Final

# Site Inspection Report for CC RVAAP-70 East Classification Yard Ravenna Army Ammunition Plant Restoration Program Camp Ravenna, Portage and Trumbull Counties, Ohio

October 31, 2018

Contract No.: W912QR-12-D-0002 Delivery Order: 0003

**Prepared for:** 



U.S. Army Corps of Engineers, Louisville District 600 Dr. Martin Luther King Jr. Place Louisville, Kentucky 40202-2267

**Prepared by:** 



401 Diamond Drive NW Huntsville, AL 35806 256-837-5200

REPORT DOCUMENTATION PAGE	Form Approved OMB No. 0704-0188		
The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Haedquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.			
1. REPORT DATE (DD-MM-YYYY) 2. REPORT TYPE		3. DATES COVERED (From - To)	
31-10-2018 Site Inspection 4. TITLE AND SUBTITLE	5a COM	June 2018 - October 2018	
Final Site Inspection	54. 001	W912QR-12-D-0002	
CC RVAAP-70 East Classification Yard	5b. GRANT NUMBER		
Ravenna Army Ammunition Plant Ravenna, Ohio	N/A		
	5c. PRO	GRAM ELEMENT NUMBER	
		N/A	
6. AUTHOR(S)	5d. PRO	JECT NUMBER	
Heyse, Edward		Delivery Order 0003	
Bartscherer, Janelle	5e. TAS	SK NUMBER	
Click, Jessica		12	
	5f. WO	RK UNIT NUMBER	
		N/A	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)		8. PERFORMING ORGANIZATION	
Parsons Government Services Inc.		REPORT NUMBER	
401 Diamond Drive NW		NA	
Huntsville, Alabama 35806			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)	
U.S. Army Corps of EngineersLouisville District		USACE	
600 Dr. Martin Luther King Jr. Place		11. SPONSOR/MONITOR'S REPORT	
Louisville, Kentucky 40202-0059		NUMBER(S)	
		N/A	
12. DISTRIBUTION/AVAILABILITY STATEMENT			
Please reference distribution page.			
13. SUPPLEMENTARY NOTES			
None.			
14. ABSTRACT			
This Report presents the results of a Site Investigation conducted at the compliance restoration Area of Concern (AOC) CC RVAAP-70, East Classification Yard. The AOC was used for switching and maintaining railroad cars at the former Ravenna Army Ammunition Plant (RVAAP). Potential sources of contamination investigated included railroad/locomotive maintenance activities, fuel releases, and herbicide storage and maintenance. Several polycyclic aromatic hydrocarbons (PAHs - benzo(a)anthracene, benzo (a)pyrene, benzo(b)fluoranthene), arsenic, and polychlorinated biphenyl (aroclor-1242) were identified as potential contaminants in subsurface soil. Based on results of the SI, this AOC is recommended to proceed to a remedial investigation for further evaluation in the CERCLA process.			
<b>15. SUBJECT TERMS</b> Compliance Restoration Site; East Classification Yard; Site Inspection; Remedial Investigation			
16. SECURITY CLASSIFICATION OF: 17. LIMITATION OF 18. NUMBER		ME OF RESPONSIBLE PERSON	
a. REPORT b. ABSTRACT c. THIS PAGE ABSTRACT OF PAGES	Edward	-	
U U U N/A 31,599	19b. TEL	EPHONE NUMBER (Include area code) (256) 217-2573	
		Reset Standard Form 298 (Rev. 8/98) Prescribed by ANSI Std. Z39.18	



John R. Kasich, Governor Mary Taylor, Lt. Governor Craig W. Butler, Director

November 21, 2018

Mr. David Connolly Re: Army National Guard Directorate Environmental Programs Division ARNG-ILE-CR 111 S. George Mason Dr. Arlington, VA 22204

US Army Ravenna Ammunition Plt RVAAP Remediation Response Project records Remedial Response Portage County 267000859220

Subject: Final Site Inspection Report, CC-RVAAP-70 East Classification Yard, September 13, 2018, Portage/Trumbull Counties, OHIO EPA ID # 267-000859-220

Dear Mr. Connolly:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office has reviewed the Final Site Inspection Report for CC-RVAAP-70, East Classification Yard dated and received by Ohio EPA on November 1, 2018. Ohio EPA approves the document as submitted.

If you have any questions or concerns related to this review or would like to schedule a meeting or conference call, please free feel to contact me at (330) 963-1170.

Sincerely,

burnere for

Edward J. D'Amato Project Coordinator Ohio EPA - Division of Emergency and Remedial Response

ED/nvp

ec: Rebecca Schreffler, Chenega Katie Tait, OHARNG RTLS Kevin Sedlak, ARNG Craig Coombs, USACE Louisville Nat Peters, USACE Louisville Mark Johnson, Manager, DERR, NEDO Bob Princic, Supervisor, DERR, NEDO Thomas Schneider, Ohio EPA, SWDO, DERR

Northeast District Office • 2110 East Aurora Road • Twinsburg, OH 44087-1924 epa.ohio.gov • (330) 963-1200 • (330) 487-0769 (fax)

#### CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Parsons has completed the Final Site Inspection Report CC RVAAP-70 East Classification Yard at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in this project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions was verified. This included review of data quality objectives; technical assumptions, methods, procedures, and materials to be used; the appropriateness of data used and the level of data obtained; and the reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing United States Corps of Engineers policy.

Independent Technical Reviewer:

Dan Griffiths, C.P.G, P.G.

**Technical Director** 

Parsons

#### **Report Preparer/Reviewer:**

Edward Heyse, Ph.D., P.E.

Project Manager

Parsons

15 August 2018

(Signature)

(Date)

Edward Degu

(Signature)

(Date)

11 September 2018

Final

# Site Inspection CC RVAAP-70 East Classification Yard Ravenna Army Ammunition Plant Restoration Program Camp Ravenna, Portage and Trumbull Counties, Ohio

October 31, 2018

Contract No.: W912QR-12-D-0002 Delivery Order: 0003

# **Prepared for:**

U.S. Army Corps of Engineers, Louisville District 600 Dr. Martin Luther King Jr. Place Louisville, Kentucky 40202-2267

#### **Prepared by:**



401 Diamond Drive NW Huntsville, AL 35806 256-837-5200

# FINAL DOCUMENT DISTRIBUTION

#### for the

### Site Inspection CC RVAAP-70 East Classification Yard

#### Ravenna Army Ammunition Plant Restoration Program Camp Ravenna, Ohio

Name/Organization	Number of Printed Copies	Number of Electronic Copies
David Connolly, ARNG-ILE-CR	0	1
Kevin Sedlak, ARNG	0	1
Katie Tait, OHARNG	1	0
Ed D'Amato, Ohio EPA-DERR-NEDO	1	1
Tom Schneider, Ohio EPA-SWDO	Transmitta	l Letter Only
Bob Princic, Ohio EPA-DERR-NEDO	Transmitta	l Letter Only
Mark Johnson, Ohio EPA-DERR-NEDO	Transmitta	l Letter Only
Gail Harris, RVAAP Administrative Record	2	2
Pat Ryan, REIMS	Email Transmittal Letter Only	
Craig Coombs, USACE – Louisville District	Email Transmittal Letter Only	
Kevin Mieczkowski, USACE – Louisville District	2	1

ARNG = Army National Guard

DERR = Division of Environmental Response and Restoration

NEDO = Northeast District Office

OHARNG = Ohio Army National Guard

Ohio EPA = Ohio Environmental Protection Agency

RVAAP = Ravenna Army Ammunition Plant

REIMS = Ravenna Environmental Information Management System

SWDO = Southwest District Office

USACE = United States Army Corps of Engineers

# TABLE OF CONTENTS

EXECUTIVE SUMMARY			
1.	INTRODUCTION1-1		
1.	1.1	OBJECTIVES	
	1.1	SCOPE	
	1.2	REPORT ORGANIZATION	
	1.5	REFORT ORGANIZATION	.1
2.	AREA	OF CONCERN BACKGROUND	
	2.1	FACILITY-WIDE BACKGROUND	-1
		2.1.1 Facility Location and Setting	-1
		2.1.2 Demography and Land Use	-1
	2.2	ENVIRONMENTAL SETTING	-1
		2.2.1 Physiographic Setting	-1
		2.2.2 Topography	-2
		2.2.3 Surface Soil and Geology	-2
		2.2.4 Hydrogeology	
		2.2.5 Surface Water	
		2.2.6 Climate	-3
		2.2.7 Surrounding Land Use	
		2.2.8 Ecology	
	2.3	AREA OF CONCERN DESCRIPTION AND OPERATIONAL HISTORY 2-	
		2.3.1 Area of Concern Description	
		2.3.2 Historical Records Review	
		2.3.3 Investigation History	
2			4
3.		DINVESTIGATION	
	3.1	RATIONALE FOR SAMPLING AND ANALYSES	
	3.2	PRE-SAMPLING SITE PREPARATION	
		3.2.1 2012 Mobilization	
		3.2.2 2018 Mobilization	
	3.3	SAMPLING METHODS	
		3.3.1 Surface Soil Sampling	
		3.3.2 Subsurface Soil Sampling	
	3.4	DEVIATIONS FROM WORK PLAN	
	3.5	SURVEYING	
	3.6	INVESTIGATION-DERIVED WASTE	0
		3.6.1 2012 Waste Handling	0
		3.6.2 2018 Waste Handling	0
4.	DATA	A EVALUATION	-1
••	4.1	DATA QUALITY	
	1.1	4.1.1 2012 Data Quality	
		4.1.1 2012 Data Quality	
		4.1.2 2010 Data Quality	.1

	4.2	SITE-RELATED CHEMICALS EVALUATION
	4.3	POTENTIAL CHEMICAL CONTAMINATION EVALUATION
	4.4	WEIGH-OF-EVIDENCE EVALUATION4-7
_		
5.		DSURE PATHWAYS
	5.1	SOIL EXPOSURE AND AIR PATHWAYS
		5.1.1 Physical Conditions
		5.1.2 Soil and Air Targets
		5.1.3 Soil Exposure and Air Pathway Conclusion
	5.2	SURFACE WATER AND SEDIMENT EXPOSURE PATHWAY
		5.2.1 Hydrological Setting
		5.2.2 Surface Water Targets
		5.2.3 Sediment Targets
		5.2.4 Surface Water Sediment Pathway Conclusions
	5.3	GROUNDWATER EXPOSURE PATHWAY
		5.3.1 Hydrogeology
		5.3.2 Groundwater Targets
		5.3.3 Groundwater Pathway Conclusion
6.	SUM	MARY AND CONCLUSIONS
	6.1	SUMMARY OF THE SITE INVESTIGATION ACTIVITIES
	6.2	SUMMARY AND CONCLUSIONS OF THE SITE RELATED CHEMICALS
	0.2	EVALUATION
		6.2.1 DU01: Former Fuel Oil Spill Area
		6.2.2 DU02 Drainage Ditch West of Building 47-40
		6.2.3 DU03 Building 47-40 Round House – Exterior
		6.2.4 DU04 Building 47-40 Round House – Interior
		6.2.5 DU05 Former Herbicide Storage Shed
		6.2.6 DU06 Outdoor Wash Rack Area
		6.2.7 DU07 Drainage Ditch East of Building 47-40
	6.3	SUMMARY AND CONCLUSIONS OF THE POTENTIAL CHEMICAL
	0.5	CONTAMINATION EVALUATION
	6.4	SUMMARY AND CONCLUSIONS OF THE EXPOSURE PATHWAYS 6-3
_		
7.	RECO	OMMENDATIONS
8.	REFE	ERENCES

# LIST OF TABLES

Table 3-1 Summary of Samples Collected at CC RVAAP-70 East Classification Yard 3-13
Table 4-1a Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification
Yard, Former Fuel Oil Spill Area (DU01)4-9
Table 4-1b Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification
Yard, Drainage Ditch West of Building 47-40 (DU02)4-11
Table 4-1c Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification
Yard, Building 47-40 Round House – Exterior (DU03)4-13
Table 4-1d Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification
Yard, Former Herbicide Storage Shed (DU05)4-15
Table 4-1e Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification
Yard, Outdoor Wash Rack Area (DU06)4-17
Table 4-1f Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification
Yard, Drainage Ditch East of Building 47-40 (DU07)4-19
Table 4-2a Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East
Classification Yard, Former Fuel Oil Spill Area (DU01)4-23
Table 4-2b Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East
Classification Yard, Building 47-40 Round House – Exterior (DU03)
Table 4-2c Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East
Classification Yard, Building 47-40 Round House – Interior (DU04)
Table 4-2d Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East
Classification Yard, Former Herbicide Storage Shed (DU05)4-31
Table 4-2e Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East
Classification Yard, Outdoor Wash Rack Area (DU06)
Table 4-3a Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70         Figure 1         Figure 2         Figure
East Classification Yard, Former Fuel Oil Spill Area (DU01)
Table 4-3b Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70         Figure 1         Figure 2         Figure
East Classification Yard, Drainage Ditch West of Building 47-40 (DU02) 4-39
Table 4-3c Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70         Figure 4.11
East Classification Yard, Building 47-40 Round House – Exterior (DU03)4-41
Table 4-3d Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70
East Classification Yard, Former Herbicide Storage Shed (DU05)
Table 4-3e Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70
East Classification Yard, Outdoor Wash Rack Area (DU06)
Table 4-3f Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70
East Classification Yard, Drainage Ditch East of Building 47-40 (DU07) 4-47
Table 4-4a Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC
RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)4-49
Table 4-4b Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC
<b>RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior</b>
(DU03)
Table 4-4c Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC
<b>RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior</b>
(DU04)

RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06) ...... 4-61

#### LIST OF FIGURES

Figure 1-1 General Location and Orientation of Former Ravenna Army Ammunition Plant
Figure 1-2 Site Location Map1-5
Figure 1-3 Site Layout1-7
Figure 2-1 Topography2-7
Figure 2-2 Soil Map
Figure 2-3 Geologic Map of Unconsolidated Deposits
Figure 2-4 Geologic Bedrock Map2-13
Figure 2-5 Surface Water Features and Surveyed Wetlands
Figure 3-1 Soil Sampling Locations
Figure 4-1 Site-Related Chemicals in Surface Soil at DU1, DU3, DU5 and DU6
Figure 4-2 Site-Related Chemicals in Surface Soil at DU2 and DU7
Figure 4-3 Site-Related Chemicals in Subsurface Soil at DU1
Figure 4-4 Site-Related Chemicals in Subsurface Soil at DU3
Figure 4-5 Site-Related Chemicals in Subsurface Soil at DU4
Figure 4-6 Site-Related Chemicals in Subsurface Soil at DU5
Figure 4-7 Site-Related Chemicals in Subsurface Soil at DU6
Figure 4-8 Potential Contaminants in Surface Soil
Figure 4-9 Potential Contaminants in Subsurface Soil

#### LIST OF APPENDICES

- Appendix A Historical Aerial Photos
- Appendix B Field Activity Forms
- **Appendix C** Boring Logs
- Appendix D Data Verification Reports
- Appendix E Analytical Results, Laboratory Analytical Reports, and Chain-of-Custody Forms
- Appendix F Data Validation Reports
- Appendix G IDW Disposal Letter Reports
- Appendix H Site Photographs
- Appendix I Survey Data
- Appendix J Regulatory Correspondence Letter

# LIST OF ACRONYMS AND ABBREVIATIONS

4,4-DDE	4,4-dichlorodiphenyldichloroethylene
4,4-DDT	4,4-dichlorodiphenyltrichloroethane
AOC	area of concern
ARNG	Army National Guard
AST	aboveground storage tank
BSV	Background Screening Value
BUSTR	Bureau of Underground Storage Tank Regulation
Camp Ravenna	Camp Ravenna Joint Military Training Center Ravenna
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability
	Act
CFR	Code of Federal Regulations
cm	centimeter
DLA	Defense Logistics Agency
DUs	decision units
ECC	Environmental Chemical Corporation
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
FWCUG	Facility-Wide Cleanup Goal
FWSAP	Facility-Wide Sampling and Analysis Plan
HQ	hazard quotient
HRR	Historical Records Review
IDW	Investigation-Derived Waste
ISM	incremental sampling methodology
MDC	maximum detected concentration
mg/kg	milligrams per kilogram
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tertiary-butyl ether
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum of 1988
NCP	National Oil and Hazardous Substances Contingency Plan
No.	Number
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA	quality assurance
QC	quality control
REIMS	Ravenna Environmental Information Management System
RI	Remedial Investigation
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant

# LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

SAIC SB	Science Applications International Corporation soil boring
SI	Site Inspection
SRCs	site-related chemicals
SS	surface soil sample
SVOCs	semivolatile organic compounds
TAL	target analyte list
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USP&FO	United States Property and Fiscal Officer
USTs	underground storage tanks
VOCs	volatile organic compounds
WOE	weight-of-evidence

#### **EXECUTIVE SUMMARY**

This Site Inspection (SI) for Camp Ravenna Compliance Restoration CC RVAAP-70 East Classification Yard area of concern (AOC) at the former Ravenna Army Ammunition Plant (RVAAP), in Portage and Trumbull counties, Ohio was initiated by Environmental Chemical Corporation (ECC), contracted by the United States Army Corps of Engineers (USACE)–Louisville District. Parsons was contracted by the USACE-Louisville District to complete the SI and SI Report under Contract No. W912QR-12-D-0002, Delivery Order No. 0003.

This SI was conducted in accordance with the *Final Inspection and Remedial Investigation Work Plan at Compliance Restoration Sites (Revision 0)* (ECC, 2012), the United States Environmental Protection Agency's (USEPA) Interim Final Guidance for Performing Site Inspections Under CERCLA (USEPA, 1992), and Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034-Motor Pool Hydraulic Lift (Parsons, 2017).

#### Area of Concern

The former RVAAP, now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), was originally equipped with east and west classification yards during the facility's early operational years to separate railroad cars onto one of several tracks. CC RVAAP-70 East Classification Yard is located east of Load Line 1 and the Main Defense Logistics Agency (DLA) Ore Storage Area in close proximity to the intersection of Ramsdell Road and Irons Road. No documentation was found during the Historical Records Review (HRR) to define the specific years of operation. The CC RVAAP-70 East Classification Yard AOC consists of Building 47-40 (the Round House still exists, but is not actively used), the former herbicide storage shed (former Building 47-60), the containment area for a former aboveground storage tank (AST) (documented spill of No. 5 fuel oil occurred within the containment area in 1986), and an outdoor open wash rack south of Building 47-40 (north of Butts-Kistler Road). A railroad track complex is located east of the AOC and is currently used by the Ohio Army National Guard (OHARNG). Two former 15,000-gallon diesel fuel underground storage tanks (USTs), RV-11 and RV-22, were located west of the wash rack, but were removed in February 1990 and received No Further Action in April 1992 (Science Applications International Corporation [SAIC], 2011b).

The CC RVAAP-70 East Classification Yard was used for switching and maintaining railroad cars. Building 47-40 (Round House) was used for locomotive engine repairs and other maintenance activities (SAIC, 2011b). The former herbicide storage shed was used to store a track-mounted herbicide sprayer and the herbicides used to control vegetation along the railroads at the former RVAAP. Interviewees for the HRR noted an outdoor open wash rack was located to the south of Building 47-40 was used to wash box cars. The wash rack was also reportedly used to wash the engines.

