal for the Installation Restoration Program and its funding source the Environmental Restoration, Army account.

The CMO and remedial goals were developed in the SWMU 54 RFI/CMS (URS, 2008). The following is a summary of the findings from that process.

The site specific CMO for SWMU 54 Area A is to mitigate further leaching of explosives constituents from soil to groundwater at levels that would potentially increase observed concentrations and adversely impact future beneficial use of groundwater; and to the extent practicable, a goal of restoring site groundwater to the most beneficial use.

The site specific CMO for SWMU 54 Area B is to mitigate the potential hypothetical future risks that have been identified for exposure to soil under a future construction worker scenario; and to prevent leaching of contaminants of concern from soil-to-groundwater at levels that would potentially adversely impact future beneficial use of groundwater.

RGs were developed and are shown in **Table 1-1** and **Table 1-2**. These RGs were used at SWMU 54 to confirm that all COIs have been removed to levels that are safe for human health and the environment.

Table 1-1
SWMU 54 Area A Remedial Goals

Chemical of Interest	Groundwater RG (mg/L)	Groundwater RG Source ⁽³⁾	Area A - Soil RG (mg/kg)	Soil RG Source
2,4,6-TNT	0.00782	RG	1.7	SSL ⁴
DNT Mixture	0.000932	RG	0.044 or Lab RL (if higher)	SSL ⁴
RDX	0.0061	RG	0.161	SSL ⁴
Perchlorate	0.0109	RG	--	--
Amino DNTs ⁽¹⁾	--	--	1.095	SSL ⁵
Nitroglycerin ⁽²⁾	--	--	0.069 or Lab RL (if higher)	SSL ⁵
Heptachlor Epoxide ⁽²⁾	--	--	0.0047	SSL ⁵
2,3,7,8-TCDD (TEQ) ⁽¹⁾	--	--	7.89E-06	SSL ⁵

Notes:

AL = Action Level

TNT = Trinitrotoluene

DNT = Dinitrotoluene

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazacyclohexane

TCDD = Tetrachlorodibenzodioxin

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

RG = Remedial Goal

(1) =Not identified as COPC in GW

(2) =Not detected in groundwater

(3) = The lowest of calculated carcinogenic and noncarcinogenic groundwater RGs used (see Appendix G.1, Table G.1-1c in URS, 2008)

Carcinogenic and noncarcinogenic RG values for groundwater contaminants of concern (2,4,6-TNT, DNT Mixture, RDX, and perchlorate) calculated using target risk 1E.-05 for the lifetime resident (see Appendix G.1 Table G.1-1c in URS, 2008) and a target hazard of 1 for the adult and child resident (see Appendix G.1 Table G.1-1b in URS, 2008)

(4) = Soil SSL RG values for soil-to-groundwater migration pathway calculated with SSL equation using groundwater RGs as target groundwater concentrations (see Tables G.1-2a - G.1-2c in URS, 2008)

(5) = Soil SSL RG values for soil-to-groundwater migration pathway calculated with SSL equation using T-RSLs as target groundwater concentrations (see Tables G.1-2d - G.1-2g in URS, 2008)

Table 1-2
SWMU 54 Area B Remedial Goals

Chemical of Interest	Area B - Soil RG (mg/kg)	Soil RG Source
2,4,6-TNT	1.45	SSL ⁴
DNT Mixture	0.037 or Lab RL (if higher)	SSL ⁴
RDX	0.134	SSL ⁴
Amino DNTs ⁽¹⁾	0.912	SSL ⁵
Nitroglycerin ⁽²⁾	0.057 or Lab RL (if higher)	SSL ⁵
Lead ^(1,3)	400	AL
Aroclor 1254 ⁽²⁾	0.25	SSL ⁵
Dieldrin ⁽²⁾	0.00446	SSL ⁵
Heptachlor Epoxide ⁽²⁾	0.0039	SSL ⁵
2,3,7,8-TCDD (TEQ) ⁽¹⁾	6.57E-06	SSL ⁵

Notes:

AL = Action Level

TNT = Trinitrotoluene

DNT = Dinitrotoluene

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazacyclohexane

TCDD = Tetrachlorodibenzodioxin

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

RG = Remedial Goal

T-RSL = Tap Water RSL (USEPA, October 2007)

(1) =Not identified as COPC in GW

(2) =Not detected in groundwater

(3) = Lead criteria are Action Levels; see USEPA Region III guidance

(4) = SSL RG values for soil-to-groundwater migration pathway calculated with SSL equation using calculated GW RGs for 2,4,6-TNT, DNT Mixture, and RDX from Area A as target groundwater concentrations (see Tables G.2-2a - G.2-2c in URS, 2008)

(5) = Soil SSL RG values for soil-to-groundwater migration pathway calculated with SSL equation using T-RSLs as target groundwater concentrations (see Tables G.2-2d - G.2-2i in URS, 2008)

Based on the SWMU 54 RFI/CMS Report, Final Document (URS, 2008), IMs were performed at SMWU 54 to mitigate the threat of a contaminant release, migration and/or exposure to the public and the environment in accordance with Part II (D)(11-21) IM of the *RFAAP Corrective Action Permit* (USEPA, 2000a). The measures included:

1. **Site Preparation.**
2. **Contaminant Delineation.** Delineation of propellant ash material and grossly-contaminated soil under the sludge material and excavation of the delineated area such that the remaining soil is below the selected remedial goals (RGs).
3. **Waste Characterization & Off-site Disposal.**
4. **Confirmation Sampling.** Samples will be collected after removal of the sludge and grossly-contaminated soil to ensure that impacted soil has been removed. Excavation will continue if the RGs have not been met.
5. **Site Restoration.**
6. **Monitored Natural Attenuation of Groundwater. Covered under a separate IMWP.**

2.0 PRE-EXCAVATION SAMPLING

2.1 Delineation Sampling

Soil borings performed in previous site investigations were relocated using a Trimble GeoXT global positioning system (GPS). To redefine the extent of the hazardous soil locations, soil data was reviewed in conjunction with previous soil boring locations. As per the *SWMU 54 RFI/CMS Report* (URS, 2008), a 30' x 30' x 6' hazardous zone was plotted in Area A surrounding soil boring 54SB27A. Additionally, hazardous areas were also located in Area B surrounding soil borings 54SB42 and 54SB46. The Trimble GeoXT was also used to delineate the excavation boundaries of Area A and Area B.

2.2 Waste Characterization Sampling

Waste characterization/delineation samples were collected in Area A and Area B to confirm the CMS defined boundaries of hazardous and non-hazardous materials. Eighteen (18) grab samples, located within the CMS defined non-hazardous zones in Area A and Area B (54ADW01 through 54ADW07 and 54BDW08 through 54BDW18), were collected and sampled for explosives, pesticides, herbicides, TCLP metals, and TCLP reactivity, ignitibility, and corrosivity as pH.

Area A grab samples did not exceed the lead or 2,4-dinitrotoluene (2,4-DNT) hazardous level estimations [concentration in milligrams per kilogram (mg/kg) divided by 20].

Area B grab samples collected within the CMS defined non-hazardous zone including 54BDW08, 54BDW10, 54BDW11, and 54BDW17 exceeded TCLP Regulatory Limits (TCLPRLs) for 2,4-DNT (estimated) and lead.

Two composite soil samples were also collected from the CMS defined hazardous zones. Soil samples 54BHZ01 and 54AHZ02 were tested to confirm the presence of explosive material within the defined zones.

- 2,4-DNT was detected at 3.1 mg/kg in 54BHZ01, and was not detected in 54AHZ02.
- 2,4,6-Trinitrotoluene was detected at 0.536 mg/kg in 54BHZ01, and was not detected in 54AHZ02.
- Nitroglycerin (NG) was detected at 26.5 mg/kg in 54BHZ01, and was not detected in 54AHZ02.
- RDX and amino-DNTs were not detected in either sample.

These two samples confirmed initial presence of explosives within the Area B; however, explosives on the RG list were not detected in the Area A sample. Despite the lack of detection within the composite sample collected at Area A, there was surficial and shallow soil evidence of propellant ash located within the Area A CMS defined hazardous zone. Based on the results of these samples, it was decided additional characterization samples were required to delineate the site and characterize excavated waste.

Additional grab and composite samples were collected within the CMS defined hazardous zone in Area B. Samples 54BHZ02 through 54BHZ06 were collected and sampled for pesticides/herbicides, reactivity, TCLP metals, and explosives. The result of these samples indicated that lead was at, or near the proposed RG level and that detections of 2,4-DNT were

estimated below the TCLPRL. Samples 54BHZ10 and 54BHZ11 were collected at the location of 54BDW10 and 54BDW11, respectively, and tested for TCLP 2,4-DNT. The levels of leachable 2,4-DNT at both locations were non-detect. The delineation/waste characterization (IDW) sample locations for Area A and Area B can be found on **Figure 2-1** and **Figure 2-2**, respectively.

Based on the detection of lead and 2,4-DNT exceedances outside the original CMS defined hazardous zone in Area B samples, an x-ray fluorescence (XRF) sampling device was brought on site in February 2010 to further delineate surficial areas of lead and associated 2,4-DNT contamination prior to the initial excavation. Approximately 48 XRF surface soil samples were collected and processed in Area B. The XRF sampling defined two “zones” of surficial lead contamination located outside the CMS defined hazardous zone, in the central and southwestern portion of the site (**Figure 2-3**). After the surficial material had been removed and disposed of, the XRF was brought back on site in May for additional sampling. Approximately 39 samples were processed from 2-4 ft bgs to delineate subsurface, hazardous contamination outside the surficial XRF defined hazardous zones. The initial XRF defined hazardous zone in Area B was expanded into the northeastern portion of the site. **Figure 2-4** displays the updated zones of hazardous contamination within Area B. XRF sample results are displayed in **Table 2-1**.

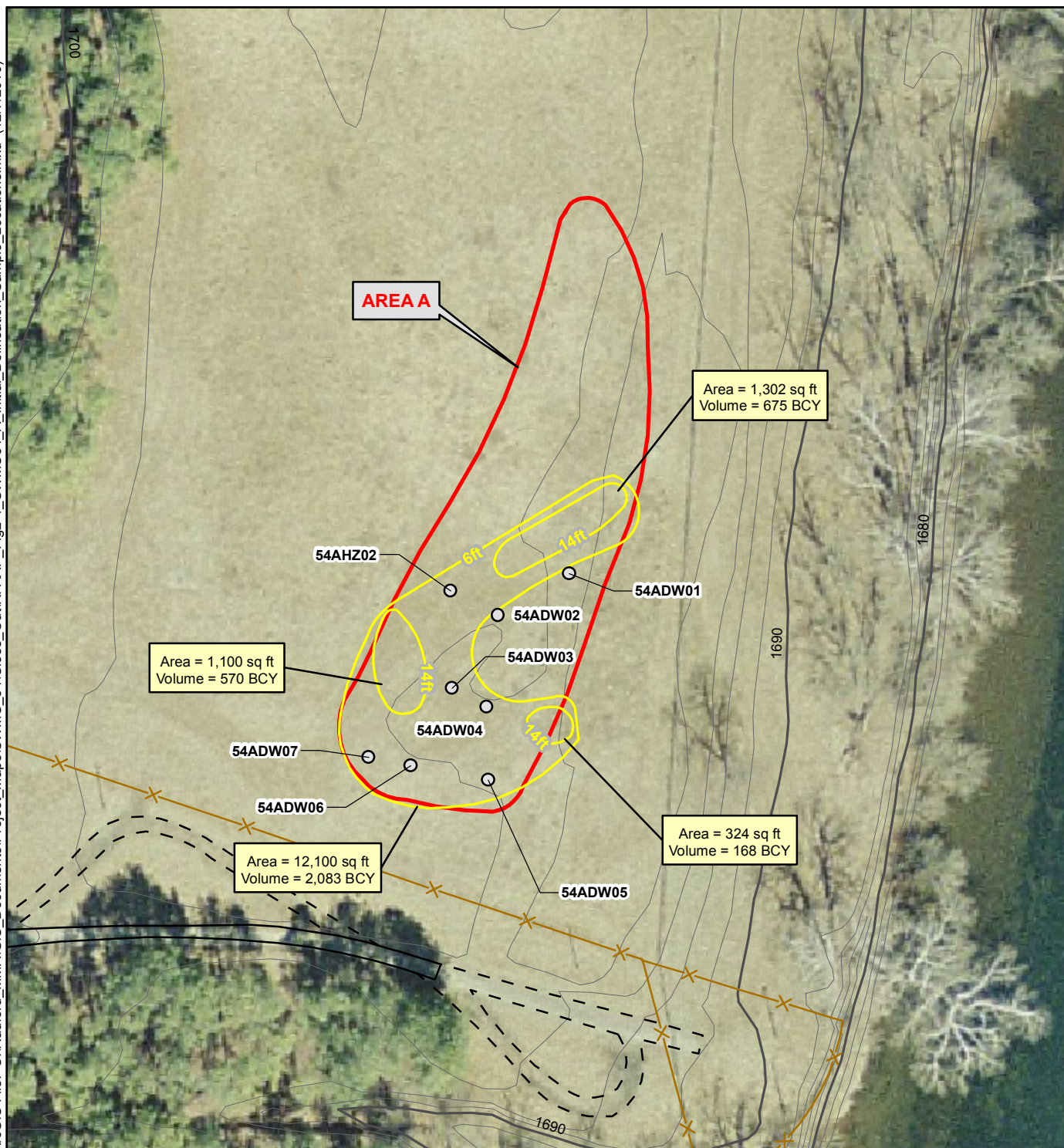
Based on the initial TCLPRL exceedances in samples collected outside the original CMS defined hazardous zone and XRF sampling in Area B, it was determined that isolated “pockets” of hazardous material were likely to exist in Areas A and B. As such, additional IDW samples were collected in Area A and Area B every 250 cubic yards of excavated material to ensure proper disposal of excavated materials. The waste disposal profiles are presented in **Appendix C-3**. The locations of the IDW samples in Area A and Area B can be found in **Figure 2-5** and **Figure 2-6**, respectively. Initial delineation and further IDW characterization samples are displayed in **Table 2-2** and **Table 2-3**, respectively.

2.3 Backfill and Top Soil Sampling

Soil used to backfill the excavation was obtained from a local contractor (JWB Contractors, LLC). Top soil used at the site was also obtained from JWB Contractors, LLC. Details of the sampling and results are described in this section.

Certified clean general fill and top soil were obtained from a local contractor, JWB Contractors, LLC of Dublin, Virginia. The borrow site was visited by site personnel and the material sampled and sent to a laboratory for analysis for target compound list (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), explosives, and target analyte list (TAL) metals. The results from the cover soil composite samples are presented in **Table 2-4**.

As shown in **Table 2-4**, results from the fill material and top soil samples indicated that VOCs were detected in two samples. Acetone was detected in two samples at levels below the residential screening level (r-SL). SVOCs, explosives, pesticides, and PCBs were not detected in any sample. Metals were present at levels below the RFAAP facility-wide background concentrations with the exception of arsenic, beryllium, cadmium, iron, lead, mercury, and vanadium. One arsenic, one vanadium, and three iron concentrations tested above the r-SL.

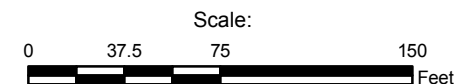


LEGEND

- Sample Location
- - - Dirt Road
- Paved Road
- + + + Railroad
- Fence
- 10 ft Contour Line
- Remedial Boundary
- SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.
- 2) Remedial boundaries and associated areas/volumes were obtained from SWMU 54 Final RCRA Facility Investigation/Corrective Measures Study Report, Volume I (September 2008, URS).

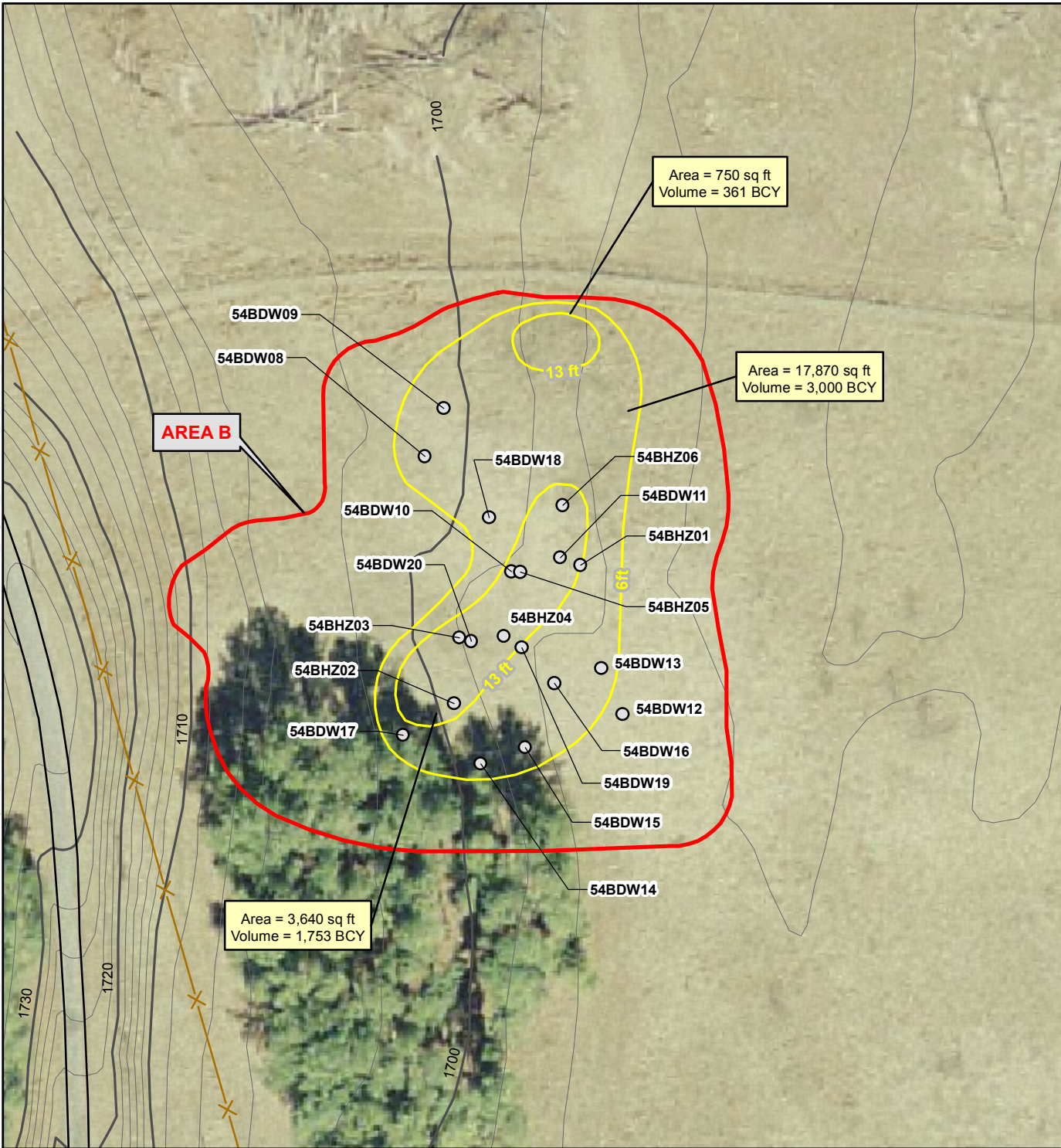


U.S. Army Corps of Engineers



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FIGURE 2-1
SWMU 54 Area A
Initial Delineation Sample Locations
 Radford Army Ammunition Plant,
 Radford, VA

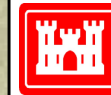
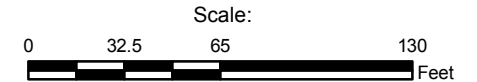


LEGEND

- Sample Location
- - - Dirt Road
- Paved Road
- + + + Railroad
- Fence
- 10 ft Contour Line
- Remedial Boundary
- SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.
- 2) Remedial boundaries and associated areas/volumes were obtained from SWMU 54 Final RCRA Facility Investigation/ Corrective Measures Study Report, Volume I (September 2008, URS).