Potential sources of contamination include railroad/locomotive maintenance activities, fuel releases, and herbicide storage and maintenance (SAIC, 2011b). Typical chemicals/products used during locomotive maintenance activities may have included engine washing chemicals, valve oil, electrolytes (battery maintenance), locomotive black paint, solvents for parts degreasing, lubrication oil, metal preservatives, carbolineum, creosote, and cold patch asphalt. In addition, the resident locomotive stored within the Round House building also contained at least two polychlorinated biphenyl (PCB) transformers.

#### Site Investigation

The HRR (SAIC, 2011b) summarized historical records pertaining to operational history and potential waste releases at CC RVAAP-70 East Classification Yard. The HRR (SAIC, 2011b) made specific recommendations for SI sampling and analysis at the potential release areas within the AOC.

SI field work was detailed in work plans (ECC, 2012 and Parsons, 2017) and sampling was conducted in November and December 2012, April 2013, and January and February 2018. Surface and subsurface soil were sampled at CC RVAAP-70 East Classification Yard to determine the presence of site-related chemicals (SRCs) and identify potential contaminants within the AOC. Surface water and sediment were not present at this AOC during the SI field work in 2012 and 2018, but surface water was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

The following decision units (DUs) were defined and investigated:

- Former Fuel Oil Spill Area DU01
- Drainage Ditch West of Building 47-40 DU02
- Building 47-40 (Round House)
  - Building 47-40 Round House Exterior DU03
  - Building 47-40 Round House Interior– DU04
- Former Herbicide Storage Shed DU05
- Outdoor Wash Rack Area DU06
- Drainage Ditch East of Building 47-40 DU07

#### Site-Related Chemicals Identified

Data generated during the CC RVAAP-70 East Classification Yard SI were screened to identify SRCs. A chemical detected at a concentration greater than the established Background Screening Value (BSV), that is not an essential nutrient, and has not been screened out through a frequency of detection evaluation is identified as an SRC. An SRC may, or may not be, related to the former operations at the AOC.

#### DU01: Former Fuel Oil Spill Area

Two petroleum hydrocarbons and 10 semivolatile organic compounds (SVOCs) (all polycyclic aromatic hydrocarbons [PAHs]) were identified as SRCs in surface soil. Two inorganics, one explosive, three petroleum hydrocarbons, 18 SVOCs (15 PAHs) and 8 volatile organic compounds (VOCs) were identified as SRCs in subsurface soil.

DU02 Drainage Ditch West of Building 47-40

Two petroleum hydrocarbons and 13 SVOCs (all PAHs) were identified as SRCs in surface soil.

DU03 Building 47-40 Round House – Exterior

Ten inorganics, 1 PCB, and 18 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, 17 SVOCs, and 5 VOCs were identified as SRCs in subsurface soil.

#### DU04 Building 47-40 Round House - Interior

Four inorganics, 9 SVOCs (7 PAHs), and 4 VOCs were identified as SRCs in subsurface soil.

#### DU05 Former Herbicide Storage Shed

One pesticide and 17 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, one petroleum hydrocarbon, one pesticide, 17 SVOCs, and 6 VOCs were identified as SRCs in subsurface soil.

#### DU06 Outdoor Wash Rack Area

One explosive, one PCB, and 17 SVOCs (14 PAHs) were identified as SRCs in surface soil. One explosive, one petroleum hydrocarbon, one PCB, 14 SVOCs (11 PAHs), and two VOCs were identified as SRCs in subsurface soil.

#### DU07 Drainage Ditch East of Building 47-40

Fourteen inorganics, one explosive, two petroleum hydrocarbons, two pesticides, three PCBs, 16 SVOCs (15 PAHs), and one VOC were identified as SRCs in surface soil.

#### **Potential Chemical Contamination Evaluation**

The maximum detected concentration (MDC) of each SRC identified by the SI at each DU was compared to its most stringent Facility-Wide Cleanup Goal (FWCUG) (SAIC, 2010) for the Resident Receptor (or May 2018 USEPA Residential Receptor Regional Screening Level [RSL] if no FWCUG is established) using the target cancer risk level of 10<sup>-6</sup> or the target hazard quotient (HQ) for non-carcinogenic risks of 0.1 to determine the presence of potential contaminants. Because FWCUGs have not yet been updated with 2017 toxicity values for PAHs, PAH concentrations were also compared to May 2018 RSLs.

The MDC of the total petroleum hydrocarbon (TPH) SRCs were compared to Bureau of Underground Storage Tank Regulation (BUSTR) (Ohio Department of Commerce, 2017) Soil Class 2 criteria because FWCUGs have not been established for petroleum hydrocarbons.

The SRCs that exceeded the most stringent value FWCUG for the Resident Receptor (or RSLs or BUSTR if no FWCUG is established), using a target cancer risk level of  $10^{-6}$  or the target HQ = 0.1 for non-carcinogenic risks, were then evaluated using a weight-of-evidence (WOE) approach. The WOE evaluation considers the SRCs that exceed their FWCUGs (or RSL or BUSTR) criteria, as described above, to determine if the chemical should be identified as a potential contaminant.

Potential contaminants were identified in surface and subsurface soil at CC RVAAP-70 East Classification Yard.

#### DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

#### DU02 Drainage Ditch West of Building 47-40

• Surface soil: benzo(a)pyrene

#### DU03 Building 47-40 Round House

• Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

#### • Subsurface soil: none

#### DU04 Building 47-40 Round House – Interior

• Subsurface soil: none

#### DU05 Former Herbicide Storage Shed

- o Surface soil: benzo(a)pyrene
- o Subsurface soil: none

#### DU06 Outdoor Wash Rack Area

- Surface soil: benzo(a)pyrene
- o Subsurface soil: none

#### DU07 Drainage Ditch East of Building 47-40

• Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

#### **Exposure Pathways**

PAHs, arsenic, and aroclor-1242 were detected in surface soil at concentrations above FWCUGs or May 2018 RSLs. PAHs were detected in subsurface soil at concentrations above May 2018 RSLs. The exposure pathway for soil is considered complete at this AOC. The exposure pathway for air is incomplete.

There are no perennial surface water streams or wetlands in the immediate vicinity of the CC RVAAP-70 East Classification Yard AOC. Benzo(a)pyrene, arsenic, and aroclor-1242 were detected in surface soil in drainage ditches at concentrations above FWCUGs. The exposure pathway for surface water is incomplete because surface water is only intermittently present at the AOC. Soil transport with intermittent surface water flow in the ditches may be a migration pathway for potential contaminants related to this AOC.

PAHs have been detected at concentrations above May 2018 RSLs in subsurface soils, indicating a potential for vertical migration of contaminants to groundwater. However, PAHs have low solubility and rarely impact groundwater. Groundwater is not present in unconsolidated soils at CC RVAAP-70 East Classification Yard. The groundwater exposure pathway is not complete because no groundwater production wells are completed at or near the CC RVAAP-70 East Classification Yard.

#### Recommendations

Further evaluation in a Remedial Investigation (RI) is recommended for CC RVAAP-70 East Classification Yard due to potential contaminants in surface and subsurface soil.

#### DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

#### DU02 Drainage Ditch West of Building 47-40

• Surface soil: benzo(a)pyrene

#### DU03 Building 47-40 Round House - Exterior

o Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

### DU05 Former Herbicide Storage Shed

• Surface soil: benzo(a)pyrene

DU06 Outdoor Wash Rack Area

• Surface soil: benzo(a)pyrene

### DU07 Drainage Ditch East of Building 47-40

• Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

No further investigation is recommended for subsurface soil at DU03 Building 47-40 Round House - Exterior, DU04 Building 47-40 Round House – Interior, DU05 Former Herbicide Storage Shed, and DU06 Outdoor Wash Rack Area as no potential contaminants were identified.

# 1. INTRODUCTION

This Site Inspection (SI) for Camp Ravenna Compliance Restoration CC RVAAP-70 East Classification Yard area of concern (AOC) at the former Ravenna Army Ammunition Plant (RVAAP), in Portage and Trumbull counties, Ohio was initiated by Environmental Chemical Corporation (ECC), contracted by the United States Army Corps of Engineers (USACE)–Louisville District. Parsons was contracted by the USACE-Louisville District to complete the SI under Contract No. W912QR-12-D-0002, Delivery Order No. 0003.

This SI was conducted in accordance with the United States Environmental Protection Agency's (USEPA) *Federal Facilities Remedial Site Inspection Summary Guide* (USEPA, 2005b). The work described in this SI report was conducted in accordance with two work plans: the *Final Site Inspection and Remedial Investigation Work Plan at Compliance Restoration Sites (Revision 0), Ravenna Army Ammunition Plant, Ravenna, Ohio* (ECC, 2012) and the *Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034-Motor Pool Hydraulic Lift, Camp Ravenna, Portage and Trumbull Counties, Ohio (Parsons, 2017). The work was also conducted in accordance with the <i>Facility-Wide Sample and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (Science Applications International Corporation [SAIC], 2011a).

# 1.1 **OBJECTIVES**

The purpose of this SI was to evaluate if soil at the CC RVAAP-70 East Classification Yard AOC has chemicals present at concentrations great enough to be defined as contamination. Surface water and sediment were not present at this AOC during the SI field work in 2012 and 2018, but surface water was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

# 1.2 SCOPE

The location of the former RVAAP is provided on Figure 1-1 and the location of CC RVAAP-70 East Classification Yard is shown on Figure 1-2. A site layout diagram of CC RVAAP-70 East Classification Yard is shown on Figure 1-3. Soil samples were collected from potential release areas by ECC in 2012 and 2013, and additional samples were collected by Parsons in 2018. Sample analytical results were assessed to evaluate the presence or absence of contamination. Essential minerals and metals present within background levels are eliminated as potential contaminants. Contamination is identified if the detected concentrations of chemicals were greater than the most stringent Facility-Wide Cleanup Goals (FWCUGs) (SAIC, 2010) established for the Resident Receptor at the former RVAAP in surface or subsurface soils. Concentrations were compared to USEPA Residential Receptor Regional Screening Levels (RSLs) (USEPA, May 2018) at cancer risk of  $1 \times 10^{-6}$  or a hazard quotient (HQ) of 0.1 for those analytes without established FWCUGs, and for polycyclic aromatic hydrocarbons (PAHs) because USEPA updated the toxicity of these compounds after FWCUGs were developed. The potential for contamination to migrate and contact receptors was also evaluated.

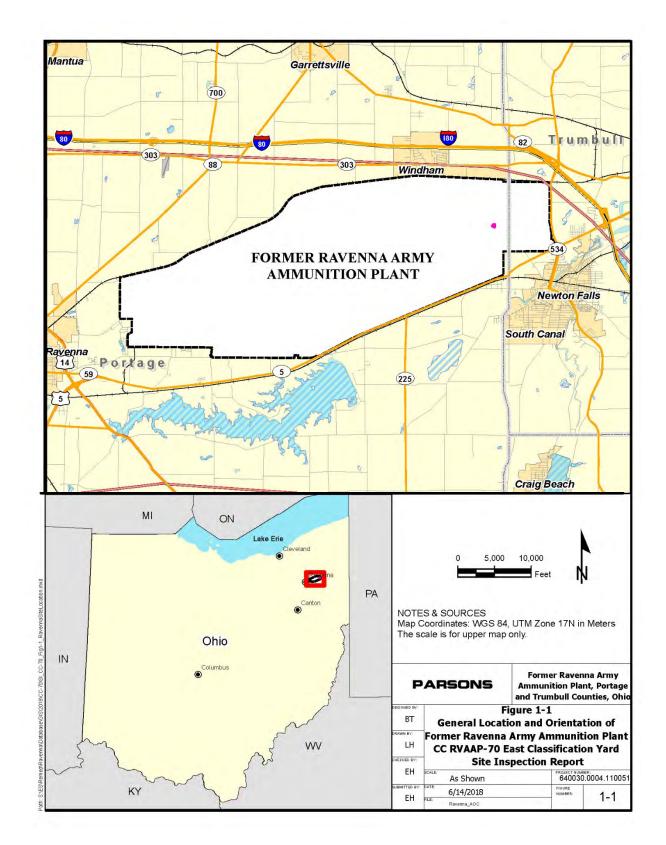
# **1.3 REPORT ORGANIZATION**

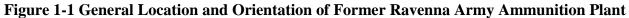
The SI report is organized into the following sections:

- Section 1 (Introduction) Provides an overview of the purpose, scope and organization of this SI.
- Section 2 (Area of Concern Background) Describes Camp Ravenna's location, operational history, demography, land use, as well as the AOC description, operational history, and previous investigations. This section also describes the environmental setting at Camp Ravenna including geology, hydrogeology, climate, potential human and ecological receptors.
- Section 3 (Field Investigation) Describes the scope of work completed and the procedures followed during this SI, including a discussion of the sampling rationale for placement of environmental media sampling locations, field activity procedures, laboratory methods, and protocols. Included in this section are the site preparation activities and the field sampling methods for the surface and subsurface soil sampling. Any deviations from the work plan are outlined in this section. In addition, this section details surveying and the characterization and management of wastes generated during the field work.
- Section 4 (Data Evaluation) Describes the analytical data generated during the SI and discusses the presence or absence of contamination at CC RVAAP-70 East Classification Yard.
- Section 5 (Exposure Pathways) Describes the potential for contaminants to migrate in the environment and contact receptors.
- Section 6 (Summary and Conclusions) Summarizes results of this SI and presents conclusions regarding the presence or absence of contamination at CC RVAAP-70 East Classification Yard.
- Section 7 (Recommendations) Contains recommendations for follow-on actions.
- Section 8 (References) Lists references used to prepare this document.

The appendices to this document contain the summarized investigation data, including:

- o Appendix A Historical Aerial Photos
- Appendix B Daily Reports and Field Activity Logs
- Appendix C Boring Logs
- Appendix D Data Verification Reports
- Appendix E Analytical Results, Laboratory Reports, and Chain-of-Custody Forms
- Appendix F Data Validation Reports
- Appendix G IDW Disposal Letter Reports
- Appendix H Site Photographs
- Appendix I Survey Data
- Appendix J Regulatory Correspondence Letters and Response to Comments Response





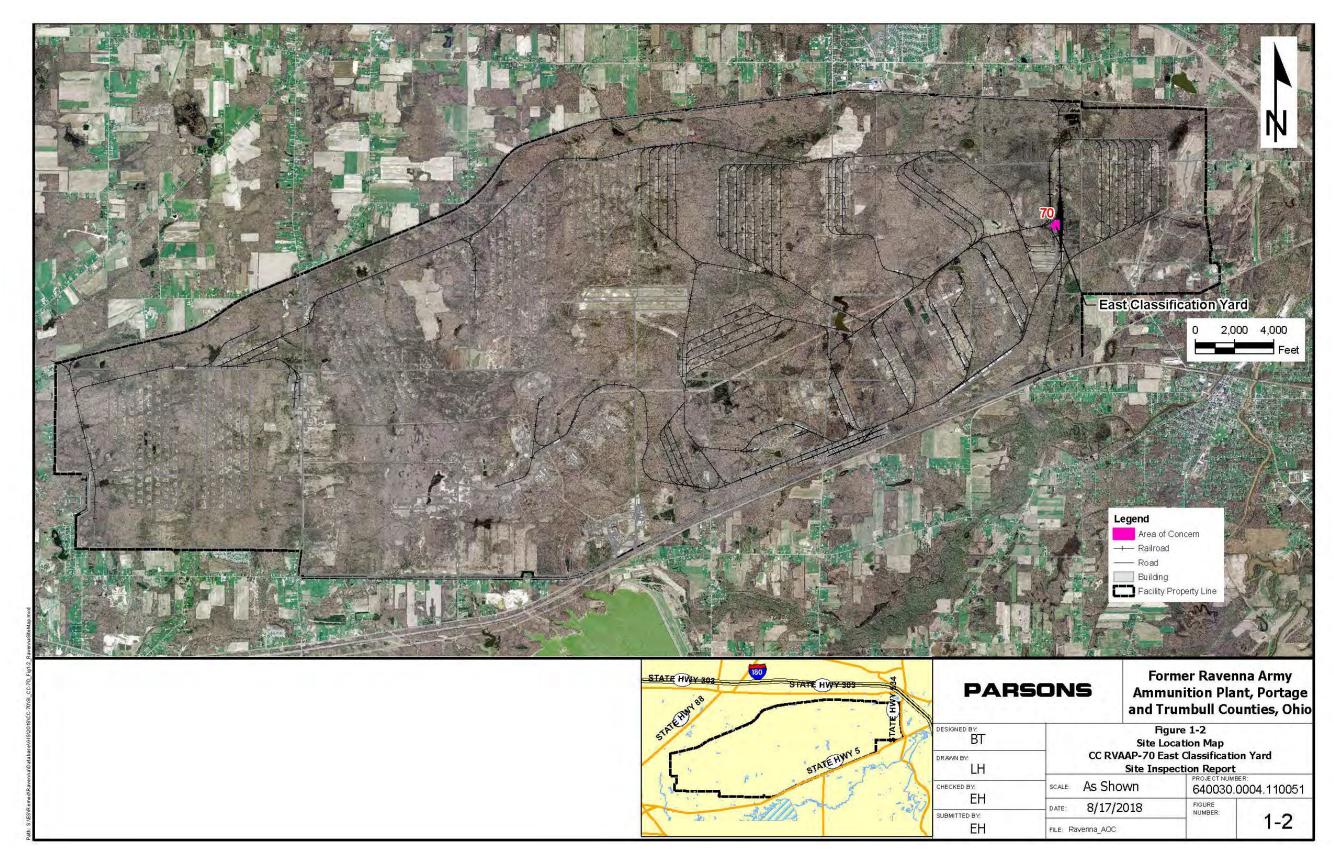
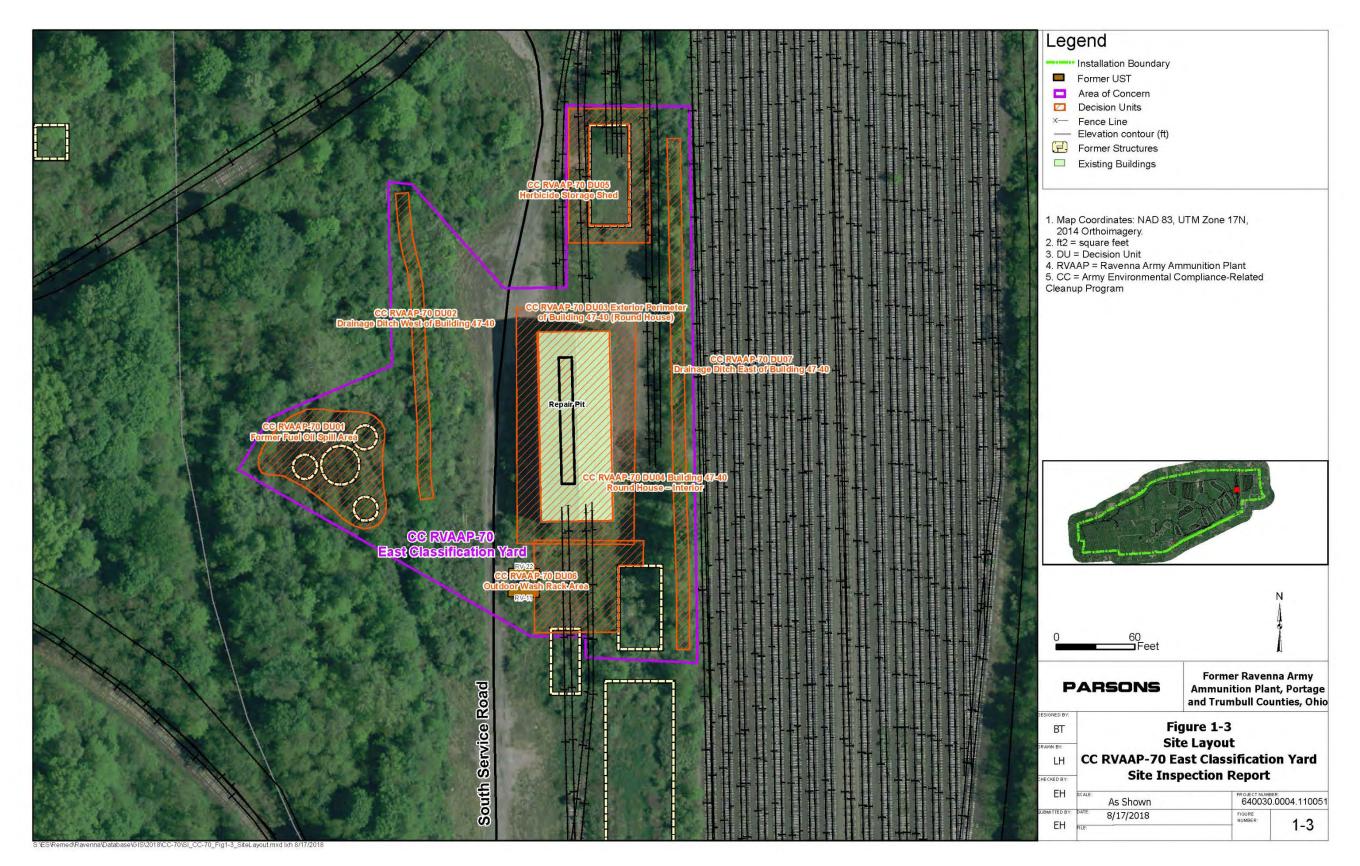


Figure 1-2 Site Location Map



**Figure 1-3 Site Layout** 

# 2. AREA OF CONCERN BACKGROUND

# 2.1 FACILITY-WIDE BACKGROUND

### 2.1.1 Facility Location and Setting

The former RVAAP, now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), is located in northeastern Ohio within Portage and Trumbull counties. Camp Ravenna is approximately three (3) miles east/northeast of the City of Ravenna and one (1) mile north/northwest of the City of Newton Falls (Figure 1-1). Camp Ravenna is federally owned and is approximately 11 miles long and 3.5 miles wide. Camp Ravenna is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad to the south; Garret, McCormick, and Berry Roads to the west; the Norfolk Southern Railroad to the north; and State Route 534 to the east. In addition, Camp Ravenna is surrounded by the communities of Windham, Garrettsville, Charlestown, and Wayland.

#### 2.1.2 Demography and Land Use

The 2010 Census reports that the populations of Portage and Trumbull counties are 161,419 and 210,312, respectively. Population centers closest to Camp Ravenna are Ravenna, with a population of 11,724, and Newton Falls, with a population of 4,795.

Camp Ravenna is located in a rural area and is not close to any major industrial or developed areas. Approximately 55 percent of Portage County, in which the majority of Camp Ravenna is located, consists of either woodland or farmland acreage. The closest major recreational area, the Michael J. Kirwan Reservoir (also known as West Branch Reservoir), is south of Camp Ravenna.

The facility, previously known as the RVAAP, was formerly used as a load, assemble, and pack facility for munitions production. As of September 2013, administrative accountability for the entire 21,683-acre facility has been transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio and the property subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site, Camp Ravenna. The RVAAP restoration program involves cleanup of former production/operational areas throughout Camp Ravenna related to former activities conducted under the RVAAP.

#### 2.2 ENVIRONMENTAL SETTING

This section describes the physical features, topography, geology, hydrogeology, and environmental characteristics of Camp Ravenna and CC RVAAP-70 East Classification Yard.

#### 2.2.1 Physiographic Setting

Camp Ravenna is located within the Southern New York Section of the Appalachian Plateaus physiographic province (U.S. Geological Survey, 1968). This province is characterized by elevated uplands underlain primarily by Mississippian and Pennsylvanian age bedrock units that are horizontal or gently dipping. The province is characterized by its rolling topography with incised streams having dendritic drainage patterns. The Southern New York Section has been modified by glaciation, which rounded ridges, filled major valleys, and blanketed many areas with glacially-derived unconsolidated deposits (e.g., sand, gravel, and finer-grained outwash deposits). As a result of glacial activity in this section, old stream drainage patterns were disrupted in many locales, and extensive wetland areas developed.

# 2.2.2 Topography

The topography of Camp Ravenna is gently undulating with an overall decrease in ground elevation from a topographic high of approximately 1,220 feet above mean sea level (ft amsl) in the far western portion of Camp Ravenna to low areas at approximately 930 ft amsl in the far eastern portion of Camp Ravenna.

USACE mapped Camp Ravenna topography in February 1998 using a 2-ft (60.1-centimeter [cm]) contour interval with an accuracy of 0.02 ft (0.61 cm). USACE based the topographic information on aerial photographs taken during the spring of 1997 (Appendix A). The USACE survey is the basis for the topographical information illustrated in figures included in this report.

Local topography is relatively flat at CC RVAAP-70 East Classification Yard. The ground surface elevation is between 950 and 960 ft amsl (Figure 2-1) and slopes gently to the east.

## 2.2.3 Surface Soil and Geology

The surficial soil unit at CC RVAAP-70 East Classification Yard is mapped as Mahoning silt loam or Fitchville silt loam (Figure 2-2). These soils are Hiram Till glacial deposits (Figure 2-3). The bedrock underlying the AOC is Sharon Sandstone. The elevation of bedrock at CC RVAAP-70 East Classification Yard is approximately 950 ft amsl (Figure 2-4) or less than 10 feet below ground surface (ft bgs).

## 2.2.4 Hydrogeology

Groundwater flow across Camp Ravenna is generally to the east. Most wells yield 5 to 20 gallons per minute from sandstone units of the Pottsville Group, of which the Sharon Sandstone is a member (Winslow and White, 1966). Wells may yield as much as 800 gallons per minute where the sandstone units are of large thickness, areal extent, and permeability.

The potentiometric surface for Camp Ravenna aquifers is mapped annually from groundwater elevation measurements in monitoring wells, most recently in the Facility-Wide Groundwater Monitoring Program, RVAAP-66 Facility-Wide Groundwater Annual Report for 2015 (TEC-WESTON Joint Venture, 2016). The groundwater flow direction in the unconsolidated aquifer is generally to the east. Groundwater and/or saturated conditions were not observed in soil borings. Therefore, it has been determined that groundwater does not exist in unconsolidated soils at CC RVAAP-70 East Classification Yard.

#### 2.2.5 Surface Water

Surface water on Camp Ravenna consists primarily of streams and small ponds and lakes. Surface water on the central and eastern portions of the facility flows generally to the northeast, eventually entering the Mahoning River. Surface water on the western portion of the facility generally flows to the south into the Michael J. Kirwan Reservoir. There are no permanent surface waters or wetlands located within CC RVAAP 70 East Classification Yard. Ditches located east and west of Building 47-40 periodically contain water. The closest permanent surface water feature is a tributary to the west branch of the Mahoning River and associated wetlands approximately 2,000 feet north and northeast of AOC CC RVAAP-70 East Classification Yard (Figure 2-5).

# 2.2.6 Climate

Camp Ravenna is located in a temperate region of Ohio with annual precipitation of 36 to 39 inches. The average July high temperature is 82 °F and the average January low temperature is 18 °F.

## 2.2.7 Surrounding Land Use

Camp Ravenna is located in northeastern Ohio within Portage County and Trumbull County. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 6 miles to the northwest; Newton Falls 1 mile to the southeast; Charlestown to the southwest; and Wayland 3 miles to the south. The land surrounding Camp Ravenna consist primarily of residential and farm land along with some areas of commercial and light industrial use.

## 2.2.8 Ecology

Camp Ravenna has a diverse range of vegetation and habitat resources. Habitats present within Camp Ravenna include large tracts of closed-canopy hardwood forest, scrub/shrub open areas, grasslands, wetlands, open-water ponds and lakes, and semi-improved administration areas (OHARNG, 2014).

Vegetation at Camp Ravenna can be grouped into three categories: herb-dominated, shrubdominated, and tree-dominated. Approximately 60% of Camp Ravenna is covered by forest or tree-dominated vegetation. Camp Ravenna has seven forest formations, four shrub formations, eight herbaceous formations, and one non-vegetated formation (OHARNG, 2014). There is a treecutting restriction from 1 April to 30 September.

Surface water features within Camp Ravenna include a variety of streams, ponds, floodplains and wetlands. Numerous streams drain Camp Ravenna, including approximately 19 miles of perennial streams. Approximately 282 acres of ponds are found on Camp Ravenna. These ponds provide valuable habitat and support to wood ducks, hooded mergansers, mallards, Canada geese, and other birds and wildlife species. Some ponds have been stocked with fish and are used for fishing and hunting (OHARNG, 2014). Wetlands are abundant and prevalent throughout Camp Ravenna. These wetland areas include seasonal wetlands, wet fields, and forested wetlands. Most of the wetland areas on Camp Ravenna are the result of natural drainage and beaver activity; however, some wetland areas are associated with anthropogenic settling ponds and drainage areas.

An abundance of wildlife is present on Camp Ravenna; 35 species of land mammals, 214 species of birds, 47 species of fish, and 34 species of amphibians and reptiles have been identified (OHARNG, 2014). The federally threatened Northern Long Eared Bat is present at Camp Ravenna. Ohio State-listed plant and animal species have been identified through confirmed sightings and/or biological inventories at Camp Ravenna.

### 2.3 AREA OF CONCERN DESCRIPTION AND OPERATIONAL HISTORY

#### 2.3.1 Area of Concern Description

The former RVAAP was originally equipped with east and west classification yards during the facility's early operational years. CC RVAAP-70 East Classification Yard is located east of Load Line 1 and the Main Defense Logistics Agency (DLA) Ore Storage Area in close proximity to the intersection of Ramsdell Road and Irons Road (Figure 1-3). No documentation was found during the Historical Records Review (HRR) to define the specific years of operation of the AOC. The CC RVAAP-70 East Classification Yard AOC consists of Building 47-40 (the Round House still

exists, but is not actively used), the former herbicide storage shed (former Building 47-60), the containment area for a former aboveground storage tank (AST) (documented spill of No. 5 fuel oil occurred within the containment area in 1986), and an outdoor open wash rack south of Building 47-40 (north of Butts-Kistler Road). A railroad track complex is located east of the AOC and is currently used by the OHARNG. Most of the other rail lines in the area have been removed. Two former 15,000-gallon diesel fuel underground storage tanks (USTs), RV-11 and RV-22, were located west of the wash rack, but were removed in February 1990 and received No Further Action in April 1992 (SAIC, 2011b).

The CC RVAAP-70 East Classification Yard was used for switching and maintaining railroad cars. Building 47-40 (Round House) was used for locomotive engine repairs and other maintenance activities (SAIC, 2011b). The former herbicide storage shed was used to store a track-mounted herbicide sprayer and the herbicides used to control vegetation along the railroads at the former RVAAP. Interviewees for the HRR noted an outdoor open wash rack was located to the south of Building 47-40 was used to wash box cars. The wash rack was also reportedly used to wash the engines.

Potential sources of contamination include railroad maintenance activities, fuel release, and herbicide storage and maintenance (SAIC, 2011b). Typical chemicals/products used during locomotive maintenance activities may have included engine washing chemicals, valve oil, electrolytes (battery maintenance), locomotive black paint, solvents for parts degreasing, lubrication oil, metal preservatives, carbolineum, creosote, and cold patch asphalt. In addition, the resident locomotive stored within the Round House building also contained at least two polychlorinated biphenyl (PCB) transformers.

# 2.3.2 Historical Records Review

The following paragraphs summarize details for CC RVAAP-70 East Classification Yard presented in the *Final Historical Records Review Report for the 2010 Phase I Remedial Investigation Services at Compliance Restoration Sites (9 Areas of Concern), Ravenna Army Ammunition Plant, Ravenna, Ohio* (SAIC, 2011b).

A spill report dated 11 August 1986 documents a leak of No. 5 fuel oil from an AST (Tank 65B) from the CC RVAAP-70 East Classification Yard. The spill report indicates that a broken valve caused the leak. The entire contents of the tank emptied into the bermed containment area. The report indicates the containment area was scarified and the contaminated soil was piled within the containment area. However, no quantities of contaminated soil were noted. The report indicates that approximately 16,632 gallons of fuel oil was salvaged from the containment area and approximately 120 gallons of oil mixed with dirt and straw were to be disposed per Ohio Environmental Protection Agency (Ohio EPA) instructions. The report indicates that straw was placed on oil in areas where the equipment could not reach, such as beneath the support structures and by piping. Samples of the contaminated soil were collected to determine if the contaminated soil could be incinerated in accordance with the regulations at that time, and the soil met the criteria for incineration. No final report regarding the cleanup was found during the HRR. The tanks had since been removed from the AOC and the area was overgrown with vegetation during the HRR site walks. The HRR recommended that surface and subsurface soil within, and in the vicinity of, the former tank containment area and surface soil and dry sediment within any nearby surface water conveyances be analyzed for semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs).

Building 47-40 (Round House) was used as a locomotive maintenance and repair building. Building 47-40 still exists but is no longer used for any purpose. The interior of the building contains a floor pit that was used by personnel to access the undersides of the engines for repair. No documented evidence related to spills or releases were found for the Round House building. Building 47-40 also contained at least two PCB transformers. Service to the transformers is unknown. Interviewees indicated the transformer oil was tested for PCBs; however, no records of testing were discovered during the HRR. Staining from past operations was visible on the concrete floor within the building. No other visible evidence of impacts was noted during the property visit/perimeter survey. The HRR recommended that surface soil and dry sediment samples around doors and service bay entrances and in drainage ditches leading from the building to the storm sewer inlets located around the building be analyzed for target analyte list (TAL) metals, SVOCs, and PCBs. (Note, the HRR term "dry sediment" referred to soil that is only intermittently covered with surface water. "Dry sediment" is surface soil.)

A storage shed used to store herbicides and a track mounted sprayer was located in the CC RVAAP-70 East Classification Yard. Herbicide mixing operations may also have occurred at the building. The interviewees noted the herbicides may have been mixed with waste oil and applied for vegetation control. The HRR did not identify any documents relating to spills or releases from herbicide storage and mixing. No documentation was found, but some herbicide applications used petroleum products (e.g., oil, kerosene, diesel fuel) as carrier agents. No documentation was found pertaining to the amount of herbicides stored in the herbicide storage shed; however, one interviewee noted the amount stored was approximately 20 gallons. No visible signs that a spill or release had occurred (e.g., stained soil, stressed vegetation) were observed in the area of the former herbicide storage shed. The HRR recommended that surface soil near the former shed and in any runoff conveyances be analyzed for herbicides and SVOCs.

Two interviewees noted the presence of an outdoor wash rack, assumed to be used to wash down the box cars and/or the train engines, on site. The wash rack was outdoors and open with no means of collecting wastewater. No documents related to the wash rack were discovered during the HRR. The wash rack was reportedly supplied with water from nearby Well House #15. One interviewee noted there were no controls in place to collect the wash water. Field personnel noted the potential location of the wash rack just south of Building 47-40 and north of Butts-Kistler Road. Concrete AST supports were discovered at the location along with old abandoned pipes and valves, assumed to be water pipes from the well house. No visual evidence of impacts (e.g., stained soil, stressed vegetation) from the tank or wash rack activities was observed. The HRR recommended that surface soil and dry sediment in the vicinity of the former wash rack and any runoff conveyances be analyzed for explosives, SVOCs, and PCBs.

## 2.3.3 Investigation History

The HRR (SAIC, 2011b) summarized historical records pertaining to operational history and chemical that may have been released during former operations at CC RVAAP-70 East Classification Yard. The HRR (SAIC, 2011b) made specific recommendations for SI sampling and analysis at the potential release areas within the AOC.

Initial SI field work was detailed in a work plan (ECC, 2012) and sampling was conducted in November and December 2012 and April 2013. A work plan was developed for additional sampling (Parsons, 2017), which was conducted at CC RVAAP-70 East Classification Yard in January and February 2018.