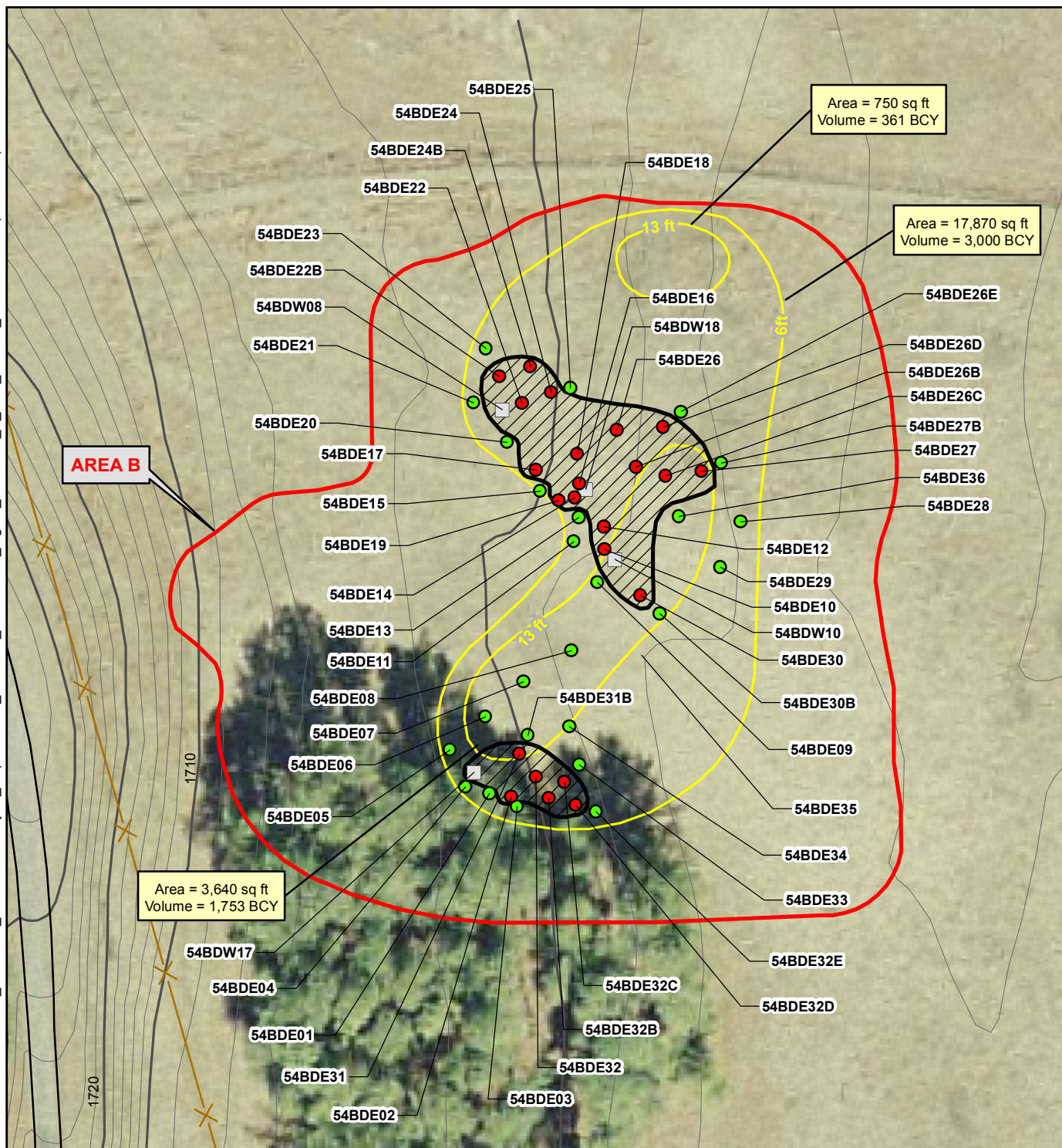


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FIGURE 2-2
SWMU 54 Area B
Initial Delineation Sample Locations
 Radford Army Ammunition Plant,
 Radford, VA



LEGEND

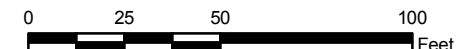
- Soil XRF Delineation Sample Location
Result > 400 ppm
- Soil XRF Delineation Sample Location
Result < 400 ppm
- Waste Characterization Sample Location
- - - Dirt Road
- Paved Road
- +— Railroad
- Fence
- 10 ft Contour Line
- Remedial Boundary
- SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.
- 2) Remedial boundaries and associated areas/volumes were obtained from SWMU 54 Final RCRA Facility Investigation/Corrective Measures Study Report, Volume I (September 2008, URS).



Scale:

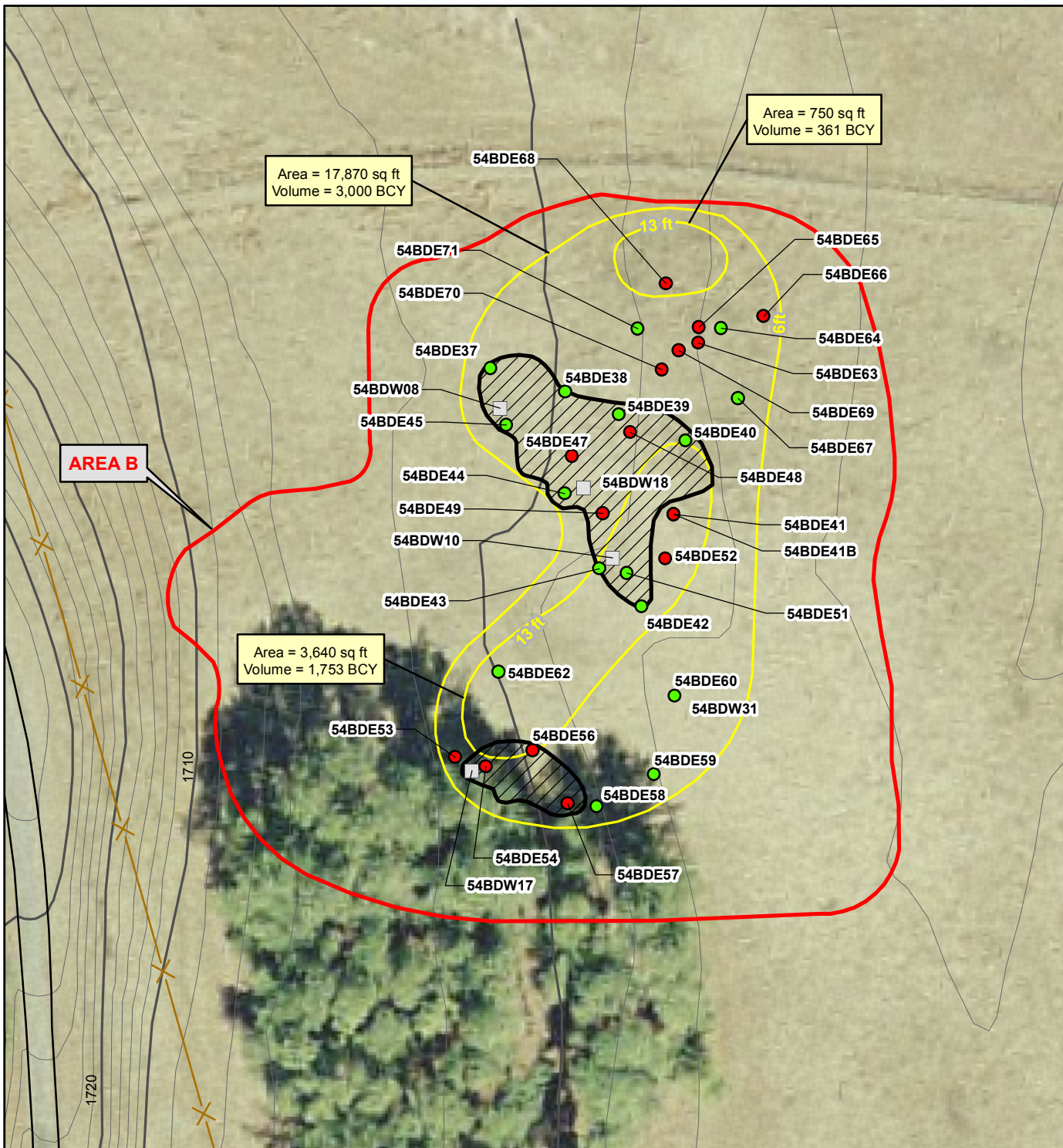


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FIGURE 2-3
SWMU 54 Area B
February 2010 XRF Delineation Results
 Radford Army Ammunition Plant,
 Radford, VA



LEGEND

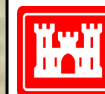
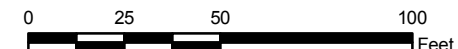
- Soil XRF Delineation Sample Location
Result < 400 ppm
- Soil XRF Delineation Sample Location
Result > 400 ppm
- Waste Characterization Sample Location
- Dirt Road
- Paved Road
- Railroad
- Fence
- 10 ft Contour Line
- Remedial Boundary
- SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.
- 2) Remedial boundaries and associated areas/volumes were obtained from SWMU 54 Final RCRA Facility Investigation/ Corrective Measures Study Report, Volume I (September 2008, URS).



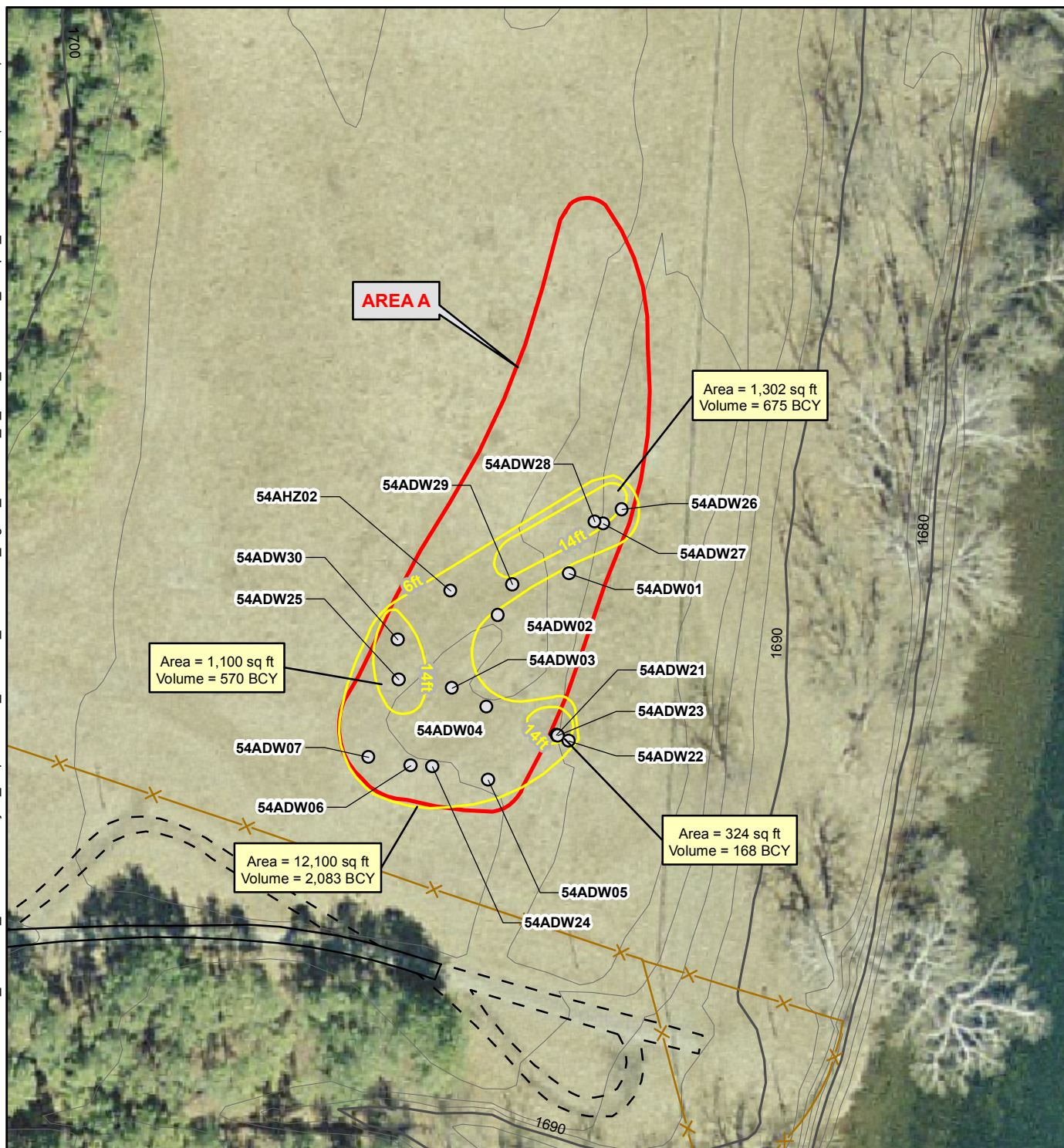
Scale:



U.S. Army Corps of Engineers



FIGURE 2-4
SWMU 54 Area B
May 2010 XRF Delineation Results
 Radford Army Ammunition Plant,
 Radford, VA

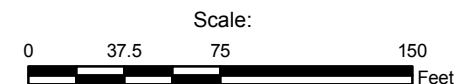


LEGEND

- Sample Location
- - - Dirt Road
- Paved Road
- + + + Railroad
- Fence
- 10 ft Contour Line
- Remedial Boundary
- SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.
- 2) Remedial boundaries and associated areas/volumes were obtained from SWMU 54 Final RCRA Facility Investigation/Corrective Measures Study Report, Volume I (September 2008, URS).

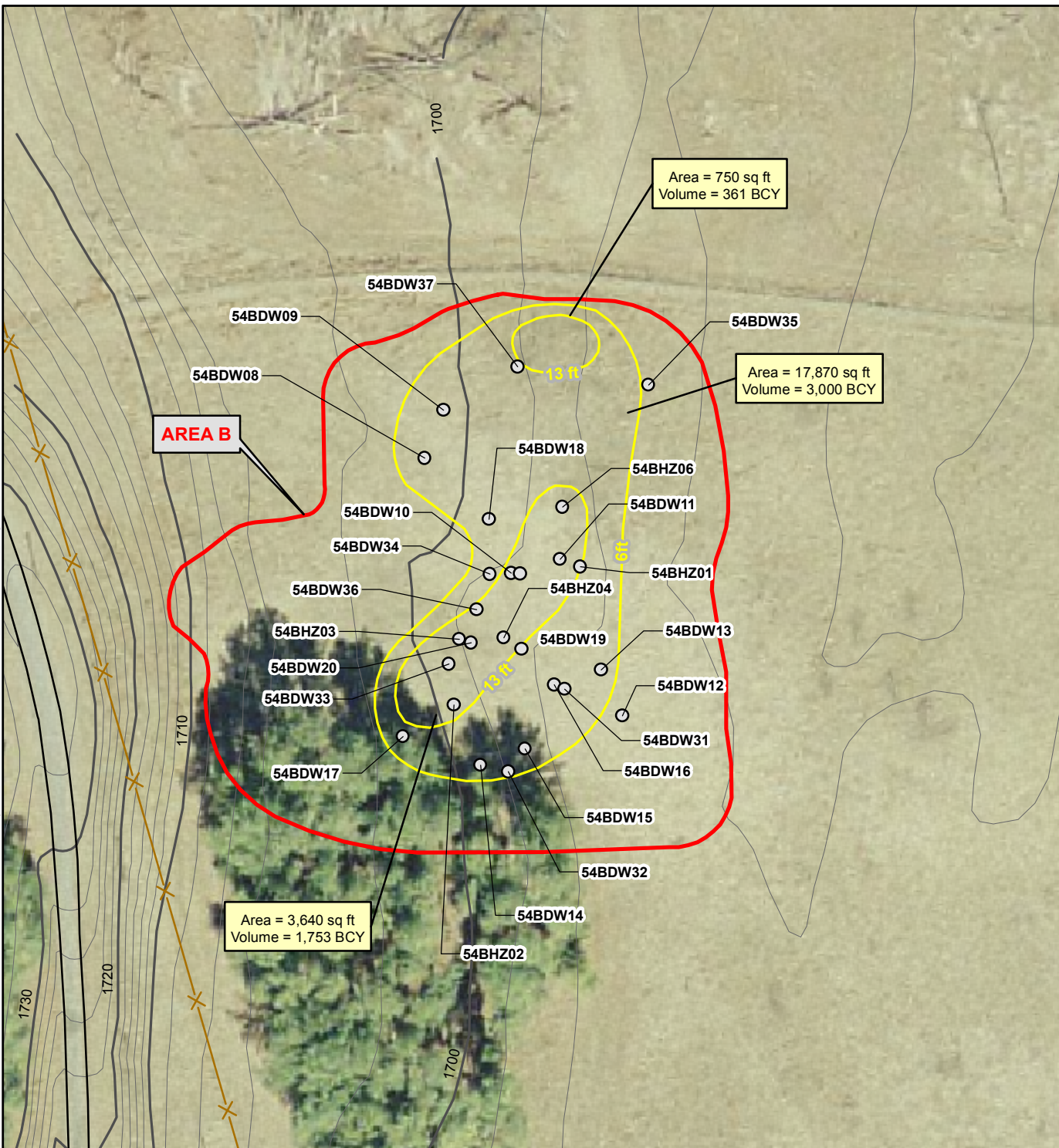


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FIGURE 2-5
SWMU 54 Area A
Final Delineation Sample Locations
 Radford Army Ammunition Plant,
 Radford, VA

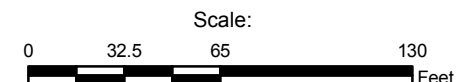


LEGEND

- Sample Location
- - - Dirt Road
- Paved Road
- + + + Railroad
- Fence
- 10 ft Contour Line
- Remedial Boundary
- SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County Planning, VA Planning & GIS Services.
- 2) Remedial boundaries and associated areas/volumes were obtained from SWMU 54 Final RCRA Facility Investigation/ Corrective Measures Study Report, Volume I (September 2008, URS).



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FIGURE 2-6
SWMU 54 Area B
Final Delineation Sample Locations
 Radford Army Ammunition Plant,
 Radford, VA

Table 2-1
SWMU 54 XRF Delineation
Page 1 of 2

Date	Sample ID	Depth (ft.)	Pb (ppm)	Pb +/-
3-Feb-10	54ADE1	0-1	178	5
3-Feb-10	54ADE2	0-1	608	10
3-Feb-10	54ADE3	0-1	22	3
3-Feb-10	54ADE4	0-1	208	6
3-Feb-10	54ADE5	0-1	220	6
3-Feb-10	54ADE6	0-1	41	4
3-Feb-10	54ADE7	0-1	47	4
3-Feb-10	54ADE8	0-1	67	4
3-Feb-10	54ADE9	0-1	138	6
3-Feb-10	54ADE10	0-1	6942	77
3-Feb-10	54ADE11	0-1	240	8
3-Feb-10	54ADE12	0-1	2127	31
3-Feb-10	54ADE13	0-1	355	9
3-Feb-10	54ADE14	0-1	2048	28
3-Feb-10	54ADE15	0-1	56	4
3-Feb-10	54ADE16	0-1	3162	38
3-Feb-10	54ADE17	0-1	549	11
3-Feb-10	54ADE18	0-1	1268	20
3-Feb-10	54ADE19	0-1	2072	29
3-Feb-10	54ADE20	0-1	26	3
3-Feb-10	54ADE21	0-1	27	3
3-Feb-10	54ADE22	0-1	2402	31
3-Feb-10	54ADE22b	0-1	3611	44
3-Feb-10	54ADE23	0-1	143	6
3-Feb-10	54ADE24	0-1	1392	22
3-Feb-10	54ADE24b	0-1	585	12
3-Feb-10	54ADE25	0-1	60	4
3-Feb-10	54ADE26	0-1	665	13
3-Feb-10	54ADE26b	0-1	2490	33
3-Feb-10	54ADE26c	0-1	1045	17
3-Feb-10	54ADE26d	0-1	1930	27
3-Feb-10	54ADE26e	0-1	337	8
3-Feb-10	54ADE27	0-1	1207	19
3-Feb-10	54ADE27b	0-1	247	7
3-Feb-10	54ADE28	0-1	58	5
3-Feb-10	54ADE29	0-1	246	8
3-Feb-10	54ADE30	0-1	554	21
3-Feb-10	54ADE30b	0-1	62	5
3-Feb-10	54ADE31	0-1	986	16
3-Feb-10	54ADE31b	0-1	196	7
3-Feb-10	54ADE32	0-1	1228	19
3-Feb-10	54ADE32b	0-1	3577	43
3-Feb-10	54ADE32c	0-1	835	16
3-Feb-10	54ADE32d	0-1	1653	28

Table 2-1
SWMU 54 XRF Delineation
Page 2 of 2

Date	Sample ID	Depth (ft.)	Pb (ppm)	Pb +/-
3-Feb-10	54ADE32e	0-1	30	3
3-Feb-10	54ADE33	0-1	78	5
3-Feb-10	54ADE34	0-1	49	4
3-Feb-10	54ADE36	0-1	275	8
4-May-10	54BDE37	4 ft bgs	44	5
4-May-10	54BDE38	4 ft bgs	16	4
4-May-10	54BDE39	4 ft bgs	20	5
4-May-10	54BDE40	4 ft bgs	70	6
4-May-10	54BDE41	4 ft bgs	2003	33
4-May-10	54BDE42	4 ft bgs	27	5
4-May-10	54BDE41b	4 ft bgs	1183	22
4-May-10	54BDE43	4 ft bgs	32	5
4-May-10	54BDE44	4 ft bgs	14	4
4-May-10	54BDE45	4 ft bgs	12	4
4-May-10	54BDE46	6 ft bgs	0	12
4-May-10	54BDE47	6 ft bgs	1296	22
4-May-10	54BDE48	6 ft bgs	938	18
4-May-10	54BDE49	6 ft bgs	2968	42
4-May-10	54BDE50	6 ft bgs	0	15
4-May-10	54BDE51	6 ft bgs	28	5
4-May-10	54BDE52	6 ft bgs	1199	21
4-May-10	54BDE53	4 ft bgs	2709	41
4-May-10	54BDE54	4 ft bgs	2467	37
4-May-10	54BDE55	4 ft bgs	112	7
4-May-10	54BDE56	4 ft bgs	1876	29
4-May-10	54BDE57	6 ft bgs	2611	39
4-May-10	54BDE41b	4 ft bgs	1210	21
4-May-10	54BDE58	4 ft bgs	62	5
4-May-10	54BDE59	4 ft bgs	135	7
4-May-10	54BDE60	4 ft bgs	293	9
4-May-10	54BDE61	4 ft bgs	0	12
4-May-10	54BDE62	4 ft bgs	217	8
4-May-10	54BDE63	3 ft bgs	1374	21
4-May-10	54BDE64	2 ft bgs	160	7
4-May-10	54BDE65	2 ft bgs	1164	21
4-May-10	54BDE66	4 ft bgs	24	5
5-May-10	54BDE66	4 ft bgs	884	17
5-May-10	54BDE67	2 ft bgs	311	9
6-May-10	54BDE68	3 ft bgs	428	11
6-May-10	54BDE69	2 ft bgs	710	14
6-May-10	54BDE70	2 ft bgs	909	17
6-May-10	54BDE71	7 ft bgs	20	4
6-May-10	54BDE72	4 ft bgs	1290	22
6-May-10	54BDE73	4 ft bgs	36	4

Table 2-2
Initial Delineation Samples and IDW
Page 1 of 5

Analyte	Sample ID Sample Date Sample Depth			54ADW01 1/13/10 1-2					54ADW02 1/13/10 1-2					54ADW03 1/13/10 1-2					54ADW04 1/13/10 1-2					54ADW05 1/13/10 1-2					54ADW06 1/13/10 1-2																			
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL															
VOCs (ug/kg)	Samples were not tested for this group.																																															
SVOCs (ug/kg)	Samples were not tested for this group.																																															
PAHs (ug/kg)	Samples were not tested for this group.																																															
PCBs (mg/kg)	Samples were not tested for this group.																																															
Pesticides (ug/kg)																																																
alpha-Chlordane	na	na	na	1.93	UJ		0.385	1.93	1.89	UJ		0.377	1.89	1.86	UJ		0.373	1.86	1.34	J		0.378	1.89	1.94	UJ		0.387	1.94	1.91	UJ		0.382	1.91															
Endosulfan sulfate	na	na	na	1.38	J		0.385	1.93	1.89	UJ		0.377	1.89	1.86	UJ		0.373	1.86	1.89	UJ		0.378	1.89	1.94	UJ		0.387	1.94	1.91	UJ		0.382	1.91															
Explosives (mg/kg)																																																
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25															
2,4,6-Trinitrotoluene	7.9	1.9	na	0.25	U		0.1	0.25	1.18			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.295			0.1	0.25	4.83		0.1	0.25																
2,4-Dinitrotoluene	120	12	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.843			0.1	0.25	0.629			0.1	0.25															
2,6-Dinitrotoluene	62	6.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.19	J		0.1	0.25	0.39			0.1	0.25															
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		0.1	0.25	0.221	J		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.157	J		0.1	0.25	0.564			0.1	0.25															
2-Nitrotoluene	13	2.9	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25															
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25															
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		0.1	0.25	0.126	J		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.136	J		0.1	0.25	0.758			0.1	0.25															
4-Nitrotoluene	110	3	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25															
HMX	4900	380	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.381			0.1	0.25	0.158	J		0.1	0.25															
Nitrobenzene	28	3.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25															
Nitroglycerin	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	11.8			1	2.5	12.6		1	2.5																
PETN	na	na	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25															
Herbicides (ug/kg)																																																
2,4,5-T	620000	61000	na	4.66	UJ		2.33	4.66	23.1	J		2.33	4.67	4.52	UJ		2.26	4.52	4.68	UJ		2.34	4.68	20.7			2.37	4.74	30.3	J		2.36	4.71															
Metals (mg/kg)																																																
Barium	19000	1500	209	680			25	100	890			25	100	659			25	100	805			25	100	1690			25	100	1160			25	100															
Cadmium	81	7	0.69	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100															
Lead	800	400	26.8	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	3120			100	1000	2210			100	1000															
Misc.																																																
pH	na	na	na	7.59	JK	B, EMPC	NA	NA	7.91	J	B	NA	NA	8.03	JK	B, EMPC	NA	NA	8.04			NA	NA	7.65			NA	NA	8.13	J	B	NA	NA															

12	J	Shading and black font indicates an i-SL exceedance.
12	J	Bold outline indicates an r-SL exceedance.
12	J	Bold, underlined font indicates a Background exceedance.
12	12	Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.EMPC - The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

SL/SSL source: ORNL Regional Screening Table. April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.

BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

i-SL - Industrial Screening Level

r-SL - Residential Screening Level

BTAG - Biological Technical Assistance Group

MDL - Method Detection Limit

MRL - Minimum Reporting Limit

NT - Not Tested

SSL - Soil Screening Level

B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

J - Estimated: The analyte was positively identified; the quantitation is estimation.

K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.

P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

Q - One or more quality control criteria failed.

U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

UJ - Not detected, quantitation limit may be inaccurate or imprecise.

Table 2-2
Initial Delineation Samples and IDW
Page 2 of 5

Analyte	Sample ID Sample Date Sample Depth			54ADW07 1/13/10 1-2					54AHZ02 1/14/10 1-2					54BDW08 1/14/10 1-2					54BDW09 1/14/10 1-2					54BDW10 1/14/10 1-2					54BDW11 1/14/10 1-2				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)	Samples were not tested for this group.																																
SVOCs (ug/kg)	Samples were not tested for this group.																																
PAHs (ug/kg)	Samples were not tested for this group.																																
PCBs (mg/kg)	Samples were not tested for this group.																																
Pesticides (ug/kg)																																	
alpha-Chlordane	na	na	na	1.85	UJ		0.37	1.85	NT					5.46	J		1.87	9.35	1.86	U		0.373	1.86	67.6			0.354	1.77	93.1	J		0.392	1.96
Endosulfan sulfate	na	na	na	1.85	UJ		0.37	1.85	NT					9.35	UJ		1.87	9.35	1.86	U		0.373	1.86	1.77	U		0.354	1.77	1.96	U		0.392	1.96
Explosives (mg/kg)																																	
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
2,4,6-Trinitrotoluene	7.9	1.9	na	0.617			0.1	0.25	0.25	U		0.1	0.25	1.77	J		0.1	0.25	0.677			0.1	0.25	12.1			2	5	380		10	25	
2,4-Dinitrotoluene	120	12	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	2.43	J		0.1	0.25	0.25	U		0.1	0.25	5.61			0.1	0.25	3.8			0.1	0.25
2,6-Dinitrotoluene	62	6.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.317	J		0.1	0.25	0.25	U		0.1	0.25	0.932	J		0.1	0.25	1.11			0.1	0.25
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.26	J		0.1	0.25	0.25	U		0.1	0.25	2.87			0.1	0.25	4			0.1	0.25
2-Nitrotoluene	13	2.9	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.269			0.1	0.25	0.25	U		0.1	0.25	4.05			0.1	0.25	5.18			0.1	0.25
4-Nitrotoluene	110	3	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
HMX	4900	380	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	1.78	J		0.1	0.25	0.18	J		0.1	0.25	92.2			2	5	105			10	25
Nitrobenzene	28	3.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
Nitroglycerin	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	10.5			0.5	1.25	1.96			0.1	0.25	34.7			2	5	54.5		10	25	
PETN	na	na	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
Herbicides (ug/kg)																																	
2,4,5-T	620000	61000	na	4.54	UJ		2.27	4.54	NT					10.1	P		2.33	4.66	4.56	U		2.28	4.56	62.5	UQ		2.17	4.33	97.2	UQ		2.36	4.73
Metals (mg/kg)																																	
Barium	19000	1500	209	1410			25	100	NT					2100			25	100	502			25	100	1610			25	100	1840		25	100	
Cadmium	81	7	0.69	100	U		25	100	NT					30.4	J		25	100	100	U		25	100	100	U		25	100	100	U		25	100
Lead	800	400	26.8	269	J		100	1000	NT					87600			1000	10000	1000	U		100	1000	9200			100	1000	3360		100	1000	
Misc.																																	
pH	na	na	na	8.36	J	J	NA	NA	NT					8.04	J	J	NA	NA	7.03	J	J	NA	NA	8.42	J	B	NA	NA	7.71	J	J	NA	NA

12	J	Shading and black font indicates an i-SL exceedance.
12	J	Bold outline indicates an r-SL exceedance.
12	J	Bold, underlined font indicates a Background exceedance.
12	12	Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.EMPC - The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

SL/SSL source: ORNL Regional Screening Table. April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.

BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

i-SL - Industrial Screening Level

r-SL - Residential Screening Level

BTAG - Biological Technical Assistance Group

MDL - Method Detection Limit

MRL - Minimum Reporting Limit

NT - Not Tested

SSL - Soil Screening Level

B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

J - Estimated: The analyte was positively identified; the quantitation is estimation.

K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.

P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

Q - One or more quality control criteria failed.

U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

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Table 2-2
Initial Delineation Samples and IDW
Page 3 of 5

Analyte	Sample ID Sample Date Sample Depth			54BDW12 1/14/10 1-2					54BDW13 1/14/10 1-2					54BDW14 1/14/10 1-2					54BDW15 1/14/10 1-2					54BDW16 1/14/10 1-2					54BDW17 1/14/10 1-2												
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL								
VOCs (ug/kg)	Samples were not tested for this group.																																								
SVOCs (ug/kg)	Samples were not tested for this group.																																								
PAHs (ug/kg)	Samples were not tested for this group.																																								
PCBs (mg/kg)	Samples were not tested for this group.																																								
Pesticides (ug/kg)																																									
alpha-Chlordane	na	na	na	0.631	J		0.383	1.92	1.86	UJ		0.371	1.86	24.5	J		0.393	1.96	1.06	J		0.377	1.88	2.03	UJ		0.407	2.03	3.23	J		0.392	1.96								
Endosulfan sulfate	na	na	na	1.92	UJ		0.383	1.92	1.86	UJ		0.371	1.86	1.96	UJ		0.393	1.96	1.88	UJ		0.377	1.88	2.03	UJ		0.407	2.03	1.96	U		0.392	1.96								
Explosives (mg/kg)																																									
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25								
2,4,6-Trinitrotoluene	7.9	1.9	na	0.57			0.0998	0.25	1.63			0.0998	0.25	5.64	J		0.1	0.25	0.339			0.1	0.25	2.19			0.1	0.25	4.97			0.1	0.25								
2,4-Dinitrotoluene	120	12	na	0.113	J		0.0998	0.25	0.159	J		0.0998	0.25	0.878			0.1	0.25	0.25	U		0.1	0.25	0.248	J		0.1	0.25	6.28			0.1	0.25								
2,6-Dinitrotoluene	62	6.1	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.205	J		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.863	J		0.1	0.25								
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	1.37	J		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.929			0.1	0.25								
2-Nitrotoluene	13	2.9	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25								
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	2.31	J		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25								
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.823			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.987	J		0.1	0.25								
4-Nitrotoluene	110	3	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25								
HMX	4900	380	na	0.25	U		0.0998	0.25	0.324			0.0998	0.25	1.22			0.1	0.25	0.316			0.1	0.25	0.192	J		0.1	0.25	3.48	J		0.1	0.25								
Nitrobenzene	28	3.1	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.158	J		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25								
Nitroglycerin	6.2	0.61	na	0.25	U		0.0998	0.25	4.63			0.0998	0.25	10.6			0.5	1.25	6.51			0.1	0.25	2.01			0.1	0.25	12.6		1	2.5									
PETN	na	na	na	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25								
Herbicides (ug/kg)																																									
2,4,5-T	620000	61000	na	4.62	U		2.31	4.62	4.5	U		2.25	4.5	22	P		2.38	4.75	4.59	U		2.3	4.59	3.39	J		2.48	4.96	64.5	P		12	24.1								
Metals (mg/kg)																																									
Barium	19000	1500	209	553			25	100	715			25	100	2250			25	100	723			25	100	953			25	100	2300			25	100								
Cadmium	81	7	0.69	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	40.4	J		25	100								
Lead	800	400	26.8	1000	U		100	1000	170	J		100	1000	2390			100	1000	1000	U		100	1000	1000	U		100	1000	154000		2000	20000									
Misc.																																									
pH	na	na	na	7.73	U		NA	NA	8.11	J	B	NA	NA	8.04	U		NA	NA	7.87			NA	NA	8.02	J	B	NA	NA	7.77			NA	NA								