Path: S\ES\Remed\Ravenna\Database\GIS\2018\CC-70\SI\_CC-70\_Fig2-1\_Topo.mxd

Figure 2-1 Topography

and a second	GEND
10-foot Top	oographic Contour Line
Existing Bu	uildings
Former Str	ucture
Area of Co	ncern
Road	
NOTES 8	& SOURCES
	n Feet.
Uleanun Prodram	
Cleanup Program	
0 100	eet N
0 100	ret N
0 100	vet N
0 100	eet N
0 100	et n
0 100	
0 100	Former Ravenna Arn Ammunition Plant, Por and Trumbull Counties,
0 100	Former Ravenna Arn Ammunition Plant, Por and Trumbull Counties,
0 100 Fe PARSONS Figu Topo	Former Ravenna Arn Ammunition Plant, Por and Trumbull Counties, Irre 2-1 bgraphy
0 100 PARSONS Figu Topo C RVAAP-70 Eas	Former Ravenna Am Ammunition Plant, Por and Trumbull Counties, I <b>rre 2-1</b>
D 100 Fe PARSONS Figu Topo C RVAAP-70 Eas	Former Ravenna Am Ammunition Plant, Por and Trumbull Counties, Ire 2-1 bgraphy t Classification Y

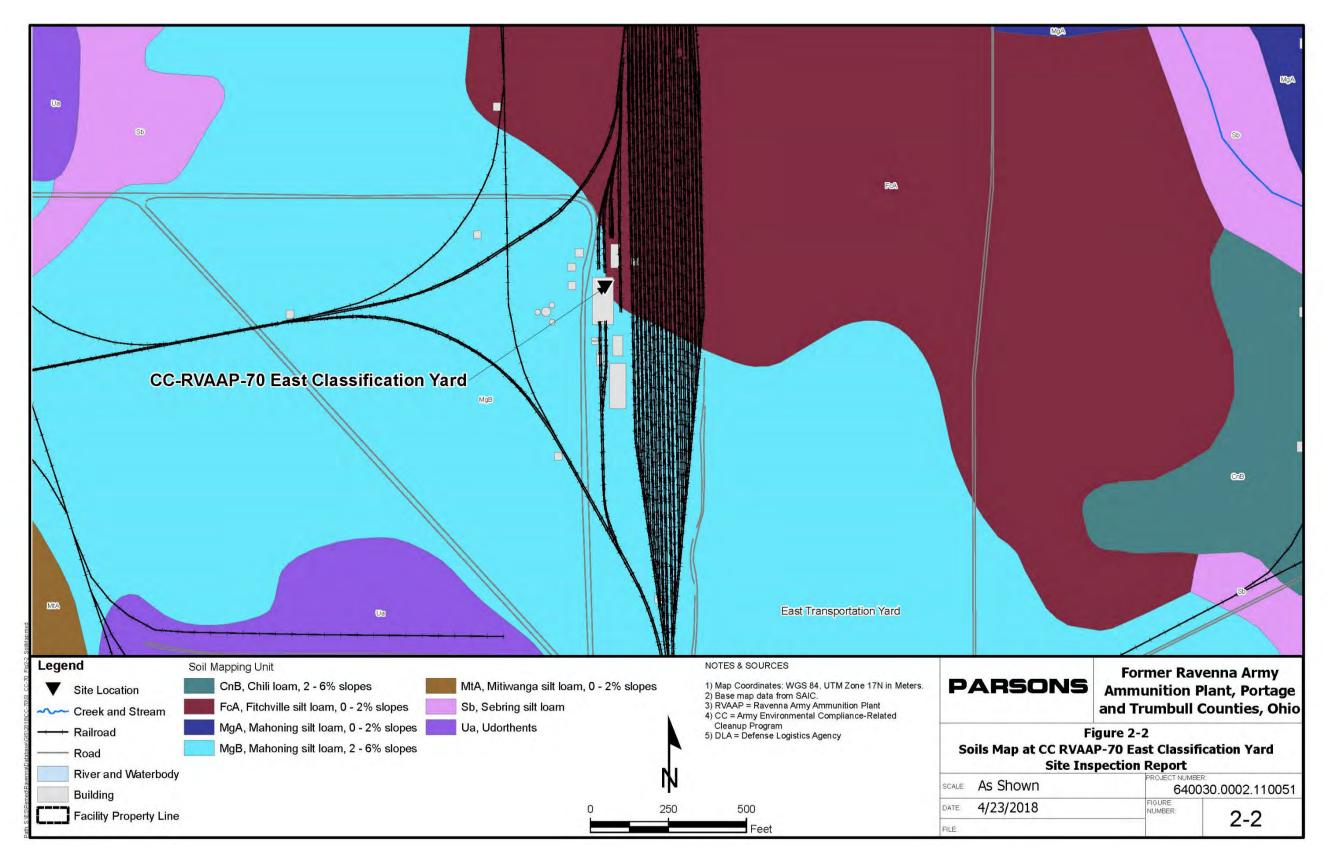


Figure 2-2 Soil Map

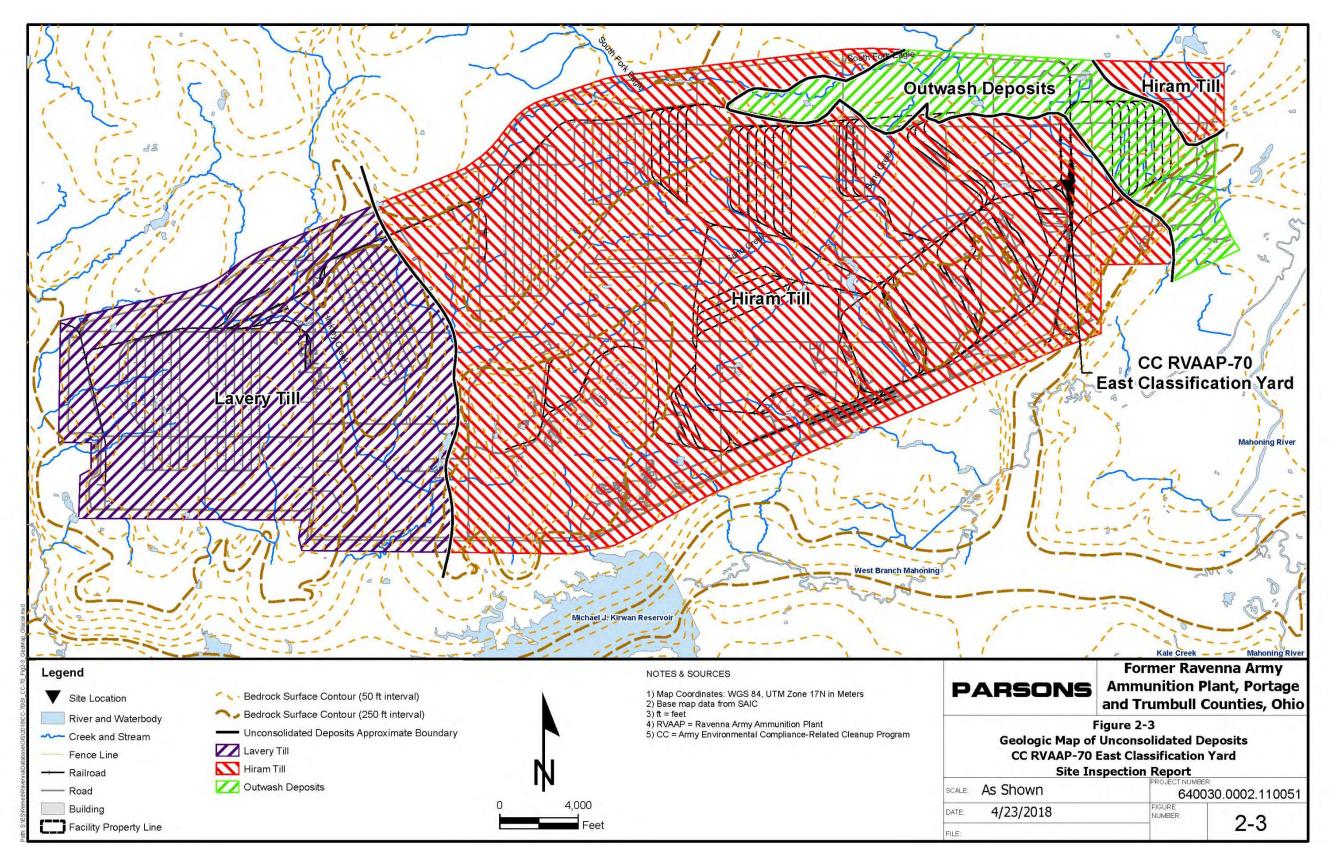


Figure 2-3 Geologic Map of Unconsolidated Deposits

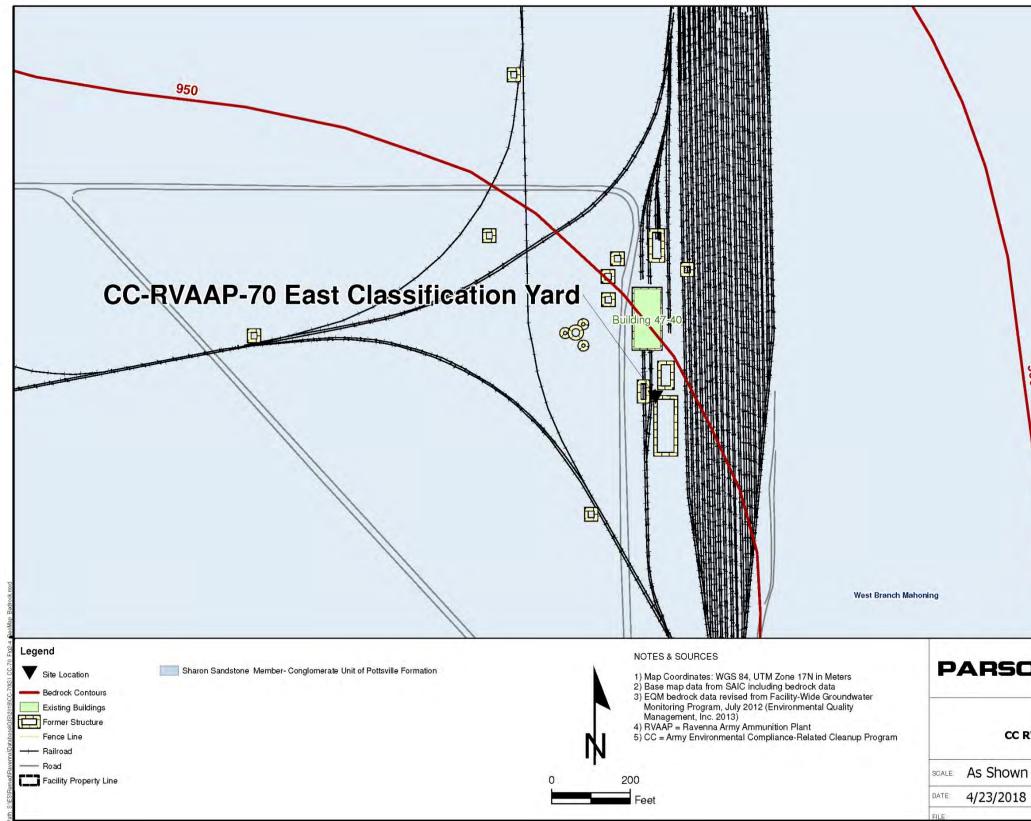
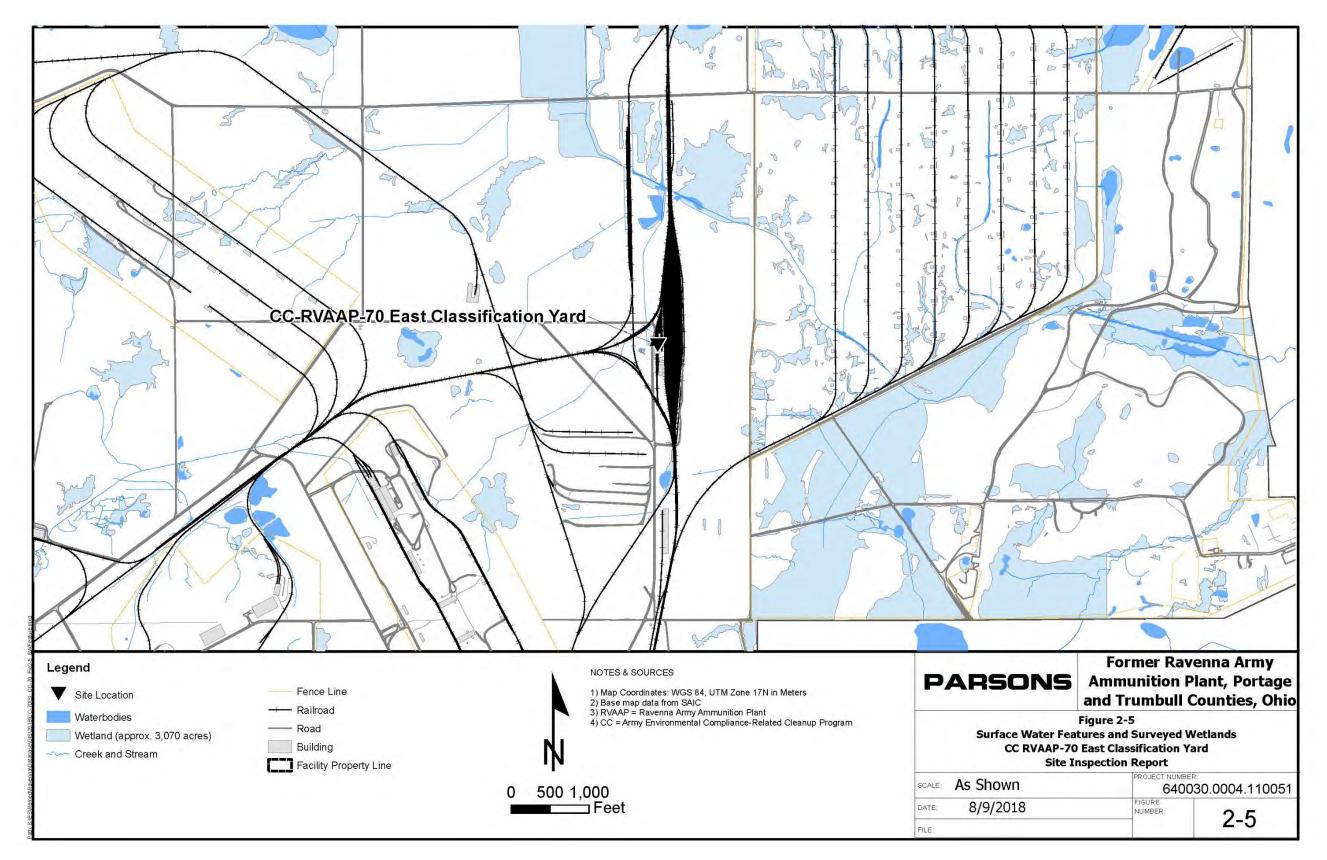


Figure 2-4 Geologic Bedrock Map

Former Ravenna Army         Ammunition Plant, Portage         and Trumbull Counties, Ohio         Figure 2-4         Geologic Bedrock Map         VAAP-70 East Classification Yard         Site Inspection Report         PROJECT NUMBER:         640030.0002.110051         PIGURE         PIGURE         PIGURE         CA	000		
	DNS An and Figure Geologic Be RVAAP-70 East (	nmunition I I Trumbull drock Map Classification tion Report PROJECT NUMBU 6400	Plant, Portage Counties, Ohio Yard



**Figure 2-5 Surface Water Features and Surveyed Wetlands** 

### 3. FIELD INVESTIGATION

Field work for this SI was conducted in accordance with *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012), *Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Trumbull Counties, Ohio* (Parsons, 2017) and the *Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (SAIC, 2011a), unless specifically noted otherwise (Section 3.4).

### 3.1 RATIONALE FOR SAMPLING AND ANALYSES

Surface soil and subsurface soil were sampled at CC RVAAP-70 East Classification Yard to determine the presence of site-related chemicals (SRCs) and identify potential contaminants within the AOC. The HRR (SAIC, 2011b) recommended sampling at four locations and two drainage ditches. The AOC was divided into seven decision units (DUs) as illustrated in Figure 3-1. Samples and analyses were selected based primarily on recommendations from the HRR (SAIC, 2011b). The rationale for the sampling approach was detailed in the work plans (ECC, 2012 and Parsons, 2017) and is summarized below. Table 3-1 lists all samples collected, the analyses performed, and rationale for each sample collected.

Note that the HRR and work plans mention sampling "dry sediment" from the drainage ditches and a storm water drain. "Dry sediment" is surface soil that is intermittently covered with water. The samples are compared to surface soil cleanup goals and for purposes of this SI are simply referred to as surface soil. This includes three locations: 70-DD-DU2-SS, 70-CDD-DU7-SS and 70-4740-SB108-SS.

Surface water was not present at this AOC during the SI field work in 2012 and 2018 but was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

In addition to the DU-specific analyses described below, ten percent of samples collected during the 2012-2013 sampling events were submitted for full suite analysis in accordance with the Facility-Wide Sampling and Analysis Plan (FWSAP) (SAIC, 2011a).

#### Former Fuel Oil Spill Area (DU01)

DU01 was established as the area within the containment berm that surrounded the former AST where No. 5 fuel oil was released. Surface and subsurface soil were sampled to determine if contaminants consistent with a petroleum release were present. In accordance with the work plan (ECC, 2012), one surface soil incremental sampling methodology (ISM) sample was collected, and five soil borings were advanced and a total of seven subsurface samples were collected in November 2012. A sixth soil boring was advanced in December 2012 to collect additional subsurface soil for quality assurance (QA) purposes. Surface and subsurface soil samples were analyzed for VOCs, methyl tertiary-butyl ether (MTBE), SVOCs, and three total petroleum hydrocarbons (TPH) carbon chain compounds (C6-C12, C10-C20, and C20-C34) because the potential release at DU01 was petroleum.

## **Drainage Ditch West of Building 47-40 (DU02)**

The HRR (SAIC, 2011b) recommended an evaluation of the dry sediment in the AOC drainage ditches. The drainage ditch to the west of Building 47-40 (DU02) is adjacent to and may have received runoff from the former Fuel Oil Spill Area (DU01). Therefore, in accordance with the work plan (ECC, 2012) one surface soil ISM sample from DU02 was collected and analyzed for the same constituents as DU01; VOCs, MTBE, SVOCs, and TPH.

### **Building 47-40 Round House – Exterior (DU03)**

DU03 was established as a 15-foot zone surrounding the exterior perimeter of Building 47-40 to sample for potential contaminants from locomotive maintenance activities conducted at Building 47-40. In accordance with the work plan (ECC, 2012), one surface soil ISM sample was collected, and five soil borings were advanced and a total of eight subsurface samples were collected in November 2012. A sixth soil boring was advanced in December 2012 and April 2013 to collect additional subsurface soil for QA purposes. Surface and subsurface soil samples were analyzed for SVOCs, TAL metals, and PCBs.

### **Building 47-40 Round House – Interior (DU04)**

DU04 was established to sample subsurface soil beneath the concrete floor of Building 47-40. Building 47-40 contained a Repair Pit that lies underneath the area where locomotives were maintained. The repair pit is the low point within the building and is therefore the most likely place for finding potential contaminants from activities conducted within Building 47-40. Oily residue and debris covered the bottom of the interior repair pit as well as other areas of the floor including a former oil storage area near the east wall (note, oily residue was removed prior to 2018 sampling to prevent cross-contamination during sampling and to reveal any cracks in the concrete, as discussed in Section 3.2.2). In 2012, subsurface soil samples were collected from five soil borings advanced through the concrete floor of the repair pit (70-4740-DU4-SB1 through 70-4740-DU4-SB5). In accordance with the work plan (ECC, 2012), all samples were analyzed for SVOCs, TAL metals and PCBs to determine if locomotive maintenance chemicals had been released below the floor of the building. Although several soil samples collected from DU04 in 2012 indicate that they were collected from the 0 to 1 ft bgs vertical interval, all of these samples were collected from under the concrete floor of the repair pit, and the repair pit floor is 3.5 feet below the floor grade. Therefore, all of the DU04 samples are subsurface soil, including samples from DU-4740-DU4-SB (070SS-0048M-0001-SO and 070SB-0049M-0001-SO) and 70-4740-DU4-SB1 (070SB-0050M-0001-SO).

Additional sampling was conducted in 2018 in accordance with the second work plan (Parsons, 2017). An additional boring was advanced through the floor of the repair pit to collect subsurface soil samples for VOC analysis (70-4740-SB104) because VOCs were also considered possible locomotive maintenance chemicals. Three additional borings were also advanced through the floor of Building 47-40 in areas that were considered potential release areas and located outside of the repair pit. The boring locations were to be selected from areas that displayed staining and cracks in the concrete, but cracks were not observed. The three selected locations were:

- near a former oil storage rack area along the east wall of the building where the concrete floor was heavily stained (70-4740-SB102),
- at a seam between the wooden flooring and concrete near the east railroad tracks (70-4740-SB101), and

 near the discharge line of a sump found under the north stairs of the repair pit (70-4740-SB103).

Subsurface soil samples from 70-4740-SB101 and 70-4740-SB102 were analyzed for VOCs, SVOCs, PCBs and TAL metals. Subsurface soil samples from 70-4740-SB103 were analyzed for VOCs.