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The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

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Table 2-2
Initial Delineation Samples and IDW
Page 4 of 5

Analyte	Sample ID Sample Date Sample Depth			54BDW18 1/14/10 1-2					54BHZ01 1/14/10 1-2					54BHZ02 1/28/10 1-2					54BHZ03 1/28/10 1-2					54BHZ04 1/28/10 1-2					54BHZ05 1/28/10 1-2														
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL										
VOCs (ug/kg)	Samples were not tested for this group.																																										
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PCBs (mg/kg)	Samples were not tested for this group.																																										
Pesticides (ug/kg)																																											
alpha-Chlordane	na	na	na	10.7	J		1.75	8.76	NT					1.84	UJ		0.368	1.84	1.97	UJ		0.395	1.97	1.88	UJ		0.377	1.88	1.99	UJ		0.398	1.99										
Endosulfan sulfate	na	na	na	8.76	U		1.75	8.76	NT					1.84	UJ		0.368	1.84	1.97	UJ		0.395	1.97	1.88	UJ		0.377	1.88	1.99	UJ		0.398	1.99										
Explosives (mg/kg)																																											
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.1	0.25	NT					0.25	UJ		0.0998	0.25	0.246	U		0.0985	0.246	0.117	J		0.0991	0.248	0.25	U		0.0998	0.25										
2,4,6-Trinitrotoluene	7.9	1.9	na	4.98			0.1	0.25	0.536	J		0.0998	0.25	0.312	J		0.0998	0.25	0.246	U		0.0985	0.246	4.17			0.0991	0.248	1.04			0.0998	0.25										
2,4-Dinitrotoluene	120	12	na	0.944			0.1	0.25	3.1	J		0.0998	0.25	0.559	J		0.0998	0.25	0.246	U		0.0985	0.246	1.14			0.0991	0.248	0.25	U		0.0998	0.25										
2,6-Dinitrotoluene	62	6.1	na	0.28			0.1	0.25	0.309	J		0.0998	0.25	0.224	J		0.0998	0.25	0.246	U		0.0985	0.246	0.514			0.0991	0.248	0.25	U		0.0998	0.25										
2-amino-4,6-Dinitrotoluene	200	15	na	0.674			0.1	0.25	0.25	U		0.0998	0.25	0.4	J		0.0998	0.25	0.246	U		0.0985	0.246	1.08			0.0991	0.248	0.25	U		0.0998	0.25										
2-Nitrotoluene	13	2.9	na	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	UJ		0.0998	0.25	0.246	U		0.0985	0.246	0.242	J		0.0991	0.248	0.25	U		0.0998	0.25										
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	UJ		0.0998	0.25	0.246	U		0.0985	0.246	0.248	U		0.0991	0.248	0.25	U		0.0998	0.25										
4-amino-2,6-Dinitrotoluene	190	15	na	0.795			0.1	0.25	0.25	U		0.0998	0.25	0.342	J		0.0998	0.25	0.246	U		0.0985	0.246	1.07			0.0991	0.248	0.25	U		0.0998	0.25										
4-Nitrotoluene	110	3	na	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	UJ		0.0998	0.25	0.246	U		0.0985	0.246	0.302			0.0991	0.248	0.25	U		0.0998	0.25										
HMX	4900	380	na	180			10	25	4.19	J		0.0998	0.25	99.5	J		0.0998	0.25	0.107	J		0.0985	0.246	1.72			0.0991	0.248	0.25	U		0.0998	0.25										
Nitrobenzene	28	3.1	na	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	UJ		0.0998	0.25	0.246	U		0.0985	0.246	0.248	U		0.0991	0.248	0.25	U		0.0998	0.25										
Nitroglycerin	6.2	0.61	na	23.7			1	2.5	26.5	U		0.998	2.5	12.5	J		0.0998	0.25	0.246	U		0.0985	0.246	3.15			0.0991	0.248	0.958			0.0998	0.25										
PETN	na	na	na	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	37.3	J		0.0998	0.25	0.246	U		0.0985	0.246	4.26			0.0991	0.248	5.39			0.0998	0.25										
Herbicides (ug/kg)																																											
2,4,5-T	620000	61000	na	55	P		10.7	21.5	NT					4.49	UQ		2.24	4.49	4.95	UQ		2.47	4.95	4.98	UQ		2.49	4.98	4.77	UQ		2.39	4.77										
Metals (mg/kg)																																											
Barium	19000	1500	209	1690			25	100	NT					1420			25	100	792			25	100	1900			25	100	979			25	100										
Cadmium	81	7	0.69	100	U		25	100	NT					100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100										
Lead	800	400	26.8	6550			100	1000	NT					540	J		100	1000	1000	U		100	1000	4330			200	2000	273	J		100	1000										
Misc.																																											
pH	na	na	na	8.55			NA	NA	NT					7.95			NA	NA	7.23			NA	NA	7.43			NA	NA	7.5			NA	NA										

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SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

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Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.EMPC - The ion-abundance ratio between the two characteristic PCDD/PCDF ions was outside accepted ranges. The detected PCDD/PCDF was reported as an estimated maximum possible concentration (EMPC).

SL/SSL source: ORNL Regional Screening Table, April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.

BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

i-SL - Industrial Screening Level

r-SL - Residential Screening Level

BTAG - Biological Technical Assistance Group

MDL - Method Detection Limit

MRL - Minimum Reporting Limit

NT - Not Tested

SSL - Soil Screening Level

B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

J - Estimated: The analyte was positively identified; the quantitation is estimation.

K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.

P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

Q - One or more quality control criteria failed.

U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

UJ - Not detected, quantitation limit may be inaccurate or imprecise.

Table 2-2
Initial Delineation Samples and IDW
Page 5 of 5

Analyte	Sample ID Sample Date Sample Depth			54BHZ06 1/28/10 1-2				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg)	Samples were not tested for this group.							
SVOCs (ug/kg)	Samples were not tested for this group.							
PAHs (ug/kg)	Samples were not tested for this group.							
PCBs (mg/kg)	Samples were not tested for this group.							
Pesticides (ug/kg)								
alpha-Chlordane	na	na	na	1.91	UJ		0.382	1.91
Endosulfan sulfate	na	na	na	1.91	UJ		0.382	1.91
Explosives (mg/kg)								
1,3,5-Trinitrobenzene	2700	220	na	0.247	U		0.0988	0.247
2,4,6-Trinitrotoluene	7.9	1.9	na	0.247	U		0.0988	0.247
2,4-Dinitrotoluene	120	12	na	0.189	J		0.0988	0.247
2,6-Dinitrotoluene	62	6.1	na	0.247	U		0.0988	0.247
2-amino-4,6-Dinitrotoluene	200	15	na	0.247	U		0.0988	0.247
2-Nitrotoluene	13	2.9	na	0.247	U		0.0988	0.247
3-Nitrotoluene	6.2	0.61	na	0.247	U		0.0988	0.247
4-amino-2,6-Dinitrotoluene	190	15	na	0.247	U		0.0988	0.247
4-Nitrotoluene	110	3	na	0.247	U		0.0988	0.247
HMX	4900	380	na	0.251			0.0988	0.247
Nitrobenzene	28	3.1	na	0.247	U		0.0988	0.247
Nitroglycerin	6.2	0.61	na	0.696			0.0988	0.247
PETN	na	na	na	2.54			0.0988	0.247
Herbicides (ug/kg)								
2,4,5-T	620000	61000	na	4.67	UQ		2.34	4.67
Metals (mg/kg)								
Barium	19000	1500	209	1200			25	100
Cadmium	81	7	0.69	100	U		25	100
Lead	800	400	26.8	475	I		100	1000
Misc.								
pH	na	na	na	7.63			NA	NA

12	J
12	J

Shading and black font indicates an i-SL exceedance.

Bold outline indicates an r-SL exceedance.

12

I

Bold, underlined font indicates a Background exceedance.

12	12
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Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.

SL/SSL source: ORNL Regional Screening Table. April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.

BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

ug/kg - micrograms per kilogram

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i-SL - Industrial Screening Level

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MDL - Method Detection Limit

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B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

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

J - Estimated: The analyte was positively identified; the quantitation is estimation.

K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.

P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

Q - One or more quality control criteria failed.

U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

UJ - Not detected, quantitation limit may be inaccurate or imprecise.

Table 2-3
Additional Delineation Sample Results
Page 1 of 5

Analyte	Sample ID Sample Date Sample Depth			54ADW21 4/20/10 4-6					54ADW22 4/20/10 9-10					54ADW23 4/20/10 12-13					54ADW24 4/20/10 5-5					54ADW25 4/20/10 6-6					54ADW26 4/20/10 6-6				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg) Samples were not tested for this group.																																	
PAHs (ug/kg) Samples were not tested for this group.																																	
SVOCs (ug/kg)																																	
Pesticides (ug/kg)																																	
alpha-Chlordane	na	na	na	1.99	UJ		0.398	1.99	2.02	UJ		0.404	2.02	2.15	UJ		0.43	2.15	1.99	UJ		0.398	1.99	2.03	UJ		0.406	2.03	1.98	UJ		0.396	1.98
PCBs (mg/kg) Samples were not tested for this group.																																	
Explosives (mg/kg)																																	
1,3,5-Trinitrobenzene	2700	220	na	0.248	U		0.0992	0.248	0.176	J		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
2,4,6-Trinitrotoluene	7.9	1.9	na	0.248	U		0.0992	0.248	4.78			0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	2.19			0.0967	0.242	0.25	U		0.0999	0.25
2,4-Dinitrotoluene	120	12	na	0.248	U		0.0992	0.248	0.536			0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
2,6-Dinitrotoluene	62	6.1	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
2-amino-4,6-Dinitrotoluene	200	15	na	0.248	UQ		0.0992	0.248	0.912	UQ		0.0953	0.238	0.239	UQ		0.0955	0.239	0.244	UQ		0.0976	0.244	0.242	UQ		0.0967	0.242	0.25	UQ		0.0999	0.25
2-Nitrotoluene	13	2.9	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
3-Nitrotoluene	6.2	0.61	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
4-amino-2,6-Dinitrotoluene	190	15	na	0.248	U		0.0992	0.248	0.613			0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
4-Nitrotoluene	110	3	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
HMX	4900	380	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
Nitrobenzene	28	3.1	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
RDX	24	5.5	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
Tetryl	250	24	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
Nitroglycerin	6.2	0.61	na	0.248	U		0.0992	0.248	6.59			0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
PETN	na	na	na	0.248	U		0.0992	0.248	0.238	U		0.0953	0.238	0.239	U		0.0955	0.239	0.244	U		0.0976	0.244	0.242	U		0.0967	0.242	0.25	U		0.0999	0.25
Herbicides (ug/kg)																																	
2,4,5-T	620000	61000	na	4.75	U		2.38	4.75	5.01	U		2.51	5.01	5.33	U		2.67	5.33	4.94	U		2.47	4.94	4.98	U		2.49	4.98	4.33	U		2.16	4.33
Dalapon	1800000	180000	na	119	U		59.4	119	125	U		62.7	125	133	U		66.6	133	123	U		61.7	123	124	U		62.2	124	108	U		54.1	108
Dichlorprop	na	na	na	47.5	UQ		23.8	47.5	50.1	UQ		25.1	50.1	53.3	UQ		26.7	53.3	49.4	UQ		24.7	49.4	49.8	UQ		24.9	49.8	43.3	UQ		21.6	43.3
MCPA	31000	3100	na	4750	U		2380	4750	5010	U		2510	5010	5330	U		2670	5330	4940	U		2470	4940	4980	U		2490	4980	4330	U		2160	4330
Metals (mg/kg)																																	
Barium	19000	1500	209	517			25	100	650			25	100	617			25	100	695			25	100	799			25	100	408			25	100
Cadmium	81	7	0.69	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100
Chromium	150000	12000	65.3	27.4	J		25	200	26.9	J		25	200	26.2	J		25	200	33.7	J		25	200	33.4	J		25	200	26.3	J		25	200
Lead	800	400	26.8	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000
Misc.																																	
pH	na	na	na	7.6			NA	NA	6.62			NA	NA	7.21			NA	NA	8.76			NA	NA	6.83			NA	NA	6.67			NA	NA

12 J Shading and black font indicates an i-SL exceedance.

12 J Bold outline indicates an r-SL exceedance.

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12 12 Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

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SL/SSL source: ORNL Regional Screening Table. April 2009.

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

J - Estimated: The analyte was positively identified; the quantitation is estimation.

K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.

P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

Q - One or more quality control criteria failed.

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Table 2-3
Additional Delineation Sample Results
Page 2 of 5

Analyte	Sample ID Sample Date Sample Depth			54ADW27 4/20/10 10-10					54ADW28 4/20/10 13-13					54ADW29 4/20/10 3-3					54ADW30 4/20/10 3-3					54BDW08 1/14/10 1-2					54BDW09 1/14/10 1-2																																						
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL																																		
VOCs (ug/kg)																																		Samples were not tested for this group.																																	
PAHs (ug/kg)																																		Samples were not tested for this group.																																	
SVOCs (ug/kg)																																																																			
Pesticides (ug/kg)																																																																			
alpha-Chlordane																																		na	na	na	2.09	UJ		0.417	2.09	2.09	UJ		0.418	2.09	1.69	UJ		0.338	1.69	1.82	UJ		0.365	1.82	5.46	J		1.87	9.35	1.86	U		0.373	1.86	
PCBs (mg/kg)																																		Samples were not tested for this group.																																	
Explosives (mg/kg)																																																																			
1,3,5-Trinitrobenzene	2700	220	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	2.23			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
2,4,6-Trinitrotoluene	7.9	1.9	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	237	J		0.1	0.25	1.77	J		0.1	0.25	0.677			0.1	0.25																																		
2,4-Dinitrotoluene	120	12	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	3.3			0.1	0.25	2.43	J		0.1	0.25	0.25	U		0.1	0.25																																		
2,6-Dinitrotoluene	62	6.1	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	4.44			0.1	0.25	0.317	J		0.1	0.25	0.25	U		0.1	0.25																																		
2-amino-4,6-Dinitrotoluene	200	15	na	0.247	UQ		0.0988	0.247	0.237	UQ		0.0947	0.237	0.231	UQ		0.0923	0.231	4.39	UQ		0.1	0.25	0.26	J		0.1	0.25	0.25	U		0.1	0.25																																		
2-Nitrotoluene	13	2.9	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.376			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
3-Nitrotoluene	6.2	0.61	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
4-amino-2,6-Dinitrotoluene	190	15	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	6.48			0.1	0.25	0.269			0.1	0.25	0.25	U		0.1	0.25																																		
4-Nitrotoluene	110	3	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.827			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
HMX	4900	380	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	4.44			0.1	0.25	1.78	J		0.1	0.25	0.18	J		0.1	0.25																																		
Nitrobenzene	28	3.1	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
RDX	24	5.5	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.671			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
Tetryl	250	24	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
Nitroglycerin	6.2	0.61	na	0.247	U		0.0988	0.247	0.237	U		0.0947	0.237	0.231	U		0.0923	0.231	0.25	U		0.1	0.25	10.5		0.5	1.25	1.96			0.1	0.25																																			
PETN	na	na	na	0.247	U		0.0988	0.247	0.247			0.0947	0.237	0.231	U		0.0923	0.231	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																		
Herbicides (ug/kg)																																																																			
2,4,5-T	620000	61000	na	4.53	U		2.27	4.53	5.29	U		2.65	5.29	3.9	U		1.95	3.9	4.3	U		2.15	4.3	10.1	P		2.33	4.66	4.56	U		2.28	4.56																																		
Dalapon	1800000	180000	na	113	U		56.6	113	132	U		66.2	132	97.6	U		48.8	97.6	108	U		53.8	108	117	U		58.3	117	114	U		57	114																																		
Dichlorprop	na	na	na	45.3	UQ		22.7	45.3	52.9	UQ		26.5	52.9	39	UQ		19.5	39	43	UQ		21.5	43	46.6	UQ		23.3	46.6	45.6	UQ		22.8	45.6																																		
MCPA	31000	3100	na	4530	U		2270	4530	5290	U		2650	5290	3900	U		1950	3900	2250	J		2150	4300	4660	U		2330	4660	4560	U		2280	4560																																		
Metals (mg/kg)																																																																			
Barium	19000	1500	209	574			25	100	556			25	100	811			25	100	1000			25	100	2100		25	100	502			25	100																																			
Cadmium	81	7	0.69	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	30.4	J		25	100	100	U		25	100																																		
Chromium	150000	12000	65.3	27	J		25	200	25.5	J		25	200	200	U		25	200	34.8	J		25	200	200	U		25	200	200	U		25	200																																		
Lead	800	400	26.8	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	135	J		100	1000	87600		1000	10000	1000	U		100	1000																																			
Misc.																																																																			
pH	na	na	na	6.24			NA	NA	6.48			NA	NA	7.55			NA	NA	6.83			NA	NA	8.04	J	J	NA	NA	7.03	J	J	NA	NA																																		

12 J Shading and black font indicates an i-SL exceedance.

12 J Bold outline indicates an r-SL exceedance.

12 J Bold, underlined font indicates a Background exceedance.

12 12 Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.

SL/SSL source: ORNL Regional Screening Table. April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.

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ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

i-SL - Industrial Screening Level

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BTAG - Biological Technical Assistance Group

MDL - Method Detection Limit

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B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

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

J - Estimated: The analyte was positively identified; the quantitation is estimation.

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P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

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Table 2-3
Additional Delineation Sample Results
Page 3 of 5

Analyte	Sample ID Sample Date Sample Depth			54BDW10 1/14/10 1-2					54BDW11 1/14/10 1-2					54BDW12 1/14/10 1-2					54BDW13 1/14/10 1-2					54BDW14 1/14/10 1-2					54BDW15 1/14/10 1-2				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg) Samples were not tested for this group.																																	
PAHs (ug/kg) Samples were not tested for this group.																																	
SVOCs (ug/kg)																																	
Pesticides (ug/kg)																																	
alpha-Chlordane	na	na	na	67.6			0.354	1.77	93.1	J		0.392	1.96	0.631	J		0.383	1.92	1.86	UJ		0.371	1.86	24.5	J		0.393	1.96	1.06	J		0.377	1.88
PCBs (mg/kg) Samples were not tested for this group.																																	
Explosives (mg/kg)																																	
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
2,4,6-Trinitrotoluene	7.9	1.9	na	12.1			2	5	380			10	25	0.57			0.0998	0.25	1.63			0.0998	0.25	5.64	J		0.1	0.25	0.339			0.1	0.25
2,4-Dinitrotoluene	120	12	na	5.61			0.1	0.25	3.8			0.1	0.25	0.113	J		0.0998	0.25	0.159	J		0.0998	0.25	0.878			0.1	0.25	0.25	U		0.1	0.25
2,6-Dinitrotoluene	62	6.1	na	0.932	J		0.1	0.25	1.11			0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.205	J		0.1	0.25	0.25	U		0.1	0.25
2-amino-4,6-Dinitrotoluene	200	15	na	2.87			0.1	0.25	4			0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	1.37	J		0.1	0.25	0.25	U		0.1	0.25
2-Nitrotoluene	13	2.9	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	2.31	J		0.1	0.25	0.25	U		0.1	0.25
4-amino-2,6-Dinitrotoluene	190	15	na	4.05			0.1	0.25	5.18			0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.823			0.1	0.25	0.25	U		0.1	0.25
4-Nitrotoluene	110	3	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
HMX	4900	380	na	92.2			2	5	105			10	25	0.25	U		0.0998	0.25	0.324			0.0998	0.25	1.22			0.1	0.25	0.316			0.1	0.25
Nitrobenzene	28	3.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.158	J		0.1	0.25	0.25	U		0.1	0.25
RDX	24	5.5	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
Tetryl	250	24	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
Nitroglycerin	6.2	0.61	na	34.7			2	5	54.5			10	25	0.25	U		0.0998	0.25	4.63			0.0998	0.25	10.6			0.5	1.25	6.51			0.1	0.25
PETN	na	na	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0998	0.25	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25
Herbicides (ug/kg)																																	
2,4,5-T	620000	61000	na	62.5	UQ		2.17	4.33	97.2	UQ		2.36	4.73	4.62	U		2.31	4.62	4.5	U		2.25	4.5	22	P		2.38	4.75	4.59	U		2.3	4.59
Dalapon	1800000	180000	na	108	U		54.2	108	118	UJ		59.1	118	116	U		57.8	116	112	U		56.2	112	119	UJ		59.4	119	115	U		57.4	115
Dichlorprop	na	na	na	43.3	UQ		21.7	43.3	47.3	UQ		23.6	47.3	46.2	UQ		23.1	46.2	45	UQ		22.5	45	47.5	UQ		23.8	47.5	45.9	UQ		23	45.9
MCPA	31000	3100	na	4330	U		2170	4330	4730	UJ		2360	4730	4620	U		2310	4620	4500	U		2250	4500	4750	UJ		2380	4750	4590	U		2300	4590
Metals (mg/kg)																																	
Barium	19000	1500	209	1610			25	100	1840			25	100	553			25	100	715			25	100	2250			25	100	723			25	100
Cadmium	81	7	0.69	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100
Chromium	150000	12000	65.3	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200
Lead	800	400	26.8	9200			100	1000	3360			100	1000	1000	U		100	1000	170	J		100	1000	2390			100	1000	1000	U		100	1000
Misc.																																	
pH	na	na	na	8.42	J	B	NA	NA	7.71	J	J	NA	NA	7.73	U		NA	NA	8.11	J	B	NA	NA	8.04	U		NA	NA	7.87			NA	NA

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12 J Bold outline indicates an r-SL exceedance.

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ug/kg - micrograms per kilogram

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Table 2-3
Additional Delineation Sample Results
Page 4 of 5

Analyte	Sample ID Sample Date Sample Depth			54BDW16 1/14/10 1-2					54BDW17 1/14/10 1-2					54BDW18 1/14/10 1-2					54BDW19 2/3/10 1-2					54BDW20 2/3/10 1-2					54BDW31 5/6/10 6-8				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
VOCs (ug/kg) Samples were not tested for this group.																																	
PAHs (ug/kg) Samples were not tested for this group.																																	
SVOCs (ug/kg)																																	
Pesticides (ug/kg)																																	
alpha-Chlordane	na	na	na	2.03	UJ		0.407	2.03	3.23	J		0.392	1.96	10.7	J		1.75	8.76	2.06	UJ		0.412	2.06	2.02	UJ		0.405	2.02	1.85	UJ		0.369	1.85
PCBs (mg/kg) Samples were not tested for this group.																																	
Explosives (mg/kg)																																	
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
2,4,6-Trinitrotoluene	7.9	1.9	na	2.19			0.1	0.25	4.97			0.1	0.25	4.98			0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	1.69			0.1	0.25
2,4-Dinitrotoluene	120	12	na	0.248	J		0.1	0.25	6.28			0.1	0.25	0.944			0.1	0.25	0.338			0.0999	0.25	0.249	U		0.0996	0.249	0.11	J		0.1	0.25
2,6-Dinitrotoluene	62	6.1	na	0.25	U		0.1	0.25	0.863	J		0.1	0.25	0.28			0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		0.1	0.25	0.929			0.1	0.25	0.674			0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.159	J		0.1	0.25
2-Nitrotoluene	13	2.9	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		0.1	0.25	0.987	J		0.1	0.25	0.795			0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.152	J		0.1	0.25
4-Nitrotoluene	110	3	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
HMX	4900	380	na	0.192	J		0.1	0.25	3.48	J		0.1	0.25	180			10	25	0.236	J		0.0999	0.25	0.249	U		0.0996	0.249	2.55			0.1	0.25
Nitrobenzene	28	3.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
RDX	24	5.5	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
Tetryl	250	24	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	UQ		0.0999	0.25	0.249	UQ		0.0996	0.249	0.25	U		0.1	0.25
Nitroglycerin	6.2	0.61	na	2.01			0.1	0.25	12.6			1	2.5	23.7			1	2.5	0.468			0.0999	0.25	0.249	U		0.0996	0.249	0.918			0.1	0.25
PETN	na	na	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	1.07			0.0999	0.25	0.249	U		0.0996	0.249	0.25	U		0.1	0.25
Herbicides (ug/kg)																																	
2,4,5-T	620000	61000	na	3.39	J		2.48	4.96	64.5	P		12	24.1	55	P		10.7	21.5	4.94	U		2.47	4.94	4.43	U		2.21	4.43	4.68	U		2.34	4.68
Dalapon	1800000	180000	na	124	U		62	124	602	U		301	602	537	U		269	537	123	U		61.7	123	111	U		55.3	111	117	U		58.5	117
Dichlorprop	na	na	na	49.6	UQ		24.8	49.6	241	UQ		120	241	215	UQ		107	215	49.4	UQ		24.7	49.4	44.3	UQ		22.1	44.3	46.8	U		23.4	46.8
MCPA	31000	3100	na	4960	U		2480	4960	24100	U		12000	24100	21500	U		10700	21500	4940	U		2470	4940	4430	U		2210	4430	4680	U		2340	4680
Metals (mg/kg)																																	
Barium	19000	1500	209	953			25	100	2300			25	100	1690			25	100	849			25	100	597			25	100	1290			25	100
Cadmium	81	7	0.69	100	U		25	100	40.4	J		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100
Chromium	150000	12000	65.3	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200
Lead	800	400	26.8	1000	U		100	1000	154000			2000	20000	6550			100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000
Misc.																																	
pH	na	na	na	8.02	J	B	NA	NA	7.77			NA	NA	8.55			NA	NA	7.84														

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Table 2-3
Additional Delineation Sample Results
Page 5 of 5

Analyte	Sample ID Sample Date Sample Depth			54BDW32 5/6/10 6-8					54BDW33 5/27/10 5-5					54BDW34 5/6/10 5-5					54BDW35 5/6/10 6-8					54BDW36 5/6/10 10-10					54BDW37 5/6/10 10-10																																				
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL																																
VOCs (ug/kg)																																	Samples were not tested for this group.																																
PAHs (ug/kg)																																	Samples were not tested for this group.																																
SVOCs (ug/kg)																																																																	
Pesticides (ug/kg)																																																																	
alpha-Chlordane																																	na	na	na	1.91	UJ		0.382	1.91	1.93	UJ		0.387	1.93	1.9	UJ		0.38	1.9	1.9	UJ		0.38	1.9	1.76	U		0.352	1.76	1.71	U		0.343	1.71
PCBs (mg/kg)																																	Samples were not tested for this group.																																
Explosives (mg/kg)																																																																	
1,3,5-Trinitrobenzene	2700	220	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	M		0.1	0.25																																
2,4,6-Trinitrotoluene	7.9	1.9	na	0.34			0.1	0.25	0.25	U		0.1	0.25	1.22			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
2,4-Dinitrotoluene	120	12	na	0.36			0.1	0.25	5.21			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
2,6-Dinitrotoluene	62	6.1	na	0.25	U		0.1	0.25	0.338			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
2-amino-4,6-Dinitrotoluene	200	15	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
2-Nitrotoluene	13	2.9	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
3-Nitrotoluene	6.2	0.61	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
4-amino-2,6-Dinitrotoluene	190	15	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
4-Nitrotoluene	110	3	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
HMX	4900	380	na	2.81			0.1	0.25	0.131	J		0.1	0.25	0.634			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
Nitrobenzene	28	3.1	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
RDX	24	5.5	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
Tetryl	250	24	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	M		0.1	0.25																																
Nitroglycerin	6.2	0.61	na	1.08			0.1	0.25	0.25	U		0.1	0.25	0.899			0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
PETN	na	na	na	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25	0.25	U		0.1	0.25																																
Herbicides (ug/kg)																																																																	
2,4,5-T	620000	61000	na	4.67	U		2.33	4.67	4.44	U		2.22	4.44	4.84	U		2.42	4.84	4.67	U		2.33	4.67	4.84	U		2.42	4.84	4.43	U		2.21	4.43																																
Dalapon	1800000	180000	na	117	U		58.3	117	111	U		55.5	111	121	U		60.5	121	117	U		58.3	117	121	U		60.4	121	111	M		55.3	111																																
Dichlorprop	na	na	na	46.7	U		23.3	46.7	44.4	U		22.2	44.4	48.4	U		24.2	48.4	46.7	U		23.3	46.7	48.4	U		24.2	48.4	44.3	M		22.1	44.3																																
MCPA	31000	3100	na	4670	U		2330	4670	4440	U		2220	4440	4840	U		2420	4840	4670	U		2330	4670	4840	U		2420	4840	4430	U		2210	4430																																
Metals (mg/kg)																																																																	
Barium	19000	1500	209	631			25	100	451			25	100	747			25	100	618			25	100	329			25	100	375			25	100																																
Cadmium	81	7	0.69	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100	100	U		25	100																																
Chromium	150000	12000	65.3	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200	200	U		25	200																																
Lead	800	400	26.8	1000	U		100	1000	310	J		100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000	1000	U		100	1000																																
Misc.																																																																	
pH	na	na	na	7.54					7.64					7.44					6.25					6.85					6.22																																				

12J

12J

12J

1212

Shading and black font indicates an i-SL exceedance.

Bold outline indicates an r-SL exceedance.

Bold, underlined font indicates a Background exceedance.

Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 0.1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.

SL/SSL source: ORNL Regional Screening Table. April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.

BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

i-SL - Industrial Screening Level

r-SL - Residential Screening Level

BTAG - Biological Technical Assistance Group

MDL - Method Detection Limit

MRL - Minimum Reporting Limit

SSL - Soil Screening Level

B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

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

J - Estimated: The analyte was positively identified; the quantitation is estimation.

K - Analyte present. Reported value may be biased high. Actual value is expected to be lower.

P - Target analyte confirmation >40% D for detected compound between the primary and secondary columns.

Q - One or more quality control criteria failed.

U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

UJ - Not detected, quantitation limit may be inaccurate or imprecise.

Table 2-4
Analytes Detected in Topsoil/Fill Material

Analyte	Sample ID Sample Date Sample Depth			54BF-01 6/3/10 TBD-TBD					54BF-02 6/3/10 TBD-TBD					54BF-03 6/3/10 TBD-TBD					54BF-04 6/3/10 TBD-TBD					54BF-05 6/7/10 TBD-TBD					54BF-06 6/7/10 TBD-TBD					54BF-07 6/7/10 TBD-TBD					
	i-SL	r-SL	Background	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	
SVOCs (ug/kg)	Not Tested																																						
Pesticides (ug/kg)	Not Tested																																						
PCBs (mg/kg)	Not Tested																																						
Explosives (mg/kg)	Not Tested																																						
VOCs (ug/kg)																																							
Acetone	6.3E+08	61000000	na	9.22	U		4.61	9.22	6.33	U		3.17	6.33	5.5	U		2.75	5.5	5.51	U		2.75	5.51	8.22	U		4.11	8.22	3.68	J		3.5	7	3.14	J		2.77	5.54	
Metals (mg/kg)																																							
Aluminum	990000	77000	40041	20900			981	1960	15100			196	391	15900			193	386	17500			874	1750	13500			1900	3800	14200			908	1820	13000			957	1910	
Antimony	410	31	na	0.533	J		0.491	0.981	0.979	U		0.489	0.979	0.964	U		0.482	0.964	0.874	U		0.437	0.874	0.949	U		0.475	0.949	0.908	U		0.454	0.908	0.957	U		0.478	0.957	
Arsenic	1.6	0.39	15.8	8			0.19	0.381	2.72			0.188	0.376	8.47			0.186	0.372	2.05			0.174	0.347	16.7			0.186	0.373	10.9			0.19	0.381	7.98			0.192	0.384	
Barium	190000	15000	209	37.1			0.0981	0.491	30.9			0.0979	0.489	30.1			0.0964	0.482	32.8			0.0874	0.437	17.2			0.0949	0.475	17.5			0.0908	0.454	15.9			0.0957	0.478	
Beryllium	2000	160	1.02	0.969			0.0123	0.491	1.25			0.0122	0.489	1.35			0.0121	0.482	1.08			0.0109	0.437	4.34			0.0119	0.475	3.72			0.0113	0.454	3.58			0.012	0.478	
Cadmium	810	70	0.69	0.0751	J		0.0491	0.491	0.489	U		0.0489	0.489	0.482	U		0.0482	0.482	0.116	J		0.0437	0.437	2.23			0.0475	0.475	2.12			0.0454	0.454	2			0.0478	0.478	
Calcium	na	na	na	6740			4.91	9.81	891			4.89	9.79	796			4.82	9.64	1050			4.37	8.74	396			4.75	9.49	441			4.54	9.08	396			4.78	9.57	
Chromium	1500000	120000	65.3	31.5			0.123	0.981	23.8			0.122	0.979	29.2			0.121	0.964	29.3			0.109	0.874	65			0.593	4.75	43.3			0.113	0.908	47			0.12	0.957	
Cobalt	300	23	72.3	17.5			0.123	0.981	12.5			0.122	0.979	13.3			0.121	0.964	11.9			0.109	0.874	15			0.119	0.949	67.9			0.567	4.54	38			0.598	4.78	
Copper	41000	3100	53.5	18.9			0.491	0.981	17.9			0.489	0.979	18.7			0.482	0.964	19.2			0.437	0.874	49			2.37	4.75	40.9			0.454	0.908	35.9			0.478	0.957	
Iron	720000	55000	50962	32400	B		0.981	2.94	28100	B		0.979	2.94	30500	B		0.964	2.89	29200	B		0.874	2.62	62500	B		190	570	59100	B		182	545	56600	B		191	574	
Lead	8000	4000	26.8	19.9			0.127	0.254	18.6			0.125	0.25	19.7			0.124	0.248	15.7			0.116	0.232	38.4			0.124	0.248	38.2			0.127	0.254	37.2			0.128	0.256	
Magnesium	na	na	na	5630			11.8	24.5	2440			11.7	24.5	2810			11.6	24.1	2370			10.5	21.8	183			11.4	23.7	245			10.9	22.7	205			11.5	23.9	
Manganese	23000	1800	2543	327			0.245	0.491	353			0.245	0.489	260			0.241	0.482	348			0.218	0.437	184			1.19	2.37	456			22.7	45.4	300			23.9	47.8	
Mercury	34	5.6	0.13	0.0962	J		0.0125	0.314	0.0964	J		0.012	0.299	0.119	J		0.0127	0.318	0.0948	J		0.0123	0.307	0.215	J		0.0118	0.294	0.203	J		0.0126	0.315	0.224	J		0.0126	0.314	
Nickel	20000	1600	62.8	17.7			0.491	1.96	17.2			0.489	1.96	19.7			0.482	1.93	20.3			0.437	1.75	60.4			2.37	9.49	55.2			2.27	9.08	44.9			0.478	1.91	
Potassium	na	na	na	1370			24.5	49.1	845			24.5	48.9	1080			24.1	48.2	862			21.8	43.7	357			23.7	47.5	410			22.7	45.4	355			23.9	47.8	
Selenium	5100	390	na	0.254	U		0.127	0.254	0.25	U		0.125	0.25	0.357			0.124	0.248	0.33			0.116	0.232	0.843			0.124	0.248	0.848			0.127	0.254	0.849			0.128	0.256	
Silver	5100	390	na	0.343	J		0.245	1.96	1.96	U		0.245	1.96	1.93	U		0.241	1.93	1.75	U		0.218	1.75	1.9	U		0.237	1.9	1.82	U		0.227	1.82	1.91	U		0.239	1.91	
Sodium	na	na	na	16.8	J		4.91	24.5	11.3	J		4.89	24.5	12	J		4.82	24.1	11.3	J		4.37	21.8	24.9			4.75	23.7	58			4.54	22.7	44.3			4.78	23.9	
Thallium	na	na	2.11	0.267			0.0254	0.0508	0.233			0.025	0.0501	0.296			0.0248	0.0496	0.218			0.0232	0.0463	0.564			0.0248	0.0497	0.552			0.0254	0.0507	0.567			0.0256	0.0513	
Vanadium	72	5.5	108	59.7			0.245	0.491	49.7			0.245	0.489	53.7			0.241	0.482	50.8			0.218	0.437	108			1.19	2.37	100			1.13	2.27	92.1			0.239	0.478	
Zinc	310000	23000	202	29.2			0.491	0.981	27			0.489	0.979	35.8			0.482	0.964	39.3			0.437	0.874	54.3			0.475	0.949	53			0.454	0.908	47.2			0.478	0.957	
Misc.																																							
pH	na	na	na	6.14			NA	NA	6.53			NA	NA	6.46			NA	NA	6.51			NA	NA	3.92			NA	NA	3.96			NA	NA	4.01			NA	NA	

12 J

Shading and black font indicates an i-SL exceedance.