### Former Herbicide Storage Shed (DU05)

DU05 was established as a 15-foot zone surrounding the exterior perimeter of the former Herbicide Storage Shed to sample for potential contaminants from herbicide storage and mixing activities. In accordance with the work plan (ECC, 2012), one surface soil ISM sample was collected, and five soil borings were advanced and a total of seven subsurface samples were collected in November 2012. A sixth soil boring was advanced in December 2012 to collect additional subsurface soil for QA purposes. Surface and subsurface soil samples were analyzed for SVOCs and herbicides. Subsurface soils collected from 70-4760-DU5-SB2 in 2012 were also analyzed for VOCs and TPH (C6-C12) due to field observations and photoionization detector (PID) field screening vapor headspace results of 75 parts per million (ppm) indicating the likelihood of potential contaminants at this boring.

#### Outdoor Wash Rack Area (DU06)

DU06 was established in the Outdoor Wash Rack Area located south of Building 47-40. Past operations may have resulted in a release of chemicals to surface soil, by infiltration to subsurface soil, and by overland flow to nearby drainage ditches and storm drains. In accordance with the work plan (ECC, 2012), one surface soil ISM sample was collected, and five soil borings were advanced and a total of seven subsurface samples were collected in November 2012. In 2012, surface and subsurface soil samples were analyzed for SVOCs, PCBs and explosives which are chemicals that could be discharged as a result of washing box cars and locomotives. The subsurface soil sample collected from 70-4759-DU6-SB5 was also analyzed for VOCs and TPH (C6-C12) due to field observations and PID field screening vapor headspace results indicating potential contaminants at this boring.

Additional sampling was conducted in 2018 in accordance with the second work plan (Parsons, 2017). Two soil borings (70-4740-SB105 and 70-4740-SB106) were advanced to collect additional subsurface soil samples for VOC analysis at locations and vertical intervals where elevated PID readings had been noted during the 2012 sampling event.

The storm drain at the southwest corner of Building 47-40 may have received wash water draining from the wash rack. In 2018, a sample of the soil that had accumulated in the storm drain (70-4740-SS108) was collected and analyzed for PCBs, SVOCs, and explosives. An additional soil boring (70-4740-SB107) was drilled as close to the drain as possible and five subsurface soil samples were collected to determine if subsurface soil near this storm drain was impacted by historical activities at the wash rack. Subsurface soil samples were analyzed for VOCs, PCBs, SVOCs, and explosives.

## Drainage Ditch East of Building 47-40 (DU07)

The HRR (SAIC, 2011b) recommended an evaluation of the dry sediment in the AOC drainage ditches. The drainage ditch to the east of Building 47-40 is adjacent to and may have received runoff from DU03, DU05 and DU06. In accordance with the work plan (ECC, 2012) one surface

soil ISM sample from DU07 was collected and analyzed for the full analytical suite including VOCs, MTBE, SVOCs, TAL metals, TPH, herbicides, explosives, PCBs, and propellants.

## **3.2 PRE-SAMPLING SITE PREPARATION**

### 3.2.1 2012 Mobilization

Prior to the 2012 field investigation, a series of pre-mobilization activities were undertaken to ensure that all applicable requirements were met. These included providing any necessary notifications to the Army, Ohio EPA, and other stakeholders.

ECC personnel mobilized to Camp Ravenna on October 22, 2012 to conduct a site walk and premark each of the seven DUs and direct-push boring locations at CC RVAAP-70 East Classification Yard. The pre-mobilization tasks included the following activities:

- Conduct a site walk
- Locate the DUs
- Locate the soil borings
- Decontaminate the sampling equipment.

### Site Walk

ECC conducted a site walk at CC RVAAP-70 East Classification Yard on October 22, 2012 to assess current AOC conditions and to note any potential health and safety hazards that could affect the field work of this SI.

#### Soil Sampling Locations

Each DU and proposed direct-push boring location was marked using wooden stakes, high visibility paint, and flagging. DU03 and DU05 were placed in the field by measuring a 15-ft offset of the corners of Building 47-40 (Round House) (DU03) and the Former Herbicide Storage Shed. The DUs for the Former Fuel Oil Spill Area (DU01) and the Outdoor Wash Rack Area (DU06) were assigned based on review of historical documents during the HRR, available AOC figures, and aerial photographs (Appendix A). The seven DUs are illustrated on Figure 3-1.

#### Munitions and Explosives of Concern and Utility Clearance Surveys

Munitions and explosives of concern clearance was not required based on HRR findings (SAIC, 2011b), and therefore was not conducted at the CC RVAAP-70 East Classification Yard. No documentation of military munitions being historically located or stored on-site was discovered.

ECC met with Vista Sciences Corporation representatives on October 23, 2012 to discuss utility clearance protocols at the former RVAAP. Mr. James D. McGee, Project Manager for Vista Sciences Corporation, reported that any utility within the CC RVAAP-70 East Classification Yard would either have been previously removed or, if still in place, inactive and not energized. No live/active utilities were encountered during any of the drilling activities conducted at CC RVAAP-70 East Classification Yard.

#### Site Clearing Activities

Low brush and debris were cleared from proposed surface soil sampling areas and soil boring locations. Paths were cleared into the bermed area of the Former Fuel Oil Spill Area to allow

access for the direct-push drill rig. Cut brush was subsequently chipped and spread on the ground surface.

## Site Security

No specific site security was needed to conduct this SI at the CC RVAAP-70 East Classification Yard. However, each work day prior to mobilizing to the AOC, Camp Ravenna Range Control was notified that ECC and subcontractor personnel would be working at CC RVAAP-70 East Classification Yard.

## **Equipment Decontamination**

Prior to beginning surface soil sampling, all sampling equipment was decontaminated at a predesignated area within Building 1036. The decontaminated sample equipment was then wrapped in aluminum foil. Sufficient sampling equipment was brought to the site each morning to allow for sampling of the DU area without the need to decontaminate additional equipment during the day. All sampling equipment was decontaminated inside Building 1036 at the end of each work day in preparation for sampling the following day.

Prior to commencing subsurface soil sampling, all direct-push drilling rods and equipment were decontaminated using a high-pressure steam cleaner and brushes. During subsurface soil sampling at the CC RVAAP-70 East Classification Yard, direct-push steel samplers were decontaminated between each DU using 5-gallon buckets, Alconox® wash, and brushes. Following the conclusion of subsurface soil sampling, drilling equipment was decontaminated using a high-pressure steam cleaner.

All decontamination fluids were containerized in a Department of Transportation-approved 55gallon closed steel drum located within secondary containment inside Building 1036. The drum was labeled with contents, date of initial generation, and contact information. All sampling equipment was decontaminated in accordance with the procedures outlined in Section 5.6.2.9 of the FWSAP (SAIC, 2011a).

## 3.2.2 2018 Mobilization

# **Utility Clearance**

Parsons deployed to the AOC on 29 January 2018. Utility clearance was performed by Underground Detective. No active utilities are present in the vicinity of CC RVAAP-70 East Classification Yard.

# Oily Residue Removal and Brush Clearance

Prior to sampling, oily residue and debris were removed from the floor of Building 47-40 and the Interior Repair Pit. The oily residue and debris were removed to reveal areas of the floor that are stained and cracked and therefore the most likely routes that chemicals could have followed to enter the subsurface, and to prevent cross contamination when borings are advanced through the floor. Although the substance was described in the Work Plan as a sludge, the oily residue was relatively dry. Oily residue was present in an interior repair pit that lies underneath the area where locomotives were maintained. The repair pit is the lowest point in the building and represents a location where spills of liquids could have drained. Oily residue was also found near the east wall of the building at the historical oil drum rack, as well as other locations on the floor. On 30 and 31 January 2018, approximately two cubic yards of oily residue and debris were removed from the floor and pit using a mini excavator, bobcat, shovels, and brooms and were placed in a 20-cubic

yard roll-off for sampling and disposal (See Section 3.6). Vegetation in the Outdoor Wash Rack Area was cut and removed on 30 January 2018.

## **Identify Additional Sample Locations**

Sample locations were identified and marked following oily residue and debris removal and brush clearance. The Work Plan (Parsons, 2017) indicated that borings within Building 47-40 be located near stains and cracks in the concrete floor and interior repair pit. The concrete floor was stained in areas but did not appear to be cracked. Soil boring locations were selected as discussed in Section 3.1.

# 3.3 SAMPLING METHODS

Initial field work was conducted between 5 November and 12 December 2012 and included collecting six surface soil (0-1 ft bgs) ISM samples, advancing 28 soil borings and collecting 39 subsurface soil samples. On 1 April 2013, one additional subsurface soil sample was collected from a soil boring at DU03 (70-4740-DU3-SB6). The sample was re-collected for pesticide analysis to replace prior pesticide sample results, which were qualified as rejected due to low surrogate recovery.

Additional field work was conducted between 2 and 6 February 2018. Nine subsurface samples were collected from four soil boring at DU04 and seven subsurface samples were collected from three soil borings at DU06. Two discrete surface soil samples were collected from and near a storm drain at DU06.

Table 3-1 presents a summary of the media sampled, sample collection methods, and number of samples collected for sampling activities conducted at each area of potential activity at CC RVAAP-70 East Classification Yard. Matrix spike/matrix spike duplicate (MS/MSD) samples were collected at a frequency of 5 percent. Field duplicate samples were collected at a frequency of 10 percent.

## 3.3.1 Surface Soil Sampling

One surface soil ISM sample was collected from each of DU01, DU03, DU05, and DU06 in 2012. Surface soil ISM samples were also collected in 2012 from each of the two ditches (DU02 and DU07) in the same manner as that for a typical ISM surface soil sample. No surface soil samples were collected at DU04 as the soil sampling was conducted inside Building 47-40 beneath the concrete floor.

The surface soil sample aliquots were collected from 0 to 1 ft bgs using ISM methods as detailed in the *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012), in order to define the lateral extent of contamination in surface soil. Thirty individual soil samples (aliquots) were collected to comprise each ISM sample. The surface soil ISM samples were collected using the method described in Section 5.6.2.1.1 of the FWSAP (SAIC, 2011a).

The samples were collected using a 40-in., one-piece soil step probe with a "T" handle attached to the top. The soil step probe collects a soil core sample that is approximately 12 in. long. A 12-in. section of the sampler is cut away to facilitate collecting the soil sample. The sampler was advanced to 1 ft bgs then withdrawn. The soil sample was then collected from within the core sampler section using a stainless-steel scoopula.

Surface soil samples were collected from 0 to 1 ft bgs. However, if rock or gravel was encountered at depths less than 1 foot, samples were collected from the accessible portion of the 0- to 1-ft interval.

A discrete soil sample was collected in 2018 with a hand auger from the surface water drain at the southwest corner of Building 47-40. The surface water drain collected runoff from DU06 Outdoor Wash Rack, and soil had accumulated in the drain.

## 3.3.2 Subsurface Soil Sampling

Subsurface soil samples were collected from DU01, DU03, DU04, DU05 and DU06 between 13 November 2012 and 1 April 2013 using a Geoprobe® Model 6620DT direct-push drill rig operated by Frontz Drilling with oversight by ECC. The procedures for hydraulic direct-push sampling were performed in accordance with Section 5.5.2.5.3 of the FWSAP (SAIC, 2011a). Samples were collected using 5-ft long stainless-steel sampling rods lined with acetate Microcore® samplers. Each sample was collected using a dedicated liner specific for that interval. The 5-ft stainless steel sampler was advanced twice at each boring location to reach the depth of 7 ft bgs and 3 times at one boring location to reach the depth of 13 ft bgs. The sampler was then retrieved from the desired depth and the liner removed. The liner was cut open length-wise and the soil was immediately field screened with a PID. Soil samples for headspace screening were collected at 2-ft intervals along the entire sampler using stainless steel scoopulas and the soil was placed in 8-ounce glass jars. The jars were then capped with aluminum foil and a plastic lid. The headspace samples were allowed to warm for approximately 10 minutes. The tip of the PID was inserted into the jar through the aluminum foil and the reading recorded on the boring log. If elevated readings were recorded, a VOC sample was collected using a disposable TerraCore® sampler at that interval. The liner containing the soil was photographed (Appendix H) and soil characteristics for each interval were then logged on the soil boring log (Appendix C). A summary of sampling information was logged on the field forms. Field activity forms and boring logs from the SI are provided in Appendices B and C, respectively. Photographs are provided in Appendix H.

Subsurface soil samples were collected between 2 and 6 February 2018 from DU04 and DU06 using a Geoprobe7822D drill rig operated by Envirocore with Parsons oversight. The procedures for hydraulic direct-push sampling were performed in accordance with Section 5.5.2.5.3 of the FWSAP (SAIC, 2011a). A total of seven borings were installed (70-4740-SB101 through 70-4740-SB107). Borings were logged continuously and a PID was used to screen the soil for volatiles. Borings were abandoned with bentonite.

## **Composite Subsurface Soil Samples**

At least five soil borings were advanced at each of the DUs. Soil was collected and composited from all borings within a DU from the 1-4 ft bgs and 4-7 ft bgs vertical intervals. Analytical results from composite subsurface soil samples represent subsurface concentrations across an entire DU from the two three-foot vertical intervals. Geoprobe rod refusal due to bedrock was encountered at less than four feet below the repair pit floor at DU04, and composite subsurface soil sample intervals were adjusted to accommodate the shallow boring depth.

## Discrete Soil Boring Subsurface Soil Samples

During the 2012 and 2013 sample events, soil was collected from the 1-7 ft bgs vertical interval of each individual soil boring. One sample was also collected from a deeper (7-13 ft bgs) interval at DU03 (station 70-4740-DU3-SB1, sample 070SB-0026-0001-SO). Analytical results from these

discrete soil boring samples represent subsurface concentrations from individual soil borings across a six-foot vertical interval. Geoprobe rod refusal due to bedrock was encountered at less than four feet the repair pit floor at DU04, and discrete soil boring subsurface soil sampling intervals were adjusted to accommodate the shallow boring depth.

Discrete soil boring subsurface soil samples were collected from two-foot vertical intervals from the additional soil borings installed in 2018. Samples for VOC analysis were collected using a disposable TerraCore® sampler. Soil borings 70-4740-SB105 and 70-4740-SB106 from the DU06 Outdoor Wash Rack were sampled at only one depth because samples were targeting a vertical interval where slightly elevated PID measurements were detected in 2012. Discrete soil samples from the remaining borings were collected from each two-foot vertical interval from the surface to Geoprobe rod refusal. However, the 0-2-foot interval for borings within Building 47-40 (70-4740-SB101 through 70-4740-SB104 in DU04) were not sampled because this interval consisted of concrete and gravel.

## 3.4 DEVIATIONS FROM WORK PLAN

Some of the terminology in the Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites (ECC, 2012) and Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Trumbull counties, Ohio (Parsons, 2017) was inaccurate or outdated. This report uses updated terminology without changing the technical approach as follows:

- The work plans used "horizontal ISM sample" to describe a soil sample that was composited from five or more soil borings from a defined vertical interval (usually 1 4 ft bgs or 4 7 ft bgs). Horizontal ISM samples are now described as composite subsurface soil samples.
- o The work plans used "vertical ISM sample" to describe a soil sample from a single soil boring that was collected from a defined vertical interval (usually 1 − 7 ft bgs). Vertical ISM samples are now referred to as discrete soil boring subsurface soil samples.
- The work plans used "composite sample" to describe a soil sample from a single soil boring that was collected from the 7 to 13 ft bgs vertical interval. Composite samples are now referred to as discrete soil boring subsurface soil samples.
- The work plans used "dry sediment" to refer to soil material that is only intermittently covered with water (such as in the ditches DU02 and DU07). "Dry sediment" is surface soil.

Deviations from the *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012) for fieldwork conducted at CC RVAAP-70 East Classification Yard are listed below:

- At DU04, five borings were advanced within the interior repair pit after coring through the concrete floor of the pit. Refusal was encountered at each of the five borings, as sandstone bedrock was encountered ranging from 1 foot to approximately 4 feet below the bottom of the concrete floor of the pit, as follows:
  - SB01 12 inches

- SB02 15 inches
- SB03 48 inches
- SB04 46 inches
- SB05 34 inches
- Due to shallow refusal and subsequent limited matrix recovery, composite and discrete soil boring subsurface soil sample collection depths were altered. In lieu of the originally planned 1- to 4-ft and 4- to 7-ft composite samples, 0- to 1-ft and 0- to 4-ft (or refusal) composite samples were collected. In lieu of the 1- to 7-ft discrete soil boring sample at each boring, a 0- to 4-ft (or refusal) discrete soil boring sample was collected at each boring.
- On 7 December 2012, three additional direct-push borings were advanced at CC RVAAP-70 East Classification Yard to comply with quality control (QC) requirements regarding the collection of subsurface soil samples for 10 percent full suite analysis. The additional borings, identified as 70-4744-DU1-SB6 at DU01, 70-4740-DU3-SB6 at DU03, and 70-4760-DU5-SB6 at DU05, were each advanced to 7 ft bgs. Samples were collected from the 1- to 7-ft bgs interval and analyzed for full suite analytical parameters.
- On 1 April 2013, one additional direct-push boring was advanced at 70-4740-DU3-SB6 and the 1- to 7-ft interval was sampled for pesticides (sample 070SB-0046M-0001-SB). This sample was collected to ensure project completeness after the original pesticide sample (070SB-0046M-0001-SO collected on 7 December 2012) surrogate failed QC requirements.
- Additional analyses were performed for VOCs and TPH (C6-C12) on discrete soil boring subsurface soil samples collected from 70-4760-DU5-SB2 and 70-4759-DU6-SB5 due to field observations and PID field screening vapor headspace results of 75 and 40 ppm indicating the likelihood of potential contaminants at these borings.

Deviations from the Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Trumbull counties, Ohio (Parsons, 2017) for fieldwork conducted at CC RVAAP-70 East Classification Yard are listed below:

The Work Plan (Parsons, 2017) specified two soil borings to be installed within the DU04 Building 47-40 interior repair pit and discrete subsurface soil samples analyzed for VOCs. After oily residue and debris were removed from the repair pit, it was observed that although the repair pit floor was stained, the concrete was in good condition (no cracks). One soil boring (70-4740-SB104) was advanced through the repair pit floor as planned. The second boring (70-4740-SB103) was relocated outside of the repair pit. Soil boring 70-4740-SB103 was located near a sump and drain line from the repair pit (near the north end of the pit). Subsurface soil samples from 70-4740-SB103 were analyzed VOCs.

## 3.5 SURVEYING

Campbell and Associates, Incorporated, Cuyahoga Falls, Ohio, a licensed surveyor in the State of Ohio surveyed the 2012 soil boring locations within CC RVAAP-70 East Classification Yard. All survey data were reported in North American Datum 1983 (NAD83) Universal Transverse Mercator Zone 17 North.

Wellert Corporation, Medina, Ohio, a licensed surveyor in the State of Ohio, surveyed the 2018 soil boring locations. Horizontal coordinates are tied to the Ohio State Plane Coordinate System, Ohio North Zone 3401 NAD83 (2011) per Ohio Department of Transportation Virtual Reference Station Network System. Vertical survey data are referenced to North American Vertical Datum of 1988 (NAVD88) elevations in feet. Coordinates were verified by locating existing National Geodetic Survey & Ravenna Arsenal Control Monuments to confirm coordinates meet project accuracy requirements. During the survey, the locations of 70-4740-SB101 and 70-4740-SB102 were switched. The survey coordinates reported by the Wellert Corporation for 70-4740-SB101 belong to 70-4740-SB102 and vice versa. This error was corrected on the figures included in this report.