12 J

Bold outline indicates an r-SL exceedance.

12 1

Bold, underlined font indicates a Background exceedance.

12 12

Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

SLs for non-Carcinogenic compounds have been recalculated to a hazard index of 1.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.

Inorganic results below background Upper Tolerance Limits are not indicated as exceedances on the table.

SL/SSL source: ORNL Regional Screening Table, April 2009.

BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks, December 2005.

BTAG soil source: USEPA Region III BTAG Soil Screening Values, 1995.

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

i-SL - Industrial Screening Level

r-SL - Residential Screening Level

BTAG - Biological Technical Assistance Group

MDL - Method Detection Limit

MRL - Minimum Reporting Limit

SSL - Soil Screening Level

B - Blank Contamination: The analyte was detected above one-half the reporting limit in an associated blank.

J - Estimated: The analyte was positively identified; the quantitation is estimation.

U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

3.0 SOIL EXCAVATION

The first phase of the project was the additional sample collection to further delineate the extent of contamination (*Section 2.0*) and the excavation and disposal of contaminated soil/sludge. During this time, Shaw mobilized the equipment and manpower required to begin the project. Photos depicting different aspects of the project are presented in **Appendix A**. Daily quality control reports are presented in **Appendix E**.

3.1 Mobilization

Prior to intrusive activity at the site, a utility survey to identify underground service lines within or near the excavation area was performed and all lines were identified by Alliant TechSystems, Inc. (ATK). An Area Access Permit and a Hot Work Permit were issued by the ATK Safety Department for the duration of the project. Copies of the permits are presented in **Appendix F**. A job safety analysis was completed by the site safety officer, was reviewed with the crew, and all potential hazards were identified prior to commencement of work activities. Daily tailgate safety meetings were held and daily work plans discussed with the crew every morning before work began. Copies of the completed health and safety forms are presented in **Appendix F**.

Erosion and sediment controls, consisting of silt fencing and hay bales, were installed according to the *SWMU 54 IMWP* (Shaw, 2010).

3.2 Excavation Activities

Upon receipt of the delineation sample results and the waste characterization results, disposal profiles were completed and approved, excavation and direct loading into dump trailers was ready to begin. The disposal profile and shipping manifests for the hazardous soil are presented in **Appendix C-2** and the hazardous shipping log is presented in **Appendix D-2**.

Excavation was performed using a 20-Ton tracked excavator (trackhoe), and the loading of dump trailers was performed using the same machine. No stockpiling of material was performed during the project; any excavated soils were shipped out the same day they were excavated. Geotextile fabric and gravel was used to construct a temporary loading zone and roadway for the trucks to stage on while being loaded. The geotextile fabric extended from the truck to the edge of the excavation. The temporary loading zone was moved as the leading edge of the excavation moved forward.

The excavation began in the eastern portion of Area A and progressed westward and southward to the southern boundary of the site, closest to the loading area. When the boundaries of Area A were reached, confirmation samples were collected from the side walls and bottom of the excavation. Concentrations were compared to the Area A RGs. During the Area A sample turnaround time, excavations began at Area B, starting with the northern portion of the site, excavating south until the boundaries have been met. Confirmation samples were then collected at Area B, with concentrations compared to the Area B RGs. Areas where sample results still contained concentrations above the RGs were further excavated an additional foot and confirmation samples for these zones were recollected. Alternating excavation at Area A and Area B continued until confirmation sample concentrations were below the respective RGs for both areas. After the initial excavation event, each successive excavation was marked with a letter (B, C, D, E), each letter indicating approximately one successive foot of materials removed. Based on the initial sample results, areas where the black/dark brown ash layer was

encountered were removed entirely prior to retesting, resulting in a skipped letter designation on the sample IDs.

3.3 Post-Excavation Samples and Analytical Results

Post-excavation samples were taken at various locations as initial excavation activities were completed. Samples were collected from the floor and sidewalls of the excavation to confirm that soil with concentrations above the RGs had been removed. The analytical services for the sampling effort were provided using the National Environmental Laboratory Accreditation Conference (NELAC) accredited laboratory Microbac Laboratories, Inc. located in Marietta, OH. Microbac provided analytical support for the collected soil samples using *USEPA SW-846, Third Edition, Test Methods for Evaluating Solid Waste, Update IIIB* (USEPA, 2004). Results were requested on a 7-day turnaround time to keep the project moving forward quickly. Completed chain-of-custody forms for the shipments of samples to the laboratory are presented in **Appendix B-3**.

Data obtained from the laboratory were reviewed by the Shaw Project Chemist to determine whether the project-specific data quality objectives, as defined in the associated work plans and sampling and analysis plans, were met. The laboratory analytical data is presented in **Appendix B-1**. For the SWMU 54 Interim Measures, the confirmatory samples were validated. Data validation determines the acceptability or unacceptability of the data quality based on a set of pre-defined criteria and is defined as the systematic process for reviewing a data package against a set of criteria to provide assurance that the data is adequate for its intended uses. The data validation criteria is based on a combination of project specific Work Plan/Quality Assurance Project Plan criteria, method-specific criteria, *Department of Defense Quality Systems Manual Final Version 3* (DoD, 2006), and the subcontract laboratory standard operating procedures. The data qualifier scheme was consistent with USEPA Region III guidance.

All data packages were validated to ensure compliance with specified analytical, quality assurance/quality control requirements, data reduction procedures, data reporting requirements, and required accuracy, precision, and completeness criteria. Results were assessed for accuracy and precision of laboratory analysis to determine the limitations and quality of the data. The quality of the data collected in support of the sampling activity was considered acceptable, unless qualified rejected “R” during the validation process. Samples qualified “J”, “L”, or “UL” were considered acceptable as estimated with noted definitions. No sample data points were determined to be rejected “R.” Out of criteria lab control samples or calibration standards resulted in some data to be qualified estimated; however, did not impact the usability of the data to make informed conclusions in this report. Qualified data for where the matrix spike and spike duplicates, serial dilutions, and field duplicates exceeded criteria were most likely due to sample matrix or inhomogeneity effects with the given analytical methodology; however, the data was determined useable as estimated and did not impact the conclusions of this report. The data validation reports are presented in **Appendix B**.

Final confirmation sample results are compared against their respective RGs for Area A and Area B in **Table 3-1** and **Table 3-2**, respectively. Toxicity Equivalent (TEQ) dioxin/furan values are compared against their respective Area A and Area B RGs in **Table 3-3**. **Figure 2-5** and **Figure 2-6** depict the excavation boundaries established during the SWMU 54 CMS (URS, 2008) before excavation activities took place. Successive excavations (initial, secondary, tertiary, quaternary, and final) and associated confirmation sample locations are shown on

Figure 3-1 through Figure 3-5. Samples that are shown in red contained concentrations that were greater than the RGs, and are shown in green where sample concentrations were below the RGs. At locations where confirmation sample results were greater than the RGs, additional soil was removed from the sample location and another confirmation sample was collected to confirm that the remaining soil concentrations were below the RGs. **Figure 3-6** depicts the final confirmation sample locations for samples collected in SWMU 54 meeting site RGs.

Soil samples 54ASC01 and 54ASC03, located approximately 12 ft apart in the same 25 x 25-foot sampling grid, and were tested at 6 and 4 ft bgs, respectively. Soil sample 54ASC03 failed the RGs for DNT mixture, Amino DNTs, lead, and NG. Sample 54ASC01 failed to meet the RGs for NG. The entire sampling grid was excavated to a depth of 7 ft bgs and resampled as 54ASC03B, which met the Area A RGs.

Confirmation sample 54ASC16B had a NG concentration of 0.111 mg/kg. This concentration detected was above the method detection limit (MDL) of 0.0988 mg/kg and below the method reporting limit (MRL) of 0.247 mg/kg. This is a common condition. Any sample value found >MDL and <MRL or <3*MDL (whichever was greater) was qualified as estimated, “J” as part of the quantitation verification. Positive reported results in this range were below the level of quantitation; therefore, were treated as estimated and still considered usable data for the close out report. As such, the sample was declared acceptable and was not resampled.

Confirmation sample 54BSC65 exceeded the NG RG at 10 ft bgs. An additional foot of material was excavated from this sampling area. Upon removal of the extra material, the sampling grid was below the groundwater table. An additional foot of material was mucked out with the excavator bucket and no further sample was collected.

Table 3-1
SWMU 54 Area A Final Confirmatoin Samples
Page 2 of 2

Analyte	Sample ID	54ASC32					54ASC33					54ASC34					54ASC35					54ASC36					54ASC37C				
	Sample Date	5/25/10					5/25/10					5/25/10					5/25/10					5/25/10					8/9/10				
	Sample Depth	6-6					6-6					6-6					6-6					6-6					8-8				
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Pesticides (ug/kg)		None Detected																													
Explosives (mg/kg)																															
2,4,6-Trinitrotoluene	1.45	0.249	U		0.0997	0.249	0.249	U		0.0996	0.249	0.248	U		0.0992	0.248	0.178	J	J	0.0981	0.245	0.251	U		0.1	0.251	0.248	U		0.0993	0.248
2-amino-4,6-Dinitrotoluene	0.912	0.249	U		0.0997	0.249	0.249	U		0.0996	0.249	0.248	U		0.0992	0.248	0.245	U		0.0981	0.245	0.251	U		0.1	0.251	0.248	U		0.0993	0.248
2-Nitrotoluene	na	0.249	U		0.0997	0.249	0.249	U		0.0996	0.249	0.248	U		0.0992	0.248	0.245	U		0.0981	0.245	0.251	U		0.1	0.251	0.248	U		0.0993	0.248
Nitroglycerin	0.057	0.249	U		0.0997	0.249	0.249	U		0.0996	0.249	0.248	U		0.0992	0.248	0.245	U		0.0981	0.245	0.251	U		0.1	0.251	0.248	U		0.0993	0.248
Misc.		None Detected																													

Analyte	Sample ID	54ASC38D					54ASC39B					54ASC40D					54ASC41D					54ASC42					54ASC43								
	Sample Date	8/20/10					7/15/10					8/20/10					8/20/10					5/26/10					5/26/10								
	Sample Depth	9-9					7-7					9-9					9-9					6-6					14-14								
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL				
Pesticides (ug/kg)												None Detected																							
Explosives (mg/kg)												None Detected																							
2,4,6-Trinitrotoluene	1.45	0.249	U		0.0996	0.249	0.823		L	0.1	0.251	0.243	U		0.0973	0.243	0.258			0.0978	0.245	0.246	U		0.0985	0.246	0.251	U		0.1	0.251				
2-amino-4,6-Dinitrotoluene	0.912	0.249	U		0.0996	0.249	0.251	U		0.1	0.251	0.243	U		0.0973	0.243	0.137	J	J	0.0978	0.245	0.246	U		0.0985	0.246	0.251	U		0.1	0.251				
2-Nitrotoluene	na	0.249	U		0.0996	0.249	0.251	U		0.1	0.251	0.243	U		0.0973	0.243	0.245	U		0.0978	0.245	0.246	U		0.0985	0.246	0.251	U		0.1	0.251				
Nitroglycerin	0.057	0.249	U		0.0996	0.249	0.251	U		0.1	0.251	0.243	U		0.0973	0.243	0.245	U		0.0978	0.245	0.246	U		0.0985	0.246	0.251	U		0.1	0.251				
Misc.												None Detected																							

Analyte	Sample ID	54ASC44					54ASC45					54ASC46					54ASC47B					54ASC48B					54ASC49C													
	Sample Date	6/2/10					5/26/10					5/26/10					7/15/10					7/15/10					8/9/10													
	Sample Depth	7-7					7-7					6-6					7-7					7-7					8-8													
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL									
Pesticides (ug/kg)																															None Detected									
Explosives (mg/kg)																																								
2,4,6-Trinitrotoluene	1.45	0.248	U		0.0993	0.248	0.172	J	J	0.0992	0.248	0.593	M	J	0.0999	0.25	0.252	U	UL	0.101	0.252	0.181	J	L	0.099	0.248	0.25	U		0.1	0.25									
2-amino-4,6-Dinitrotoluene	0.912	0.248	U		0.0993	0.248	0.248	U		0.0992	0.248	0.25	U		0.0999	0.25	0.252	U		0.101	0.252	0.248	U		0.099	0.248	0.25	U		0.1	0.25									
2-Nitrotoluene	na	0.248	U		0.0993	0.248	0.248	U		0.0992	0.248	0.25	U		0.0999	0.25	0.252	U		0.101	0.252	0.248	U		0.099	0.248	0.25	U		0.1	0.25									
Nitroglycerin	0.057	0.248	U		0.0993	0.248	0.248	U		0.0992	0.248	0.25	U		0.0999	0.25	0.252	U		0.101	0.252	0.248	U		0.099	0.248	0.25	U		0.1	0.25									
Misc.																															None Detected									

Analyte	Sample ID	54ASC50B					54ASC51B					54ASC52E					54ASC53				
	Sample Date	7/15/10					7/15/10					9/2/10					5/26/10				
	Sample Depth	15-15					8-8					10-10					7-7				
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL
Pesticides (ug/kg)		None Detected																			
Explosives (mg/kg)																					
2,4,6-Trinitrotoluene	1.45	0.248	U	UL	0.0991	0.248	0.149	J	L	0.0987	0.247	0.242	U		0.0967	0.242	0.251	U		0.101	0.251
2-amino-4,6-Dinitrotoluene	0.912	0.248	U		0.0991	0.248	0.247	U		0.0987	0.247	0.242	U		0.0967	0.242	0.251	U		0.101	0.251
2-Nitrotoluene	na	0.248	U		0.0991	0.248	0.247	U		0.0987	0.247	0.242	U		0.0967	0.242	0.251	U		0.101	0.251
Nitroglycerin	0.057	0.248	U		0.0991	0.248	0.247	U		0.0987	0.247	0.242	U		0.0967	0.242	0.251	U		0.101	0.251
Misc.		None Detected																			

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SWMU 54 Area B Final Confirmation Samples
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Analyte	Sample ID	54BSC05					54BSC54					54BSC55					54BSC56B					54BSC57					54BSC58					
	Sample Date	5/6/10					6/9/10					6/9/10					7/21/10					6/9/10					6/9/10					
	Sample Depth	10-10					6-6					6-6					11-11					7-7					10-10					
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	
Pesticides (ug/kg)																																
None detected																																
PCBs (mg/kg)																																
PCB-1254	0.25	0.02	U		0.01	0.02	18.3	U		0.00915	0.0183	17.9	U		0.00895	0.0179	0.0187	U		0.00934	0.0187	0.0141	J	J	0.00897	0.0179	0.0175	U		0.00876	0.0175	
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene	1.45	0.25	U		0.1	0.25	0.247	U		0.0986	0.247	0.247	U		0.0989	0.247	0.249	U		0.0996	0.249	0.181	J	J	0.0981	0.245	0.247	U		0.0987	0.247	
2-Nitrotoluene	na	0.25	U		0.1	0.25	0.247	U		0.0986	0.247	0.247	U		0.0989	0.247	0.249	U		0.0996	0.249	0.245	U		0.0981	0.245	0.247	U		0.0987	0.247	
Nitroglycerin	0.057	0.25	U		0.1	0.25	0.247	U		0.0986	0.247	0.247	U		0.0989	0.247	0.249	U		0.0996	0.249	0.245	U		0.0981	0.245	0.247	U		0.0987	0.247	
Metals (mg/kg)																																
Lead	400	6.61			0.412	4.12	27.5			0.424	4.24	9.43			0.411	4.11	7.44		K	0.402	4.02	44.5			0.404	4.04	38.7			0.404	4.04	

Analyte	Sample ID	54BSC59					54BSC60C					54BSC61B					54BSC62B					54BSC63					54BSC64B					
	Sample Date	6/9/10					8/12/10					7/21/10					7/21/10					6/9/10					7/21/10					
	Sample Depth	6-6					12-12					8-8					11-11					6-6					11-11					
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	
Pesticides (ug/kg)																																
None detected																																
PCBs (mg/kg)																																
PCB-1254	0.25	0.0184	U		0.00918	0.0184	0.0196	U		0.00979	0.0196	0.0186	U		0.00931	0.0186	0.0185	U		0.00923	0.0185	0.0179	U		0.00893	0.0179	0.0196	U		0.00982	0.0196	
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene	1.45	0.306			0.101	0.252	0.248	U		0.0991	0.248	0.25	U		0.0998	0.25	0.192	J	J	0.1	0.25	0.408			0.098	0.245	0.241			0.0958	0.239	
2-Nitrotoluene	na	0.252	U		0.101	0.252	0.248	U		0.0991	0.248	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.245	U		0.098	0.245	0.239	U		0.0958	0.239	
Nitroglycerin	0.057	0.252	U		0.101	0.252	0.248	U		0.0991	0.248	0.25	U		0.0998	0.25	0.25	U		0.1	0.25	0.245	U		0.098	0.245	0.239	U		0.0958	0.239	
Metals (mg/kg)																																
Lead	400	23			0.422	4.22	12.1			0.368	3.68	6.87		K	0.429	4.29	12		K	0.408	4.08	142			0.395	3.95	19.8		K	0.425	4.25	