## 3.6 INVESTIGATION-DERIVED WASTE

## 3.6.1 2012 Waste Handling

Investigation-Derived Waste (IDW) consisted of soil cuttings from subsurface soil sampling, personal protective equipment (PPE), used, empty acetate liners, used TerraCore® samplers, and general non-environmental trash. The soil cuttings were collected in plastic garbage liners, and then placed inside 5-gallon buckets. The buckets for soil cuttings were brought to Building 1036 and placed in labeled 55-gallon open-headed drums.

All IDW, including soil cuttings, PPE, disposable sampling equipment, and decontamination fluids, was properly handled, labeled, characterized, and managed in accordance with Section 8.0 of the FWSAP (SAIC, 2011a), federal and state of Ohio large quantity generator requirements, and the former RVAAP's *Installation Hazardous Waste Management Plan* (BRACO, 2009).

IDW was sampled for disposal characterization on 12 December 2012. Samples were comprised of liquid IDW consisting of decontamination fluids, and solid IDW consisting of drill cuttings. IDW analysis included both liquid and solid full Toxicity Characteristic Leaching Procedure (TCLP), and Reactivity, Corrosivity, and Ignitability analyses. On 15 March 2013, the Ohio EPA approved the IDW letter report for the transport and disposal of the accumulated IDW as a result of executed SI tasks. The Ohio EPA approval letter for the IDW is provided in Appendix G. On 5 April 2013, Emerald Environmental Services, Inc. transported the drummed IDW under a non-hazardous waste manifest to Vexor Technology in Medina, Ohio for proper disposal. The manifest is provided in Appendix G.

## 3.6.2 2018 Waste Handling

Waste was managed in accordance with Camp Ravenna Waste Management Guidelines and Waste Inspection Form (OHARNG, 2016) and the FWSAP (SAIC, 2011a). Final IDW Reports and manifests are provided in Appendix G.

## **Investigation-Derived Waste**

IDW consisted of soil cuttings and decontamination water. All IDW was containerized in 55gallon drums and sampled for TCLP (Method 1311) metals, TCLP VOCs, TCLP SVOCs, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. Solid IDW was sampled on 20 February 2018 and liquid IDW was sampled on 6 March 2018. The data were compared to disposal screening criteria, which are from three sources:

• Concentration of Contaminants for Toxicity Characteristic (40 Code of Federal Regulations [CFR] 261.24), as listed in Table 8-1 of the FWSAP;

- Table 8-2 of the FWSAP; and
- 40 CFR 261.23 Characteristic of Reactivity.

Results of the IDW sampling indicated the solid and liquid IDW were non-hazardous. Solid IDW was transported by American Waste Management Services for disposal at the Waste Management / American Landfill in Waynesburg, Ohio on 13 April 2018. Liquid IDW was transported by American Waste Management Services for disposal at the Waste Management / American Landfill in Waynesburg, Ohio on 27 April 2018.

### Oily residue and debris

Oily residue and debris (referred to as "sludge" in the Work Plan [Parsons, 2017] and waste characterization report [Appendix G]) removed from Building 47-40 Round House on 2 February 2018 was placed in a 20-cubic yard roll-off. Samples were collected on 6 February and 5 March 2018 and analyzed for TCLP (Method 1311) metals, TCLP VOCs, TCLP SVOCs, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. The data were compared to disposal screening criteria as outlined above. The analyses indicated that the waste was non-hazardous. The oily residue and debris were transported off site on 13 April 2018 for disposal by American Waste Management.

## Table 3-1 Summary of Samples Collected at CC RVAAP-70 East Classification Yard

Area	Decision Unit	Station	Sample ID	Sampling	Result		Ending	Date Collected	Media	Purpose	TAL	Explosives	ТРН	Pesticides	SVOCs	VOCs
Former Fuel Oil Spill Area	1	70-4744-DU1-SS	070SS-0001M-0001-SO	Method ISM	Type REG	Depth 0	Depth 1	05-Nov-12	Surface Soil	P or A	Metals	/Propellants	X		Х	Х
Former Fuel Oil Spill Area	1	70-4744-DU1-SB	070SB-0011M-0001-SO	Composite	REG	1	4	14-Nov-12	Subsurface Soil	P or A			X		Х	X
Former Fuel Oil Spill Area Former Fuel Oil Spill Area	1	70-4744-DU1-SB 70-4744-DU1-SB	070SB-0011M-0002-SO 070SB-0011M-0002-SO	Composite Composite	MS MSD	1	4	14-Nov-12 14-Nov-12	Subsurface Soil Subsurface Soil	QC QC					X	
Former Fuel Oil Spill Area	1	70-4744-DU1-SB1	070SB-0013M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			Х		Х	Х
Former Fuel Oil Spill Area Former Fuel Oil Spill Area	1	70-4744-DU1-SB2 70-4744-DU1-SB3	070SB-0014M-0001-SO 070SB-0015M-0001-SO	Discrete SB Discrete SB	REG REG	1	7	14-Nov-12 14-Nov-12	Subsurface Soil Subsurface Soil	P or A P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB4	070SB-0016M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			X		Х	X
Former Fuel Oil Spill Area Former Fuel Oil Spill Area	1	70-4744-DU1-SB4 70-4744-DU1-SB4	070SB-0016M-0002-SO 070SB-0016M-0002-SO	Discrete SB Discrete SB	MS MSD	1	7	14-Nov-12 14-Nov-12	Subsurface Soil Subsurface Soil	QC QC					X	
Former Fuel Oil Spill Area	1	70-4744-DU1-SB5	070SB-0017M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			Х		X	Х
Former Fuel Oil Spill Area Former Fuel Oil Spill Area	1	70-4744-DU1-SB5 70-4744-DU1-SB5	070SB-0017M-0002-SO 070SB-0017M-0002-SO	Discrete SB Discrete SB	MS MSD	1	7	14-Nov-12 14-Nov-12	Subsurface Soil Subsurface Soil	QC QC			X			
Former Fuel Oil Spill Area	1	70-4744-DU1-SB	070SB-0012M-0001-SO	Composite	REG	4	7	14-Nov-12	Subsurface Soil	P or A			X		Х	Х
Former Fuel Oil Spill Area Former Fuel Oil Spill Area	1		070SB-0042M-0001-SO 070SB-0042M-0002-SO	Discrete SB Discrete SB	REG MS	1	7	07-Dec-12 07-Dec-12	Subsurface Soil Subsurface Soil	P or A QC	Х	X X	X	X	X X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0002-SO	Discrete SB	MSD	1	7	07-Dec-12	Subsurface Soil	QC		X	X	X	X	X
Former Fuel Oil Spill Area Former Fuel Oil Spill Area	1	70-4744-DU1-SB6 70-4744-DU1-SB6	070SB-0043M-0001-SO 070SB-0042M-0001-SO	Discrete SB Discrete SB	FD REG	1	7 7	07-Dec-12 12-Dec-12	Subsurface Soil Subsurface Soil	QC P or A			X X		Х	Х
Former Fuel Oil Spill Area	1		070SB-0042M-0001-SO	Discrete SB	MS	1	7	12-Dec-12 12-Dec-12	Subsurface Soil	QC			X			
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0001-SO	Discrete SB	MSD	1	7	12-Dec-12	Subsurface Soil	QC			X		v	×
Drainage Ditch West of Building 47-40 Drainage Ditch West of Building 47-40	2	70-DD-DU2-SS 70-DD-DU2-SS	070SS-0002M-0001-SO 070SS-0002M-0002-SO	ISM ISM	REG REG	0	1	05-Nov-12 07-Nov-12	Surface Soil Surface Soil	P or A P or A			X		Х	Х
Building 47-40 Round House - Exterior	3	70-4740-DU3-SS	070SS-0003M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A	Х			Х	Х	
Building 47-40 Round House - Exterior Building 47-40 Round House - Exterior	3	70-4740-DU3-SB2 70-4740-DU3-SB1	070SB-0022M-0001-SO 070SB-0026-0001-SO	Discrete SB Discrete SB	REG REG	1 7	13 13	13-Nov-12 13-Nov-12	Subsurface Soil Subsurface Soil	P or A P or A	X X			X	X X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB	070SB-0019M-0001-SO	Composite	REG	1	4	13-Nov-12	Subsurface Soil	P or A	Х			Х	Х	
Building 47-40 Round House - Exterior Building 47-40 Round House - Exterior	3	70-4740-DU3-SB1 70-4740-DU3-SB3	070SB-0021M-0001-SO 070SB-0023M-0001-SO	Discrete SB Discrete SB	REG REG	1	7	13-Nov-12 13-Nov-12	Subsurface Soil Subsurface Soil	P or A P or A	X			X	X X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB4	070SB-0024M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB5	070SB-0025M-0001-SO 070SB-0020M-0001-SO	Discrete SB	REG REG	1	7 7	13-Nov-12	Subsurface Soil	P or A	X X			X	X X	
Building 47-40 Round House - Exterior Building 47-40 Round House - Exterior	3	70-4740-DU3-SB 70-4740-DU3-SB6	070SB-0020M-0001-SO 070SB-0046M-0001-SO	Composite Discrete SB	REG	4	7	13-Nov-12 07-Dec-12	Subsurface Soil Subsurface Soil	P or A P or A	X	Х		X X	X	х
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0046M-0001-SO	Discrete SB	MS	1	7	07-Dec-12	Subsurface Soil	QC						X
Building 47-40 Round House - Exterior Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6 70-4740-DU3-SB6	070SB-0046M-0001-SO 070SB-0047M-0001-SO	Discrete SB Discrete SB	MSD FD	1	7	07-Dec-12 07-Dec-12	Subsurface Soil Subsurface Soil	QC QC	Х			х	х	X
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0046M-0001-SB	Discrete SB	REG	1	7	01-Apr-13	Subsurface Soil	P or A				Х		
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-DU4-SB 70-4740-DU4-SB1	070SB-0049M-0001-SO 070SB-0050M-0001-SO	Composite Discrete SB	REG REG	0	1	07-Dec-12 07-Dec-12	Subsurface Soil Subsurface Soil	P or A P or A	X			X	X X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SS	070SS-0048M-0001-SO	Composite	REG	0	1	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB2	070SB-0051M-0001-SO 070SB-0054M-0001-SO	Discrete SB	REG REG	0	1.25	07-Dec-12	Subsurface Soil	P or A	X X			X	X X	
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-DU4-SB5 70-4740-DU4-SB4	070SB-0054M-0001-SO 070SB-0053M-0001-SO	Discrete SB Discrete SB	REG	0	2.8 3.75	07-Dec-12 07-Dec-12	Subsurface Soil Subsurface Soil	P or A P or A	X			X X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB3	070SB-0052M-0001-SO	Discrete SB	MS	0	4	07-Dec-12	Subsurface Soil	QC					Х	
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-DU4-SB3 70-4740-DU4-SB3	070SB-0052M-0001-SO 070SB-0052M-0001-SO	Discrete SB Discrete SB	MSD REG	0	4	07-Dec-12 07-Dec-12	Subsurface Soil Subsurface Soil	QC P or A	х			х	X X	
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-0065-SO	Discrete SB	REG	2	4	02-Feb-18	Subsurface Soil	P or A	Х			Х	Х	Х
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-SB102 70-4740-SB101	070SB-102-0065-SO 070SB-101-0062-SO	Discrete SB Discrete SB	MS/MSD REG	2	4	02-Feb-18 02-Feb-18	Subsurface Soil Subsurface Soil	QC P or A	X			X	X X	X X
Building 47-40 Round House - Interior	4	70-4740-SB101	070SB-101-0002-SO	Discrete SB	REG	2	4	05-Feb-18	Subsurface Soil	P or A	~			~	~	X
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-SB103 70-4740-SB102	070SB-103-0069-SO 070SB-102-0066-SO	Discrete SB Discrete SB	REG REG	2 4	4	06-Feb-18 02-Feb-18	Subsurface Soil Subsurface Soil	P or A P or A	х			x	х	X X
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-SB102 70-4740-SB102	070SB-102-0066-SO 070SB-102-9066-SO	Discrete SB	FD	4 4	6	02-Feb-18 02-Feb-18	Subsurface Soil	QC	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB101	070SB-101-0063-SO	Discrete SB	REG	4	6	02-Feb-18	Subsurface Soil	P or A	Х			Х	Х	X
Building 47-40 Round House - Interior Building 47-40 Round House - Interior	4	70-4740-SB103 70-4740-SB101	070SB-103-0070-SO 070SB-101-0064-SO	Discrete SB Discrete SB	REG REG	4 6	6 7	06-Feb-18 02-Feb-18	Subsurface Soil Subsurface Soil	P or A P or A	х			х	Х	X X
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-0067-SO	Discrete SB	REG	6	8	02-Feb-18	Subsurface Soil	P or A	Х			Х	Х	Х
Former Herbicide Storage Shed Former Herbicide Storage Shed	5	70-4760-DU5-SS 70-4760-DU5-SB	070SS-0004M-0001-SO 070SB-0027M-0001-SO	ISM Composite	REG MS	0	1	05-Nov-12 13-Nov-12	Surface Soil Subsurface Soil	P or A QC				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB	070SB-0027M-0001-SO	Composite	MSD	1	4	13-Nov-12	Subsurface Soil	QC				Х		
Former Herbicide Storage Shed Former Herbicide Storage Shed	5 5	70-4760-DU5-SB 70-4760-DU5-SB1	070SB-0027M-0001-SO 070SB-0029M-0001-SO	Composite Discrete SB	REG REG	1	4	13-Nov-12 13-Nov-12	Subsurface Soil Subsurface Soil	P or A P or A				X X	X X	
Former Herbicide Storage Shed	5	70-4760-D05-SB2	070SB-0029M-0001-SO	Discrete SB	MS	1	7	13-Nov-12	Subsurface Soil	QC			Х	~	~	
Former Herbicide Storage Shed Former Herbicide Storage Shed	5 5		070SB-0030M-0001-SO 070SB-0030M-0001-SO	Discrete SB Discrete SB	MSD REG	1	7	13-Nov-12 13-Nov-12	Subsurface Soil Subsurface Soil	QC P or A			X	х	Х	Х
Former Herbicide Storage Shed	5	70-4760-D05-SB3	070SB-0031M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A			Λ	X	X	~
Former Herbicide Storage Shed Former Herbicide Storage Shed	5	70-4760-DU5-SB4 70-4760-DU5-SB5	070SB-0032M-0001-SO 070SB-0033M-0001-SO	Discrete SB Discrete SB	REG REG	1	7 7	13-Nov-12 13-Nov-12	Subsurface Soil Subsurface Soil	P or A P or A				X X	X X	
Former Herbicide Storage Shed	5 5		070SB-0033M-0001-SO 070SB-0028M-0001-SO	Composite	REG	1 4	7	13-Nov-12 13-Nov-12	Subsurface Soil	P or A P or A	L			X	X	
Former Herbicide Storage Shed	5		070SB-0044M-0001-SO 070SB-0044M-0002-SO	Discrete SB Discrete SB	REG	1	7	07-Dec-12	Subsurface Soil	P or A	Х	Х		X	X	X
Former Herbicide Storage Shed Former Herbicide Storage Shed	5 5	70-4760-DU5-SB6 70-4760-DU5-SB6	070SB-0044M-0002-SO 070SB-0044M-0002-SO	Discrete SB Discrete SB	MS MSD	1	7 7	07-Dec-12 07-Dec-12	Subsurface Soil Subsurface Soil	QC QC				X X	X X	X X
Former Herbicide Storage Shed	5	70-4760-DU5-SB6	070SB-0045M-0001-SO	Discrete SB	FD	1	7	07-Dec-12 06-Feb-18	Subsurface Soil	QC P.or A		v		X	X	
Outdoor Wash Rack Area Outdoor Wash Rack Area	6 6	70-4740-SS108 70-4740-SS108	070SS-108-0081-SO 070SS-108-0081-SO	Discrete Discrete	REG MS/MSD	0	0.5 0.5	06-Feb-18 06-Feb-18	Surface Soil Surface Soil	P or A QC		Х		X X	Х	
Outdoor Wash Rack Area	6	70-4759-DU6-SS	070SS-0005M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A		X		Х	X	
Outdoor Wash Rack Area Outdoor Wash Rack Area	6 6	70-4740-SB107 70-4740-SB107	070SS-107-0075-S0 070SS-107-0075-S0	Discrete SB Discrete SB	REG MS/MSD	0	1	05-Feb-18 05-Feb-18	Surface Soil Surface Soil	P or A QC		х		X X	Х	
Outdoor Wash Rack Area	6	70-4740-SB107	070SS-107-9075-S0	Discrete SB	FD	0	1	05-Feb-18	Surface Soil	QC		Х		Х	X	
Outdoor Wash Rack Area Outdoor Wash Rack Area	6 6	70-4740-SB107 70-4740-SB107	070SB-107-0080-S0 070SB-107-0076-S0	Discrete SB Discrete SB	REG MS/MSD	9 1	10 3	05-Feb-18 05-Feb-18	Subsurface Soil Subsurface Soil	P or A QC		X X		Х	X	X
Outdoor Wash Rack Area	6	70-4740-SB107	070SB-107-0076-S0	Discrete SB	REG	1	3	05-Feb-18	Subsurface Soil	P or A		Х		х	Х	Х
Outdoor Wash Rack Area Outdoor Wash Rack Area	6 6	70-4759-DU6-SB 70-4740-SB107	070SB-0034M-0001-SO 070SB-107-0077-S0	Composite Discrete SB	REG REG	1 3	4 5	13-Nov-12 05-Feb-18	Subsurface Soil Subsurface Soil	P or A P or A		X X		X X	X X	Х
Outdoor Wash Rack Area	6		070SB-0036M-0001-SO	Discrete SB	REG	1	5 7	13-Nov-12	Subsurface Soil	P or A		Х		Х	X	
Outdoor Wash Rack Area	6 6	70-4759-DU6-SB2	070SB-0037M-0001-SO	Discrete SB	REG	1	7 7	13-Nov-12 13-Nov-12	Subsurface Soil	P or A		X		X	X	
Outdoor Wash Rack Area Outdoor Wash Rack Area	6	70-4759-DU6-SB3 70-4759-DU6-SB4	070SB-0038M-0001-SO 070SB-0039M-0001-SO	Discrete SB Discrete SB	REG REG	1	7	13-Nov-12 13-Nov-12	Subsurface Soil Subsurface Soil	P or A P or A		X X		X X	X X	
Outdoor Wash Rack Area	6	70-4759-DU6-SB5	070SB-0040M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A		Х	Х	Х	Х	Х
Outdoor Wash Rack Area Outdoor Wash Rack Area	6 6	70-4759-DU6-SB 70-4740-SB107	070SB-0035M-0001-SO 070SB-107-0078-S0	Composite Discrete SB	REG REG	4 5	7	13-Nov-12 05-Feb-18	Subsurface Soil Subsurface Soil	P or A P or A		X X		X X	X X	x
Outdoor Wash Rack Area	6	70-4740-SB106	070SB-106-0074-S0	Discrete SB	REG	6	7	05-Feb-18	Subsurface Soil	P or A						Х
Outdoor Wash Rack Area Outdoor Wash Rack Area	6 6	70-4740-SB105 70-4740-SB107	070SB-105-0073-S0 070SB-107-0079-S0	Discrete SB Discrete SB	REG REG	6 7	7 9	05-Feb-18 05-Feb-18	Subsurface Soil Subsurface Soil	P or A P or A		х		x	Х	X X
Drainage Ditch East of Building 47-40	7	70-CDD-DU7-SS	070SS-0006M-0001-SO	ISM	REG	0	1	05-Pep-18 05-Nov-12	Subsurface Soil	P or A	Х	X	Х	X	X	X
Drainage Ditch East of Building 47-40 Drainage Ditch East of Building 47-40	7	70-CDD-DU7-SS 70-CDD-DU7-SS	070SS-0006M-0001-SO 070SS-0006M-0002-SO	ISM ISM	MSD MS	0	1	05-Nov-12 05-Nov-12	Surface Soil Surface Soil	QC QC	X X	X	х	x	Х	х
Drainage Ditch East of Building 47-40 Drainage Ditch East of Building 47-40	7		070SS-0006M-0002-SO 070SS-0006M-0002-SO	ISM	MSD	0	1	05-Nov-12 05-Nov-12	Surface Soil	QC	X	X	X	X	X	X
Drainage Ditch East of Building 47-40	7	70-CDD-DU7-SS	070SS-0007M-0001-SO	ISM	FD	0	1	05-Nov-12	Surface Soil	QC	Х	Х	Х	Х	Х	Х
Drainage Ditch East of Building 47-40 Drainage Ditch East of Building 47-40	7	70-CDD-DU7-SS 70-CDD-DU7-SS	070SS-0006M-0003-SO 070SS-0006M-0004-SO	ISM ISM	REG MS	0	1	07-Nov-12 07-Nov-12	Surface Soil Surface Soil	P or A QC			X			
Drainage Ditch East of Building 47-40	7	70-CDD-DU7-SS	070SS-0006M-0004-SO	ISM	MSD	0	1	07-Nov-12	Surface Soil	QC			Х			
Drainage Ditch East of Building 47-40		70-CDD-DU7-SS	070SS-0007M-0002-SO	ISM	FD	0	1	07-Nov-12	Surface Soil	QC	1		Х	i i		

A Pesticide sample collected and analyzed in 2013 due to surrogate failure in original sample. Recollected to ensure project completeness. B. Extra surface soil MS/MSD samples collected. This was to be analyzed on a contingency basis if all of the method extractions exhibited low recovery. Surface soil ISM samples were collected from DU02 and DU07, since drainage ditches were dry at time of sample collection. FD = field duplicate; MS = matrix spike; MSD = matrix spike duplicate; QC = quality control; REG = regular; SVOCs = semivolatile organic compounds; TAL = Target Analyte List; TPH = Total Petroleum Hydrocarbons; VOCs = volatile organic compounds; P or A: Determine presence or absence of potential contamination in media not previously sampled.

P or A: Determine presence or absence of potential contamination in Propellants include nitroguanidine, nitrocellulose, and nitroglycerin. not previously sampled.

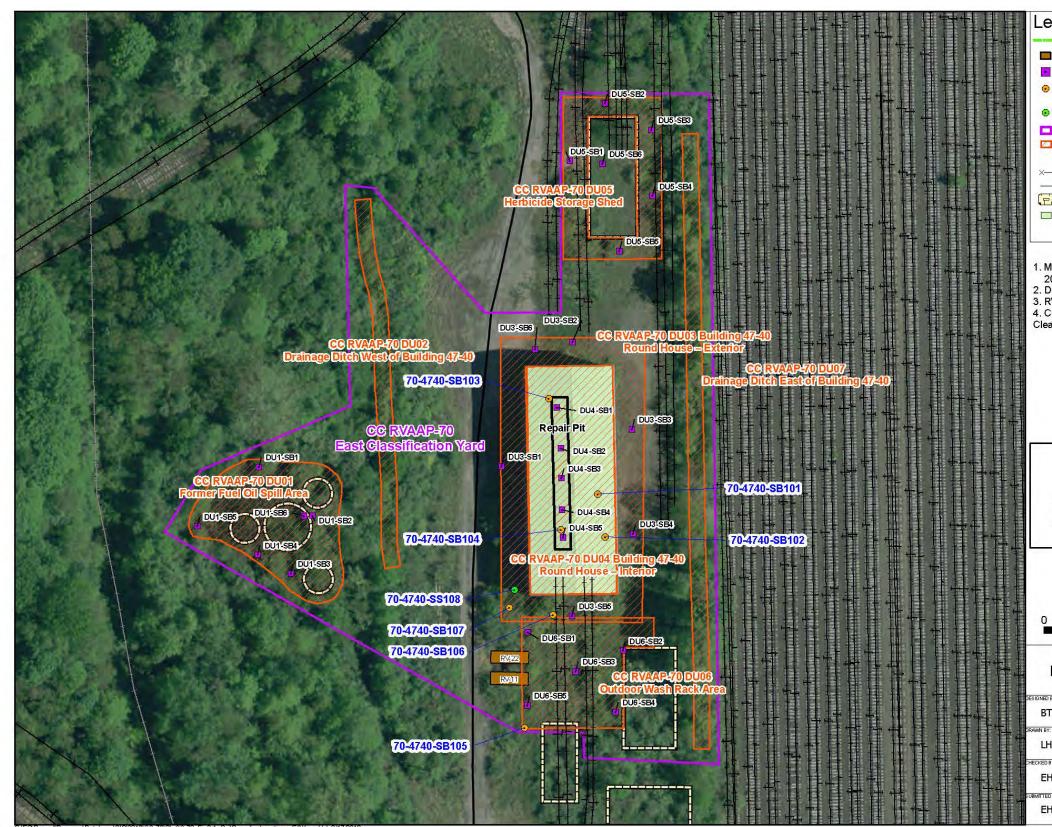


Figure 3-1 Soil Sampling Locations

## 4. DATA EVALUATION

This section presents and evaluates the analytical results for CC RVAAP-70 East Classification Yard SI samples. Data are screened to identify SRCs and potential contaminants.

## 4.1 DATA QUALITY

### 4.1.1 2012 Data Quality

ECC performed internal data verification on 100 percent of the data and third-party independent data validation on 10 percent of the SI laboratory data.

Data verification was performed on the surface soil and subsurface soil samples. The analytical results were reported by the laboratory in accordance with the FWSAP (SAIC, 2011a).

Data qualifiers were assigned to each result based on the laboratory (TestAmerica Laboratories, Inc.) QA review and verification criteria. Results were qualified as follows:

- "U" indicates not detected.
- "UJ" indicates not detected, reporting limit estimated.
- "J" indicates the analyte was positively identified; however, the associated numerical value is an approximate concentration of the analyte in the sample.
- "R" indicates result not usable.

In addition to assigning qualifiers, the verification process also selected the appropriate result to use when re-analyses or dilutions were performed. Where laboratory surrogate recovery data or laboratory QC samples were outside of analytical method specifications, the verification chemist determined whether laboratory re-analysis should be used in place of an original reported result. If the laboratory reported results for both diluted and undiluted samples, diluted sample results were used for those analytes that exceeded the calibration range of the undiluted sample. A complete discussion of verification process results is contained in the Data Verification Report (Appendix D).

A data validation report was completed for six AOCs where ECC conducted SIs. The *Final Data Validation Report for Compliance Restoration Sites: RVAAP-70 East Classification Yard, RVAAP-71 Barn No. 5 Petroleum Release, RVAAP-72 Facility-Wide Underground Storage Tanks, RVAAP-75 George Road Sewer Treatment Plan Mercury Spill, RVAAP-77 Building 1037 Laundry Waste Water Sump, and RVAAP-83 Former Buildings 1031 and 1039 was issued by North Wind Services and MEC<sup>x</sup> in August 2014 (Appendix F). Data validation for the CC RVAAP-70 East Classification Yard SI indicates that results are usable for their intended purposes. Three compounds were qualified as rejected in select samples: n-nitrosodiphenylamine, 4-chloroaniline, and 3,3'-dichlorobenzidine. None of these compounds are SRCs.* 

#### 4.1.2 2018 Data Quality

The quality of 2018 data was assessed in accordance with the Quality Assurance Project Plan (component of the Work Plan, Parsons, 2017) and USEPA's *Implementation of the Uniform Federal Policy for Quality Assurance Project Plans at Federal Waste Hazardous Waste Sites* (USEPA, 2005a).

Parsons performed data validation on 100% of the 2018 laboratory data from CC RVAAP-70 East Classification Yard. The changes to qualifiers that were applied to data based on the validation are discussed in the data validation reports. Results from the CC RVAAP-70 East Classification Yard SI 2018 sampling event are usable for their intended purposes. However, the following instances are where data were rejected ("R" qualified) and are therefore deemed unusable:

• For 8260C, seven non-detect results for acetone and eleven non-detect results for 2-butanone were rejected and flagged "R" because the minimum relative response factor was not met in one or more continuing calibration verifications (CCV).

The rejected ("R" qualified) results are not considered usable and were not used for environmental decisions. However, none of these analytes are SRCs. All remaining data is usable for its intended purposes as qualified by the Parsons data validator. The data qualified as estimated ("J" or "UJ") were due to QC deficiencies such as minor holding time exceedances (less than 2x the holding time), QA/QC samples (initial calibration verification, CCV, and MS/MSD) exceeding criteria, relative percent difference of field duplicate/parent exceeding criteria. Furthermore, two results for acetone were qualified "B" due to trip blank contamination. Data verification and validation reports are provided in Appendices D and F, respectively.

# 4.2 SITE-RELATED CHEMICALS EVALUATION

Data generated during the CC RVAAP-70 East Classification Yard SI were screened to identify SRCs. A chemical detected at a concentration greater than the established Background Screening Value (BSV), that is not an essential nutrient, and has not been screened out through a frequency of detection evaluation is identified as an SRC. Note that no chemicals were eliminated through a frequency of detection evaluation because less than 20 samples were collected for any medium in any DU. An SRC may, or may not be, related to the former operations at the AOC. SRCs for surface soil are presented in Tables 4-1a through 4-1f, and SRCs for subsurface soil are presented in Tables 4-2a through 4-2e. SRCs are discussed in the paragraphs below for each DU.

## **DU01:** Former Fuel Oil Spill Area

SRCs identified in surface soil (Table 4-1a and Figure 4-1) include two petroleum hydrocarbons and 10 SVOCs (all PAHs).

- Petroleum hydrocarbons: TPH (C10-C20 and C20-C34)
- SVOCs (PAHs): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene

SRCs identified in subsurface soil (Table 4-2a and Figure 4-3) include two inorganics, one explosive, three petroleum hydrocarbons, 18 SVOCs (15 PAHs) and 8 VOCs.

- Inorganics: cadmium and silver
- Explosives: nitrobenzene
- Petroleum hydrocarbon: TPH (C6-C12, C10-C20, and C20-C34)
- SVOCs (PAHs): acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- o SVOCs (other than PAHs): dibenzofuran, 4-nitroaniline, n-nitrosodiphenylamine
- VOCs: acetone, benzene, 2-butanone, carbon disulfide, ethylbenzene, methylene chloride, toluene, xylenes

## **DU02 Drainage Ditch West of Building 47-40**

SRCs identified in drainage ditch surface soil (Table 4-1b and Figure 4-2) include two petroleum hydrocarbons and 13 SVOCs (all PAHs).

- Petroleum hydrocarbon: TPH (C10-C20 and C20-C34)
- SVOCs (PAHs): anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene

### DU03 Building 47-40 Round House – Exterior

SRCs identified in surface soil (Table 4-1c and Figure 4-1) include 10 inorganics, 1 PCB, and 18 SVOCs (16 PAHs).

- Inorganics: barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc
- o PCBs: aroclor-1254
- SVOCs (PAHs): acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): carbazole and dibenzofuran

SRCs identified in subsurface soil (Table 4-2b and Figure 4-4) include two inorganics, 17 SVOCs, and 5 VOCs.

- Inorganics: cadmium and silver
- SVOCs (PAHs): acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): bis(2-ethylhexyl)phthalate and dibenzofuran
- VOCs: acetone, benzene, 2-butanone, carbon disulfide, and toluene

## **DU04 Building 47-40 Round House – Interior**

SRCs identified in subsurface soil (Table 4-2c and Figure 4-5) include 4 inorganics, 9 SVOCs (7 PAHs), and 4 VOCs.

- o Inorganics: cadmium, cobalt, selenium, and silver
- SVOCs (PAHs): acenaphthene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): butyl benzyl phthalate and dibenzofuran
- o VOCs: acetone, carbon disulfide, chlorobenzene, and trichloroethene

## **DU05 Former Herbicide Storage Shed**

SRCs identified in surface soil (Table 4-1d and Figure 4-1) include one pesticide and 17 SVOCs (16 PAHs).

- Pesticides: 2,4,5-trichlorophenoxyacetic acid
- SVOCs (PAHs): acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene,

naphthalene, phenanthrene, and pyrene

• SVOCs (other than PAHs): dibenzofuran

SRCs identified in subsurface soil (Table 4-2d and Figure 4-6) include two inorganics, one petroleum hydrocarbon, one pesticide, 17 SVOCs, and 6 VOCs.

- o Inorganics: cadmium and silver
- Petroleum Hydrocarbons: TPH (C10-C20)
- Pesticides: 2,4,5-trichlorophenoxyacetic acid
- SVOCs (PAHs): acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): 1,2-dichlorobenzene and 2,4,5-trichlorophenol
- o VOCs: acetone, benzene, 2-butanone, carbon disulfide, ethylbenzene, and toluene

### **DU06 Outdoor Wash Rack Area**

SRCs identified in surface soil (Table 4-1e and Figure 4-1) include one explosive, one PCB, and 17 SVOCs (14 PAHs).

- Explosives: 2,6-dinitrotoluene
- o PCBs: aroclor-1260
- SVOCs (PAHs): acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- o SVOCs (other than PAHs): benzoic acid, dibenzofuran and 1,2-dichlorobenzene

SRCs identified in subsurface soil (Table 4-2e and Figure 4-7) include one explosive, one petroleum hydrocarbon, one PCB, 14 SVOCs (11 PAHs), and two VOCs.

- Explosives: tetryl
- Petroleum Hydrocarbons: TPH (C10-C20)
- PCBs: aroclor-1260
- SVOCs (PAHs): anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- o SVOCs (other than PAHs): dibenzofuran, 1,2-dichlorobenzene, and isophorone
- VOCs: acetone and trichloroethene

No SRCs were detected in the surface soil sample from the surface water drain.

## **DU07 Drainage Ditch East of Building 47-40**

SRCs identified in drainage ditch surface soil (Table 4-1f and Figure 4-7) include 14 inorganics, one explosive, two petroleum hydrocarbons, two pesticides, three PCBs, 16 SVOCs (15 PAHs), and one VOC.

o Inorganics: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead,

nickel, selenium, silver, thallium, zinc

- Explosives: nitrocellulose
- Petroleum Hydrocarbons: TPH (C10-C20 and C20-C34)
- Pesticides: 4,4-dichlorodiphenyldichloroethylene (4,4-DDE), and 4,4-dichlorodiphenyltrichloroethane (4,4-DDT)
- PCBs: aroclor-1242, aroclor-1248, and aroclor-1260
- SVOCs (PAHs): acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): dibenzofuran
- VOCs: acetone

## 4.3 POTENTIAL CHEMICAL CONTAMINATION EVALUATION

The maximum detected concentration (MDC) of each SRC identified by the SI at each DU was compared to its most stringent FWCUG (SAIC, 2010) for the Resident Receptor (or May 2018 USEPA Residential RSLs if no FWCUG is established) using the target cancer risk level of 10<sup>-6</sup> or the target HQ for non-carcinogenic risks of 0.1 to determine the presence of potential contaminants. Because FWCUGs have not yet been updated with 2017 toxicity values for PAHs, PAH concentrations were also compared to May 2018 RSLs.

The MDC of the TPH SRCs were compared to Bureau of Underground Storage Tank Regulation (BUSTR) (Ohio Department of Commerce, 2017) Soil Class 2 criteria because FWCUGs have not been established for petroleum hydrocarbons.

The SRCs that exceeded the most stringent value FWCUG for the Resident Receptor (or RSLs or BUSTR if no FWCUG is established), using a target cancer risk level of  $10^{-6}$  or the target HQ = 0.1 for non-carcinogenic risks, were then evaluated using a weight-of-evidence (WOE) approach. The WOE evaluation considers the SRCs that exceed their FWCUGs (or RSL or BUSTR) criteria, as described above, to determine if the chemical should be identified as a potential contaminant.

## DU01 Former Fuel Oil Spill Area

Of the 12 SRCs identified in surface soil at DU01, only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3a). The concentration of benzo(a)pyrene also exceeds the May 2018 USEPA Residential RSL.

Of the 32 SRCs identified in subsurface soil at DU01 only benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene exceeded the most stringent FWCUGs for the Resident Receptor in one or more subsurface soil sample (Figure 4-3 and Table 4-4a). The concentrations of benzo(b)fluoranthene and dibenz(a,h)anthracene do not exceed their May 2018 USEPA Residential RSLs. The concentrations of benzo(a)anthracene and benzo(a)pyrene exceed the 2010 FWCUG and the May 2018 USEPA Residential RSL.

The concentrations of TPH (C6-C12) (190 milligrams per kilogram [mg/kg] in subsurface soil), TPH (C10-C20) (57 mg/kg in surface soil and 4,000 mg/kg in subsurface soil), and TPH (C20-C34) (540 mg/kg in surface soil and 430 mg/kg in subsurface soil) at DU01 were compared to the BUSTR Soil Class 2 Action Levels of 5,000 mg/kg, 10,000 mg/kg, and 20,000 mg/kg respectively. Because the

maximum concentrations of petroleum hydrocarbons are less than BUSTR Soil Class 2 Action Levels, TPH is not considered a potential contaminant at DU01.

Benzo(a)pyrene is retained as a potential contaminant in surface soil at DU01. Benzo(a)pyrene and benzo(a)anthracene are retained as potential contaminants in subsurface soil at DU01.

## **DU02 Drainage Ditch West of Building 47-40**

Of the 15 SRCs identified in surface soil at DU02 only benzo(a)pyrene and benzo(b)fluoranthene exceeded the most stringent surface soil FWCUG for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3b). The concentration of benzo(b)fluoranthene does not exceed the May 2018 USEPA Residential RSL for soil. The concentration of benzo(a)pyrene exceeds the 2010 surface soil FWCUG and the May 2018 USEPA Residential RSL for soil.

The concentration of TPH (C10-C20) (120 mg/kg) and TPH (C20-C34) (750 mg/kg) in surface soil at DU02 were compared to the BUSTR Soil Class 2 Action Level of 10,000 mg/kg and 20,000 mg/kg, respectively. Because the maximum concentrations are less than BUSTR Soil Class 2 Action Level, TPH is not considered a potential contaminant in surface soil at DU02.