Analyte	Sample ID	54BSC65					54BSC66B					54BSC67C					54BSC68					54BSC69C					54BSC70B					
	Sample Date	6/9/10					7/21/10					8/12/10					6/9/10					8/12/10					7/21/10					
	Sample Depth	10-10					9-9					8-8					10-10					8-8					7-7					
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	
Pesticides (ug/kg)																																
None detected																																
PCBs (mg/kg)																																
PCB-1254	0.25	0.0538			0.00847	0.0169	0.0193	U		0.00966	0.0193	NT					0.0188			0.00924	0.0185	0.0187	U		0.00934	0.0187	0.0202	U		0.0101	0.0202	
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene	1.45	0.556			0.0992	0.248	0.249	U		0.0994	0.249	NT					0.251	U		0.1	0.251	0.245	U		0.0981	0.245	0.102	J	J	0.0989	0.247	
2-Nitrotoluene	na	0.248	U		0.0992	0.248	0.249	U		0.0994	0.249	NT					0.251	U		0.1	0.251	0.245	U		0.0981	0.245	0.247	U		0.0989	0.247	
Nitroglycerin	0.057	1.27			0.0992	0.248	0.249	U		0.0994	0.249	NT					0.251	U		0.1	0.251	0.245	U		0.0981	0.245	0.247	U		0.0989	0.247	
Metals (mg/kg)																																
Lead	400	76.3			0.374	3.74	9.62		K	0.41	4.1	NT					8.27			0.423	4.23	11.1			0.389	3.89	116		K	0.444	4.44	

Analyte	Sample ID	5
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SWMU 54 Area B Final Confirmation Samples
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Analyte	Sample ID	54BSC90B						54BSC91						54BSC92						54BSC93C						54BSC94C						54BSC95C																															
	Sample Date	7/21/10						6/15/10						6/15/10						8/12/10						8/12/10						7/19/10																															
	Sample Depth	3-3						3-3						3-3						3-3						3-3						3-3																															
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL																																
Pesticides (ug/kg)																																None detected																															
PCBs (mg/kg)																																																															
PCB-1254	0.25	0.0209	U		0.0105	0.0209	0.0258			0.00854	0.0171	0.0163	J	J	0.00915	0.0183	0.0175	U		0.00875	0.0175	0.0189	U		0.00944	0.0189	0.0194	U		0.00972	0.0194																																
Explosives (mg/kg)																																																															
2,4,6-Trinitrotoluene	1.45	0.25	U		0.0998	0.25	0.248	U		0.0991	0.248	0.253	U		0.101	0.253	0.25	U		0.1	0.25	0.249	U		0.0996	0.249	0.249	U		0.0995	0.249																																
2-Nitrotoluene	na	0.25	U		0.0998	0.25	0.248	U		0.0991	0.248	0.253	U		0.101	0.253	0.25	U		0.1	0.25	0.249	U		0.0996	0.249	0.249	U		0.0995	0.249																																
Nitroglycerin	0.057	0.25	U		0.0998	0.25	0.248	U		0.0991	0.248	0.253	U		0.101	0.253	0.25	U		0.1	0.25	0.249	U		0.0996	0.249	0.249	U		0.0995	0.249																																
Metals (mg/kg)																																																															
Lead	400	13.3		K	0.417	4.17	28.6		J	0.377	3.77	15.2		J	0.399	3.99	11.1			0.375	3.75	10.8			0.385	3.85	11.9			0.4	4																																

Analyte	Sample ID	54BSC96						54BSC97						54BSC98						54BSC99						54BSC100						54BSC101																																			
	Sample Date	6/15/10						6/15/10						6/15/10						6/15/10						6/15/10						6/15/10																																			
	Sample Depth	6-6						10-10						10-10						6-6						6-6						6-6																																			
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL																															
Pesticides (ug/kg)																																		None detected																																	
PCBs (mg/kg)																																																																			
PCB-1254		0.25		0.0179	U		0.00897	0.0179	0.0175	U		0.00873	0.0175	0.0182	U		0.00912	0.0182	0.0208	U		0.0104	0.0208	0.0215	U		0.0107	0.0215	0.0182	U		0.00912	0.0182																																		
Explosives (mg/kg)																																																																			
2,4,6-Trinitrotoluene	1.45	0.248	U		0.0991	0.248	0.247	U		0.0988	0.247	0.248	U		0.0991	0.248	0.247	U		0.0987	0.247	0.246	U		0.0985	0.246	0.246	U		0.0983	0.246																																				
2-Nitrotoluene	na	0.248	U		0.0991	0.248	0.247	U		0.0988	0.247	0.248	U		0.0991	0.248	0.247	U		0.0987	0.247	0.246	U		0.0985	0.246	0.246	U		0.0983	0.246																																				
Nitroglycerin	0.057	0.248	U		0.0991	0.248	0.247	U		0.0988	0.247	0.248	U		0.0991	0.248	0.247	U		0.0987	0.247	0.246	U		0.0985	0.246	0.246	U		0.0983	0.246																																				
Metals (mg/kg)																																																																			
Lead	400	11.9		J	0.376	3.76	11.3		J	0.4	4	8.18		J	0.38	3.8	8.57		J	0.481	4.81	9.93		J	0.459	4.59	14.8		J	0.412	4.12																																				

Analyte	Sample ID	54BSC102						54BSC103						54BSC104						54BSC105						54BSC106						54BSC107B					
	Sample Date	6/15/10						6/15/10						6/15/10						6/15/10						6/15/10						7/21/10					
	Sample Depth	6-6						6-6						6-6						6-6						6-6						7-7					
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL						
Pesticides (ug/kg)																																					
PCBs (mg/kg)																																					
PCB-1254	0.25	0.0179	U		0.00894	0.0179	0.0182	U		0.00912	0.0182	0.0186	U		0.00932	0.0186	0.0188	U		0.00938	0.0188	0.0181	U		0.00904	0.0181	0.0186	U		0.00932	0.0186						
Explosives (mg/kg)																																					
2,4,6-Trinitrotoluene	1.45	0.247	U		0.0987	0.247	0.246	U		0.0983	0.246	0.247	U		0.0986	0.247	0.246	U		0.0985	0.246	0.246	U		0.0982	0.246	0.245	U		0.0981	0.245						
2-Nitrotoluene	na	0.247	U		0.0987	0.247	0.246	U		0.0983	0.246	0.247	U		0.0986	0.247	0.246	U		0.0985	0.246	0.246	U		0.0982	0.246	0.245	U		0.0981	0.245						
Nitroglycerin	0.057	0.247	U		0.0987	0.247	0.246	U		0.0983	0.246	0.247	U		0.0986	0.247	0.246	U		0.0985	0.246	0.246	U		0.0982	0.246	0.245	U		0.0981	0.245						
Metals (mg/kg)																																					
Lead	400	10.8		J	0.385	3.85	10.9		J	0.419	4.19	9.25		J	0.43	4.3	12.6		J	0.402	4.02	32		J	0.42	4.2	7.04		K	0.418	4.18						

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SWMU 54 Area B Final Confirmation Samples
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Analyte	Sample ID	54BSC120					54BSC121					54BSC122B					54BSC123B					54BSC124					54BSC125B					
	Sample Date	6/15/10					6/15/10					7/21/10					7/21/10					6/15/10					7/21/10					
	Sample Depth	6-6					6-6					7-7					7-7					6-6					7-7					
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	
Pesticides (ug/kg)																																
None Detected																																
PCBs (mg/kg)																																
PCB-1254	0.25	0.0569			0.0106	0.0212	0.0197	U		0.00987	0.0197	0.0193	U		0.00963	0.0193	0.0196	U		0.00979	0.0196	0.0178	U		0.00892	0.0178	0.0188	U		0.00939	0.0188	
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene	1.45	0.371			0.1	0.25	0.246	U		0.0985	0.246	0.247	U		0.0989	0.247	0.247	U		0.0987	0.247	0.246	U		0.0983	0.246	0.246	U		0.0983	0.246	
2-Nitrotoluene	na	0.25	U		0.1	0.25	0.22	J	J	0.0985	0.246	0.247	U		0.0989	0.247	0.247	U		0.0987	0.247	0.246	U		0.0983	0.246	0.246	U		0.0983	0.246	
Nitroglycerin	0.057	1.01			0.1	0.25	0.246	U		0.0985	0.246	0.247	U		0.0989	0.247	0.247	U		0.0987	0.247	0.246	U		0.0983	0.246	0.246	U		0.0983	0.246	
Metals (mg/kg)																																
Lead	400	157		J	0.488	4.88	14.4		J	0.469	4.69	11		K	0.412	4.12	16.5		K	0.418	4.18	9.02		J	0.413	4.13	7.68		K	0.434	4.34	

Analyte	Sample ID	54BSC126					54BSC127					54BSC128					54BSC129					54BSC130					54BSC131					
	Sample Date	6/15/10					6/15/10					6/15/10					6/15/10					6/15/10					6/15/10					
	Sample Depth	6-6					3-3					3-3					3-3					3-3					3-3					
	RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL	
Pesticides (ug/kg)																																
None Detected																																
PCBs (mg/kg)																																
PCB-1254	0.25	0.0184	U		0.00919	0.0184	0.0209	U		0.0104	0.0209	0.0183	U		0.00913	0.0183	0.0185	U		0.00926	0.0185	0.019	U		0.00949	0.019	0.0172	J	J	0.00936	0.0187	
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene	1.45	0.248	U		0.0993	0.248	0.25	U		0.0999	0.25	0.2	J	J	0.0986	0.247	0.251	U		0.1	0.251	0.252	U		0.101	0.252	0.3			0.101	0.252	
2-Nitrotoluene	na	0.248	U		0.0993	0.248	0.25	U		0.0999	0.25	0.247	U		0.0986	0.247	0.251	U		0.1	0.251	0.252	U		0.101	0.252	0.252	U		0.101	0.252	
Nitroglycerin	0.057	0.248	U		0.0993	0.248	0.25	U		0.0999	0.25	0.247	U		0.0986	0.247	0.251	U		0.1	0.251	0.252	U		0.101	0.252	0.252	U		0.101	0.252	
Metals (mg/kg)																																
Lead	400	24.8		J	0.395	3.95	14.9			0.472	4.72	27			0.431	4.31	17.4			0.402	4.02	8.79			0.429	4.29	48.6			0.433	4.33	

Analyte	Sample ID	54BSC132					54BSC133					
	Sample Date	6/15/10					6/15/10					
	Sample Depth	3-3					3-3					
RG	Result	Lab Q	Val Q	MDL	MRL	Result	Lab Q	Val Q	MDL	MRL		
Pesticides (ug/kg)											None Detected	
PCBs (mg/kg)												
PCB-1254	0.25	0.0187	U		0.00934	0.0187	0.0118	J	J	0.0084	0.0168	
Explosives (mg/kg)												
2,4,6-Trinitrotoluene	1.45	0.251	U		0.1	0.251	0.817			0.0989	0.247	
2-Nitrotoluene	na	0.251	U		0.1	0.251	0.247	U		0.0989	0.247	
Nitroglycerin	0.057	0.251	U		0.1	0.251	0.247	U		0.0989	0.247	
Metals (mg/kg)												
Lead	400	9.65			0.423	4.23	37.9			0.358	3.58	

12	J	Shading and black font indicates an RG exceedance.
12	12	Shading in the MDL/MRL columns indicates the MDL exceeds a criterion.

The pyrene SL and SSL was used for acenaphthylene, benzo(g,h,i)perylene and phenanthrene.
SL/SSL source: ORNL Regional Screening Table. April 2009.
BTAG sediment source: USEPA Region III BTAG Sediment Screening Benchmarks. December 2005.
BTAG soil source: USEPA Region III BTAG Soil Screening Values. 1995.

J - Estimated: The analyte was positively identified; the quantitation is estimation.
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.
U - Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
BTAG - Biological Technical Assistance Group
MDL - Method Detection Limit
MRL - Minimum Reporting Limit

RG - Remedial Goal
SL - Screening Level
SSL - Soil Screening Level

Table 3-3
TEQ Values for 2,3,7,8-TCDD

Area A:				
Sample #	TEQ	RG	Units	Pass/Fail
54ASC01	3.07E-06	7.89E-06	mg/kg	Pass
54ASC06C	2.99E-07	7.89E-06	mg/kg	Pass
54ASC10	2.73E-07	7.89E-06	mg/kg	Pass
54ASC14	2.86E-07	7.89E-06	mg/kg	Pass
54ASC18	3.35E-07	7.89E-06	mg/kg	Pass
54ASC22	3.66E-07	7.89E-06	mg/kg	Pass
54ASC26C	2.46E-06	7.89E-06	mg/kg	Pass
54ASC28D	2.21E-07	7.89E-06	mg/kg	Pass
54ASC32	3.18E-07	7.89E-06	mg/kg	Pass
54ASC36	1.47E-06	7.89E-06	mg/kg	Pass
54ASC40D	2.36E-07	7.89E-06	mg/kg	Pass
54ASC41D	2.24E-07	7.89E-06	mg/kg	Pass
54ASC44	2.72E-07	7.89E-06	mg/kg	Pass
54ASC48	4.35E-07	7.89E-06	mg/kg	Pass
54ASC52E	2.97E-07	7.89E-06	mg/kg	Pass
Area B:				
Sample #	TEQ	RG	Units	Pass/Fail
54BSC55	3.87E-07	6.57E-06	mg/kg	Pass
54BSC59	6.48E-07	6.57E-06	mg/kg	Pass
54BSC63	1.22E-06	6.57E-06	mg/kg	Pass
54BSC67C	2.67E-07	6.57E-06	mg/kg	Pass
54BSC72C	4.93E-07	6.57E-06	mg/kg	Pass
54BSC76C	2.02E-07	6.57E-06	mg/kg	Pass
54BSC80C	3.78E-07	6.57E-06	mg/kg	Pass
54BSC84	1.36E-06	6.57E-06	mg/kg	Pass
54BSC88	3.57E-07	6.57E-06	mg/kg	Pass
54BSC92	6.33E-06	6.57E-06	mg/kg	Pass
54BSC96	5.41E-07	6.57E-06	mg/kg	Pass
54BSC100	1.47E-07	6.57E-06	mg/kg	Pass
54BSC104	1.23E-07	6.57E-06	mg/kg	Pass
54BSC108C	2.63E-07	6.57E-06	mg/kg	Pass
54BSC112	2.54E-07	6.57E-06	mg/kg	Pass
54BSC116	2.54E-07	6.57E-06	mg/kg	Pass
54BSC119C	2.26E-07	6.57E-06	mg/kg	Pass
54BSC120C	3.13E-07	6.57E-06	mg/kg	Pass
54BSC128	1.07E-06	6.57E-06	mg/kg	Pass
54BSC132	4.45E-07	6.57E-06	mg/kg	Pass

Note: TEQ Values are 'WHO2005 ND=0.5' values

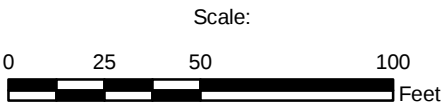
AcGIS File: C:\Radford\MMAGIS\Documents\Project_Maps\SWMU_54\Close_Out\REAP_Fig3-1_SWMU54_Initial_Lab_Conf_Sample_Results.mxd (12/17/2010)



LEGEND

- Confirmation Soil Sample Location < RGs or Non-Detect
- Confirmation Soil Sample Location >= RGs
- CMS Defined Excavation Boundary
- SWMU 54 Boundary

Notes:
1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.

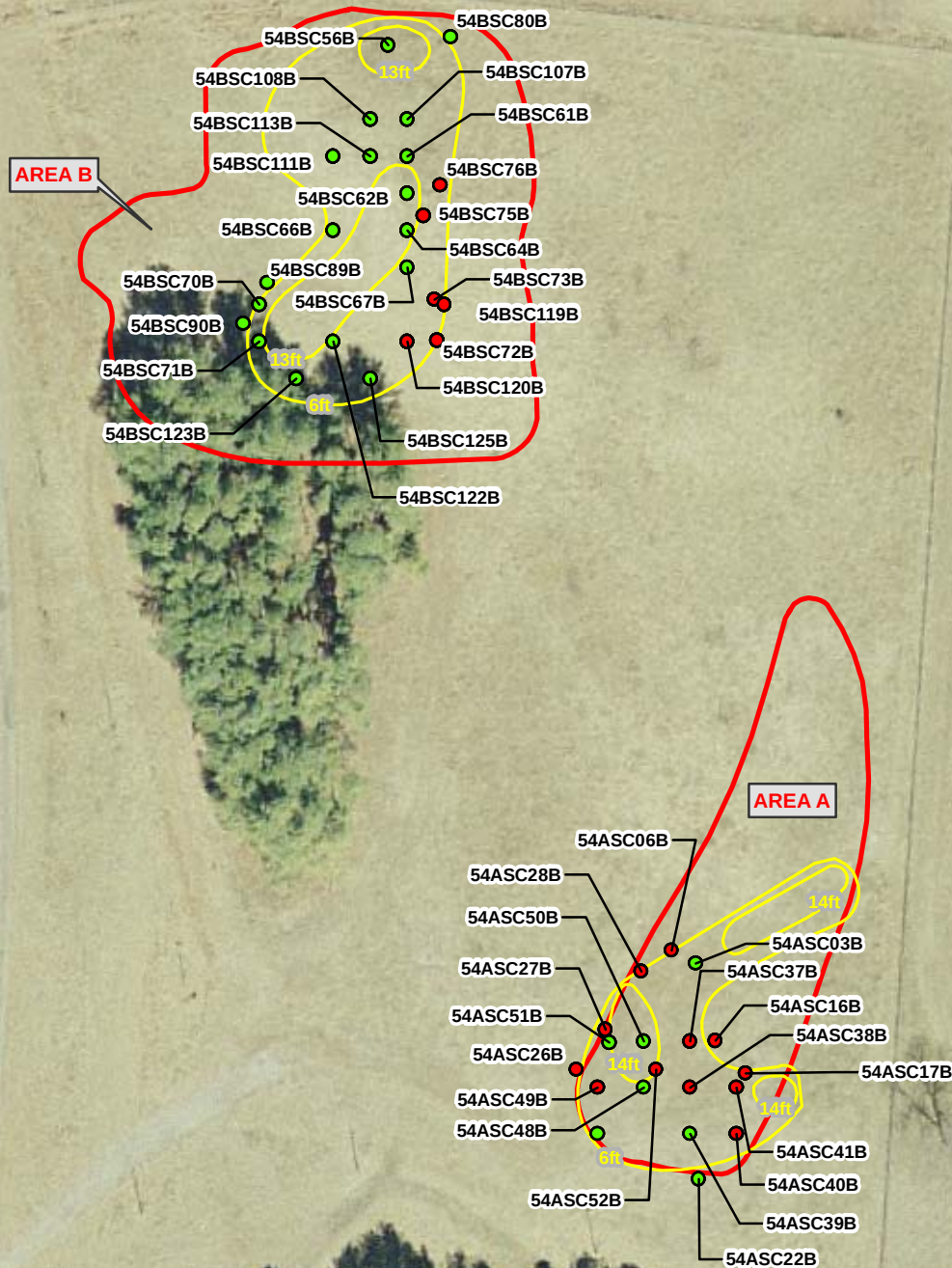


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FIGURE 3-1
SWMU 54 Initial Confirmation Soil
Sample Results
Radford Army Ammunition Plant,
Radford, VA



LEGEND

● Confirmation Soil Sample Location < RGs or Non-Detect

● Confirmation Soil Sample Location ≥ RGs

□ CMS Defined Excavation Boundary

□ SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.
- 2) Samples were collected in April/May 2009.



Scale:
0 50 100 200 Feet



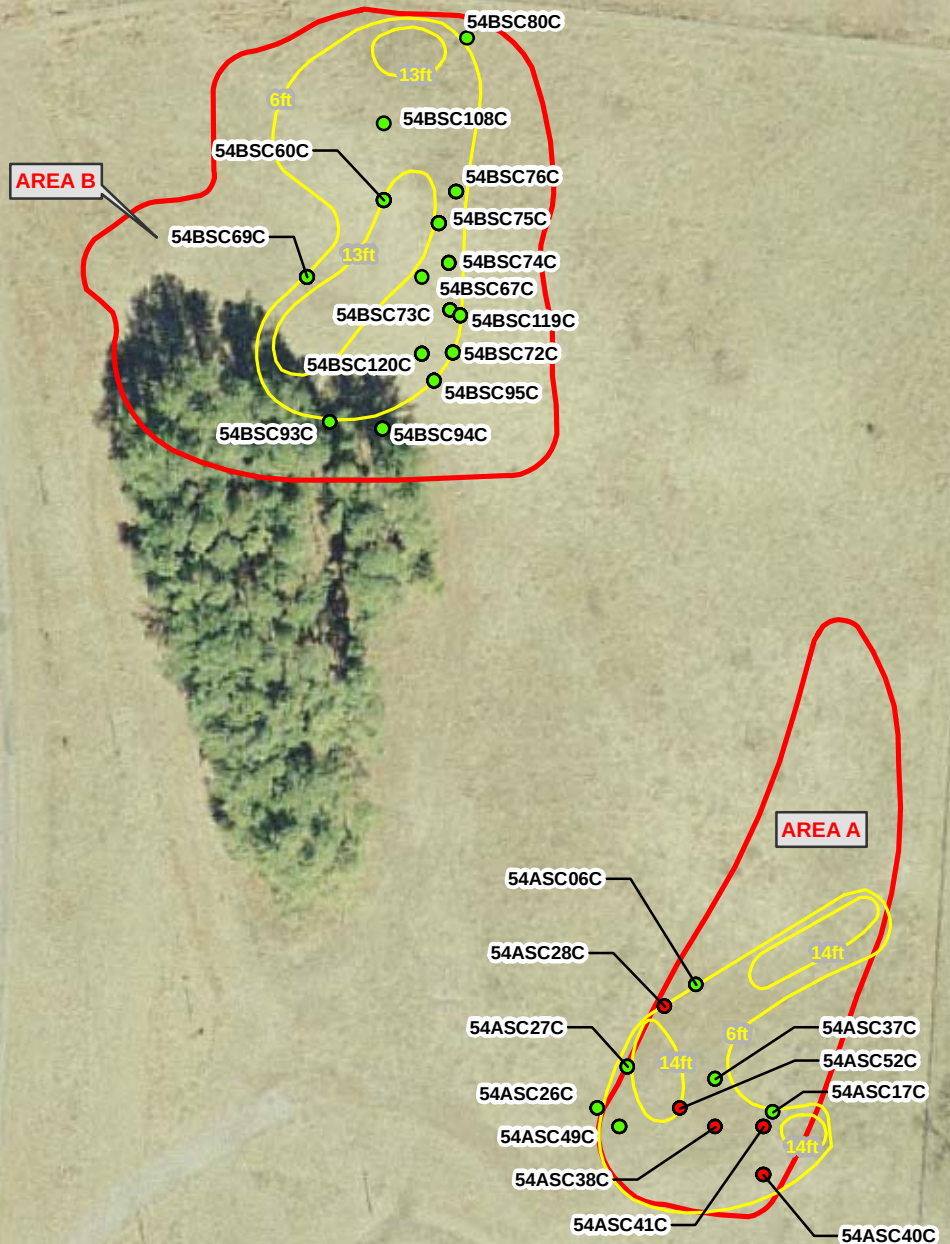
U.S. Army Corps of Engineers



Shaw Environmental, Inc.

FIGURE 3-2 SWMU 54 Secondary Confirmation Soil Sample Results

Radford Army Ammunition Plant,
Radford, VA



LEGEND

● Confirmation Soil Sample
Location < RGs or Non-Detect

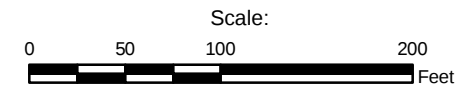
● Confirmation Soil Sample
Location ≥ RGs

□ CMS Defined Excavation
Boundary

□ SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.
- 2) Samples were collected in April/May 2009.

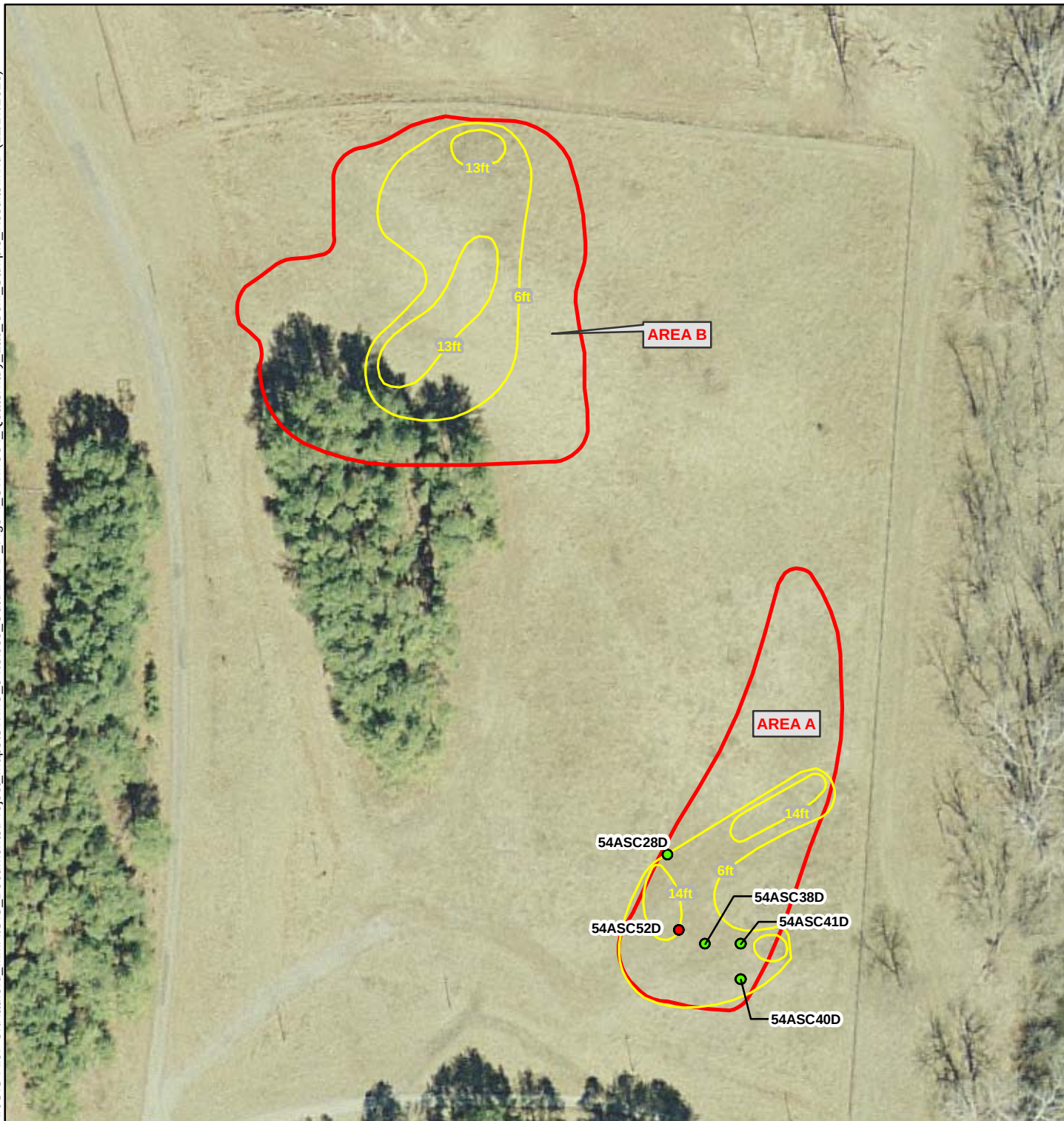


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FIGURE 3-3
SWMU 54 Tertiary Confirmation Soil
Sample Results
Radford Army Ammunition Plant,
Radford, VA



LEGEND

● Confirmation Soil Sample
Location < RGs or Non-Detect

● Confirmation Soil Sample
Location >= RGs

□ CMS Defined Excavation
Boundary

□ SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.
- 2) Samples were collected in April/May 2009.



Scale:
0 50 100 200
Feet

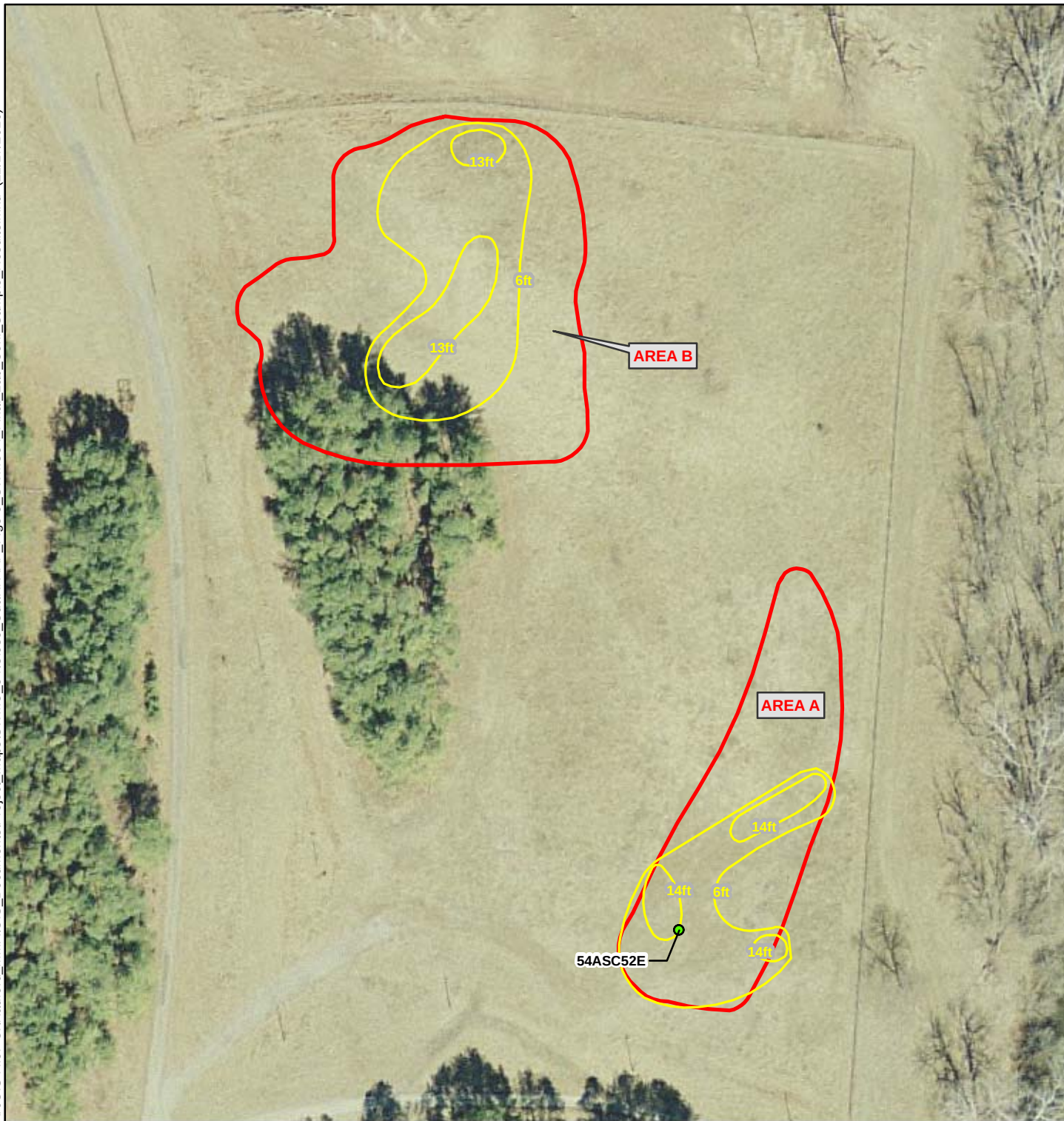


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FIGURE 3-4
SWMU 54 Quarternary Confirmation
Soil Sample Results
Radford Army Ammunition Plant,
Radford, VA



LEGEND

● Confirmation Soil Sample Location < RGs or Non-Detect

● Confirmation Soil Sample Location $\geq$ RGs

□ CMS Defined Excavation Boundary

□ SWMU 54 Boundary

Notes:

- 1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.
- 2) Samples were collected in April/May 2009.



Scale:
0 50 100 200 Feet



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FIGURE 3-5
SWMU 54 Final Confirmation Soil
Sample Results
Radford Army Ammunition Plant,
Radford, VA

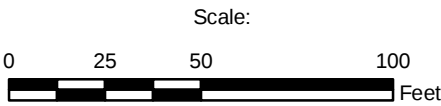
\\radford\mwa\GIS Documents\Project Maps\SWMU 54\Close Out\FAAP Figs-6 SWMU54 Final Lab Conf Sample Locations.mxd (2/9/2011)



LEGEND

- Final Confirmation Soil Sample Location
- CMS Defined Excavation Boundary
- Final Excavation Boundary
- SWMU 54 Boundary

Notes:
1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.



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FIGURE 3-6
SWMU 54 Final Confirmation Soil
Sample Locations
Radford Army Ammunition Plant,
Radford, VA

3.4 Summary

As per URS RFI/CMS sections 8.2.1 and 8.2.2, the primary objectives for the remedial action at SWMU 54, leading to an industrial future use scenario are:

- Area A: Mitigate further leaching of explosives constituents from soil to groundwater at levels that would potentially increase observed concentrations and adversely impact future beneficial use of groundwater; and to the extent practicable, a goal of restoring groundwater to the most beneficial use.
- Area B: Mitigate the potential hypothetical future risks that have been identified for exposure to soil under a future construction worker scenario; and to prevent the leaching of COCs from soil-to-groundwater at levels that would potentially adversely impact future beneficial use of groundwater.

Site specific RGs for SWMU 54 were calculated for Area A and Area B (**Tables 1-1 and 1-2**, respectively) based on a soil leaching criteria. Confirmation samples indicate that the contaminated soil at SWMU 54 Area A and Area B have been removed, and that the remaining on-site soil is at concentrations less than, or equal to the CMS defined RGs.

The conservative soil-to-groundwater transfer RGs calculated in the CMS are lower than both the industrial and residential EPA Regional Screening Levels (RSLs), with the exception of Aroclor 1254 and 2,3,7,8-TCDD (TEQ), of which Aroclor 1254 was not detected above either RG level in the collected confirmation samples and 2,3,7,8-TCDD (TEQ) exceeded the EPA r-RSL in one of thirty-five samples collected.. A comparison of the CMS defined RGs and the EPA industrial and residential screening levels can be found on **Table 3-4**.

Table 3-4

Area A Final Confirmation Sample Results – SWMU 54 Interim Measures

Chemical of Interest	Area A - Soil RG (mg/kg)	Area B - Soil RG (mg/kg)	EPA Region 3 i-RSLs (mg/kg)	EPA Region 3 r-RSLs (mg/kg)
2,4,6-TNT	1.7	1.45	79	19
DNT Mixture	0.044 or Lab RL (if higher)	0.037 or Lab RL (if higher)	2.5	0.71
RDX	0.161	0.134	24	5.5
Amino DNTs ⁽¹⁾	1.095	0.912	1900	158
Nitroglycerin ⁽²⁾	0.069 or Lab RL (if higher)	0.057 or Lab RL (if higher)	62	6.1
Lead	---	400	800	400
Aroclor 1254	---	0.25	0.74	0.22
Dieldrin	---	0.00446	0.11	0.03
Heptachlor Epoxide ⁽²⁾	0.0047	0.0039	0.19	0.053
2,3,7,8-TCDD (TEQ) ⁽¹⁾	7.89E-06	6.57E-06	1.80E-05	4.50E-06

In conclusion, the soil remediation objectives outlined in the SWMU 54 CMS have been successfully achieved. In addition to achieving the site CMOs, interim measures at SWMU 54 have brought soil concentrations for the COCs below the EPA Region 3 residential RSLs with the exception of one 2,3,7,8-TCDD (TEQ) of thirty-five samples..

4.0 REFERENCES

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