Benzo(a)pyrene is retained as a potential contaminant in surface soil at DU02.

## **DU03 Building 47-40 Round House**

Of the 29 SRCs identified in surface soil at DU03 only benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene exceeded the most stringent FWCUGs for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3c). The concentration of indeno(1,2,3-cd)pyrene does not exceed the May 2018 USEPA Residential RSL. Concentrations of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceed the 2010 FWCUG and the May 2018 USEPA Residential RSL.

Of the 24 SRCs identified in subsurface soil at DU03 only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in one or more subsurface soil sample (Figure 4-4 and Table 4-4b). The concentration of benzo(a)pyrene does not exceed the May 2018 USEPA Residential RSL.

Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene are retained as potential contaminants in surface soil at DU03. No potential contaminants were identified for subsurface soil at DU03.

#### **DU04 Building 47-40 Round House – Interior**

None of the 17 SRCs identified in subsurface soil at DU04 exceeded the most stringent FWCUG for the Resident Receptor in any subsurface soil sample (Figure 4-5 and Table 4-4c). No potential contaminants were identified for subsurface soil at DU04.

## **DU05 Former Herbicide Storage Shed**

Of the 18 SRCs identified in surface soil at DU05 only benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene exceeded the most stringent FWCUGs for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3d). The concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene do not exceed the May 2018 USEPA Residential RSL. The concentration of benzo(a)pyrene exceeds the 2010 FWCUG and the May 2018 USEPA Residential RSL.

Of the 27 SRCs identified in subsurface soil at DU05 only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in one or more subsurface soil sample (Figure 4-6 and

Table 4-4d). The concentration of benzo(a)pyrene does not exceed the May 2018 USEPA Residential RSL.

Benzo(a)pyrene was retained as a potential contaminant in surface soil at DU05. No potential contaminants were identified in subsurface soil at DU05.

### DU06 Outdoor Wash Rack Area

Of the 18 SRCs identified in surface soil at DU06 only benzo(a)pyrene and benzo(b)fluoranthene exceeded the most stringent FWCUGs for the Resident Receptor in one or more surface soil samples (Figure 4-1 and Table 4-3e). The concentration of benzo(b)fluoranthene does not exceed the May 2018 USEPA Residential RSL. The detected concentration of benzo(a)pyrene exceeds the 2010 FWCUG and the May 2018 USEPA Residential RSL.

Of the 19 SRCs identified in subsurface soil at DU06 only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in one or more subsurface soil sample (Figure 4-7 and Table 4-4e). The concentration of benzo(a)pyrene does not exceed the May 2018 USEPA Residential RSL.

Benzo(a)pyrene was retained as a potential contaminant in surface soil at DU06. No potential contaminants were identified in subsurface soil at DU06.

#### **DU07 Drainage Ditch East of Building 47-40**

Of the 39 SRCs identified in surface soil at DU07, arsenic, aroclor-1242, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeded the most stringent surface soil FWCUG for the Resident Receptor in one or more surface soil samples (Figure 4-1 and Table 4-3f).

Arsenic exceeded its BSV (15.4 mg/kg) and therefore its Adult Resident Receptor FWCUG of 0.425 mg/kg (the lowest of the Adult Resident Receptor and Child Resident Receptor FWCUGs). Aroclor-1242 exceeded its May 2018 RSL of 0.23 mg/kg (there are no FWCUGs for Aroclor-1242).

Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene concentrations in surface soil exceed their surface soil FWCUGs for the Resident Receptor. The detected concentrations of benzo(a)anthracene and benzo(b)fluoranthene do not exceed the May 2018 USEPA Residential RSL for soil. The detected concentration of benzo(a)pyrene exceeds the 2010 surface soil FWCUG and the May 2018 USEPA Residential RSL for soil.

The concentrations of TPH (C10-C20) (42 mg/kg) and TPH (C20-C34) (210 mg/kg) in surface soil at DU07 were compared to the BUSTR Soil Class 2 Action Levels of 10,000 mg/kg and 20,000 mg/kg, respectively. Because the concentrations are less than BUSTR Soil Class 2 Action Levels, TPH is not considered a potential contaminant in surface soil at DU07.

Arsenic, aroclor-1242, and benzo(a)pyrene are retained as potential contaminants in surface soil at DU07.

### 4.4 WEIGH-OF-EVIDENCE EVALUATION

Potential contaminants were identified in surface soil and subsurface soil at CC RVAAP-70 East Classification Yard. All of the SRCs identified as potential contaminants are consistent with historical operations at the CC RVAAP-70 East Classification Yard.

Potential contaminants in surface soil (Figure 4-8):

- o Inorganics: arsenic
- PAHs: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

• PCBs: aroclor-1242

Potential contaminants in subsurface soil (Figure 4-9):

• PAHs: benzo(a)pyrene and benzo(a)anthracene

PAHs were detected in all surface soil ISM samples. The most common potential contaminants are PAHs in surface soil. PAHs are consistent with historical use of chemicals at Building 47-40 Round House (DU03 and DU04), the fuel oil release (DU01), and mixing fuel with herbicides at the Former Herbicide Storage Shed (DU05). PAHs are also created by burning fossil fuels and would be expected to be commonly found on railroad vehicles that were cleaned at the wash rack (DU06). Other potential sources of PAHs include asphalt pavement; decaying asphalt pavement was present in surface soil surrounding the Round House (DU03) and Former Herbicide Storage Shed (DU05) (Appendix H, Photographs). Although there is uncertainty regarding the source of PAHs in surface soil, WOE is insufficient to eliminate them as potential contaminants at the CC RVAAP-70 AOC.

PAHs were identified as potential contaminants in subsurface soil at the Former Fuel Oil Spill (DU01). At least one PAH was detected in eight of the nine subsurface soil samples collected from DU01. PAHs are consistent with a fuel oil release.

PCBs were detected in four of seven surface soil samples but was only detected at a concentration sufficient to be defined as a potential contaminant in one surface soil sample from the ditch east of Building 47-40 (DU07). Many of the detections were J-flagged (estimated concentrations). The presence of PCBs is consistent with historical records of PCB transformers at the AOC. Given that PCBs were historically used at the CC RVAAP-70 AOC and the relatively frequent (though very low concentration) detections, WOE suggests PCBs are present in surface soils.

Arsenic was detected above its background screening level in surface soil samples from DU07 but not at DU03. Arsenic was identified as a potential contaminant in surface soil from the ditch east of Building 47-40 (DU07). Arsenic is naturally present in Camp Ravenna soils. The concentration in sample 070SS-0006M-0001-SO was 29 mg/kg, whereas the BSV for arsenic at Camp Ravenna surface soil is 15.4 mg/kg. Cox and Colvin (1996) documented arsenic concentrations in Ohio soils ranging up to 56 mg/kg. Therefore, the arsenic detected in CC RVAAP-70 surface soil could potentially be naturally occurring minerals. Anthropogenic sources of arsenic include use of pesticides and herbicides. If arsenic is present as a result of application of pesticide or herbicide for intended use, the arsenic at CC RVAAP-70 surface soil would not constitute a release. Arsenic could potentially be present as result of a release of arsenic-containing herbicides stored and mixed at the Former Herbicide Storage Shed (DU05); however, the HRR only mentions that organic herbicides were used and there are no records of any spills from the herbicide stored at the shed. The WOE is inconclusive regarding the source of arsenic in CC RVAAP-70 surface soil.

 Table 4-1a Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Land the ID							70 4744 DU14 00
Location ID:							70-4744-DU1-SS
Field Sample ID:				Background			070SS-0001M-0001-S
Lab Sample ID:	CAS Number	Frequency of Detection	Max Detect	Screening	SRC-	SRC Justification	240-17230-1
Sample Date:	CAS Nulliber		Concentration	Value	Yes/No	SRC Justification	11/5/2012
Sample Depth:				Value			0-1
Sample Type:							REG
Total Petroleum Hydrocarbons (mg/kg)							
TPH (C10-C20)	68476-34-6	1/1	57 J	NB	Yes	Detected Organic	57 J
TPH (C20-C34)	100664-65-1	1/1	540 M	NB	Yes	Detected Organic	540 M
Semivolatile Organic Compounds (mg/kg)							
Benzo(a)anthracene	56-55-3	1/1	0.097	NB	Yes	Detected Organic	0.097
Benzo(a)pyrene	50-32-8	1/1	0.13	NB	Yes	Detected Organic	0.13
Benzo(b)fluoranthene	205-99-2	1/1	0.13	NB	Yes	Detected Organic	0.13
Benzo(g,h,i)perylene	191-24-2	1/1	0.31	NB	Yes	Detected Organic	0.31
Benzo(k)fluoranthene	207-08-9	1/1	0.04	NB	Yes	Detected Organic	0.04
Chrysene	218-01-9	1/1	0.15	NB	Yes	Detected Organic	0.15
Fluoranthene	206-44-0	1/1	0.13	NB	Yes	Detected Organic	0.13
Indeno(1,2,3-cd)pyrene	193-39-5	1/1	0.054	NB	Yes	Detected Organic	0.054
Phenanthrene	85-01-8	1/1	0.15	NB	Yes	Detected Organic	0.15
Pyrene	129-00-0	1/1	0.21	NB	Yes	Detected Organic	0.21

Notes:

BOLD chemical detected above background, not an essential nutrient.

ID = identification

J = Estimated value less than reporting limits.

M = manually integrated compound mg/kg = milligrams per kilogram NB = No background REG = Regular

TPH = Total Petroleum Hydrocarbons SRC = Site-related chemical

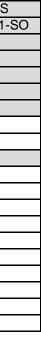


Table 4-1b Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch West of Building 47-40 (DU02)

Location ID:							70-DD-DU2-SS
Field Sample ID:				Background			070SS-0002M-0001-S
Lab Sample ID:	CAS Number	Frequency of	f Max Detect	-	SRC-	SRC Justification	240-17230-2
Sample Date:	CAS Nulliber	Detection	Concentration	Screening	Yes/No	SRC Justification	11/5/2012
Sample Depth:				Value			0-1
Sample Type:							REG
Total Petroleum Hydrocarbons (mg/kg)						•	
TPH (C10-C20)	68476-34-6	1/1	120 J	NB	Yes	Detected Organic	120 J
TPH (C20-C34)	100664-65-1	1/1	750 M	NB	Yes	Detected Organic	750 M
Semivolatile Organic Compounds (mg/kg)						•	
2-Methylnaphthalene	91-57-6	1/1	0.042 J	NB	Yes	Detected Organic	0.042 J
Anthracene	120-12-7	1/1	0.03 J	NB	Yes	Detected Organic	0.03 J
Benzo(a)anthracene	56-55-3	1/1	0.18	NB	Yes	Detected Organic	0.18
Benzo(a)pyrene	50-32-8	1/1	0.22	NB	Yes	Detected Organic	0.22
Benzo(b)fluoranthene	205-99-2	1/1	0.27	NB	Yes	Detected Organic	0.27
Benzo(g,h,i)perylene	191-24-2	1/1	0.4	NB	Yes	Detected Organic	0.4
Benzo(k)fluoranthene	207-08-9	1/1	0.12	NB	Yes	Detected Organic	0.12
Chrysene	218-01-9	1/1	0.23	NB	Yes	Detected Organic	0.23
Fluoranthene	206-44-0	1/1	0.3	NB	Yes	Detected Organic	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	1/1	0.17	NB	Yes	Detected Organic	0.17
Naphthalene	91-20-3	1/1	0.035 J	NB	Yes	Detected Organic	0.035 J
Phenanthrene	85-01-8	1/1	0.12	NB	Yes	Detected Organic	0.12
Pyrene	129-00-0	1/1	0.28	NB	Yes	Detected Organic	0.28

Notes:

BOLD chemical detected above background, not an essential nutrient.

ID = identification

J = Estimated value less than reporting limits.

J = Estimated value less than reporting M = manually integrated compound mg/kg = milligrams per kilogram NB = No background REG = Regular TPH = Total Petroleum Hydrocarbons SRC = Site-related chemical

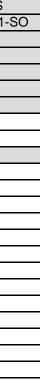


 Table 4-1c Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID:							70-4740-DU3-SS
Field Sample ID:							070SS-0003M-0001-SO
Lab Sample ID:		Frequency of	Max Detect	Background	SRC-		240-17230-3
Sample Date:	CAS Number	Detection	Concentration	Screening	Yes/No	SRC Justification	11/5/2012
Sample Depth:		Detection	ooncentration	Value	103/110		0-1
Sample Type:							REG
TAL Metals (mg/kg)							
Aluminum	7429-90-5	1/1	9,000	17,700	No	Below Background	9,000
Antimony	7440-36-0	1/1	0.41	0.96	No	Below Background	0.41
Arsenic	7440-38-2	1/1	11	15.4	No	Below Background	11
Barium	7440-39-3	1/1	93	88.4	Yes	Exceeds Background	93
Beryllium	7440-41-7	1/1	0.91	0.88	Yes	Exceeds Background	0.91
Cadmium	7440-43-9	1/1	0.26	0.00	Yes	Exceeds Background	0.26
Calcium	7440-70-2	1/1	33,000	15,800	No	Essential Nutrient	33,000
Chromium	7440-70-2	1/1	<b>26</b>	13,800	Yes		26
Cobalt	7440-47-3	1/1	7.4	10.4	No	Exceeds Background	7.4
			7.4 <b>21</b>	10.4	Yes	Below Background	21
Copper	7440-50-8	1/1			Yes No	Exceeds Background	
Iron	7439-89-6	1/1	19,000	23,100	-	Essential Nutrient	19,000
Lead	7439-92-1	1/1	45	26.1	Yes	Exceeds Background	45
Magnesium	7439-95-4	1 / 1	4,300	3,030	No	Essential Nutrient	4,300
Manganese	7439-96-5	1/1	960	1,450	No	Below Background	960
Nickel	7440-02-0	1/1	29	21.1	Yes	Exceeds Background	29
Potassium	7440-09-7	1/1	740	NB	No	Essential Nutrient	740
Selenium	7782-49-2	1/1	0.65	1.4	No	Below Background	0.65
Silver	7440-22-4	1/1	0.035 J	0	Yes	Exceeds Background	0.035 J
Sodium	7440-23-5	1 / 1	130	NB	No	Essential Nutrient	130
Thallium	7440-28-0	1/1	0.17 J	0	Yes	Exceeds Background	0.17 J
Vanadium	7440-62-2	1/1	12	31.1	No	Below Background	12
Zinc	7440-66-6	1/1	76	61.8	Yes	Exceeds Background	76
Polychlorinated Biphenyls (PCBs) (mg/kg)							
Aroclor-1254	11097-69-1	1/1	0.047 J	NB	Yes	Detected Organic	0.047 J
Semivolatile Organic Compounds (mg/kg)				-	_		
2-Methylnaphthalene	91-57-6	1/1	0.69	NB	Yes	Detected Organic	0.54
Acenaphthene	83-32-9	1/1	0.55	NB	Yes	Detected Organic	0.55
Acenaphthylene	208-96-8	1/1	0.066	NB	Yes	Detected Organic	0.047 J
Anthracene	120-12-7	1/1	2.5	NB	Yes	Detected Organic	2.5
Benzo(a)anthracene	56-55-3	1/1	3.2	NB	Yes	Detected Organic	3.2
Benzo(a)pyrene	50-32-8	1/1	1.9	NB	Yes	Detected Organic	1.9
Benzo(b)fluoranthene	205-99-2	1/1	3.1	NB	Yes	Detected Organic	3.1
Benzo(g,h,i)perylene	191-24-2	1/1	1.1	NB	Yes	Detected Organic	1.1
Benzo(k)fluoranthene	207-08-9	1/1	0.98	NB	Yes	Detected Organic	0.98
Carbazole	86-74-8	1/1	0.34 J	NB	Yes	Detected Organic	0.34 J
Chrysene	218-01-9	1/1	3.3	NB	Yes	Detected Organic	3.3
Dibenzofuran	132-64-9	1/1	0.42 J	NB	Yes	Detected Organic	0.42 J
Fluoranthene	206-44-0	1/1	8.4	NB	Yes	Detected Organic	8.4
Fluorene	86-73-7	1/1	0.71	NB	Yes	Detected Organic	0.71
Indeno(1,2,3-cd)pyrene	193-39-5	1/1	1	NB	Yes	Detected Organic	1
Naphthalene	91-20-3	1/1	0.49	NB	Yes	Detected Organic	0.48
Phenanthrene	85-01-8	1/1	5.9	NB	Yes	Detected Organic	5.9
Pyrene	129-00-0	1/1	5.7	NB	Yes	Detected Organic	5.7

Notes: **BOLD chemical detected above background, not an essential nutrient.** FD = Field Duplicate ID = identification J = Estimated value less than reporting limits. mg/kg = milligrams per kilogram NB = No background REG = Regular TPH = Total Petroleum Hydrocarbons SRC = Site-related chemical

Table 4-1d Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

		II TO LIUDE CIUD	,		140 00014	Se blied (B C CC)	
Location ID:							70-4760-DU5-SS
Field Sample ID:				Background			070SS-0004M-0001-S
Lab Sample ID:	CAS Number	Frequency of	Max Detect	Screening	SRC-	SRC Justification	240-17230-4
Sample Date:	CAS Number	Detection	Concentration	Value	Yes/No	SRC Justification	11/5/2012
Sample Depth:				Value			0-1
Sample Type:							REG
Organochlorine Pesticides (mg/kg)							
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	1/1	0.01 J	NB	Yes	Detected Organic	0.01 J
Semivolatile Organic Compounds (mg/kg)			•	•		·	·
2-Methylnaphthalene	91-57-6	1/1	0.42	NB	Yes	Detected Organic	0.42
Acenaphthene	83-32-9	1/1	0.14	NB	Yes	Detected Organic	0.14
Acenaphthylene	208-96-8	1/1	0.065	NB	Yes	Detected Organic	0.065
Anthracene	120-12-7	1/1	0.42	NB	Yes	Detected Organic	0.42
Benzo(a)anthracene	56-55-3	1/1	0.75	NB	Yes	Detected Organic	0.75
Benzo(a)pyrene	50-32-8	1/1	0.46	NB	Yes	Detected Organic	0.46
Benzo(b)fluoranthene	205-99-2	1/1	0.95	NB	Yes	Detected Organic	0.95
Benzo(g,h,i)perylene	191-24-2	1/1	0.31	NB	Yes	Detected Organic	0.31
Benzo(k)fluoranthene	207-08-9	1/1	0.31	NB	Yes	Detected Organic	0.31
Chrysene	218-01-9	1/1	1.1	NB	Yes	Detected Organic	1.1
Dibenzofuran	132-64-9	1/1	0.17 J	NB	Yes	Detected Organic	0.17 J
Fluoranthene	206-44-0	1/1	1.8	NB	Yes	Detected Organic	1.8
Fluorene	86-73-7	1/1	0.16	NB	Yes	Detected Organic	0.16
Indeno(1,2,3-cd)pyrene	193-39-5	1/1	0.28	NB	Yes	Detected Organic	0.28
Naphthalene	91-20-3	1/1	0.27	NB	Yes	Detected Organic	0.27
Phenanthrene	85-01-8	1/1	1.2	NB	Yes	Detected Organic	1.2
Pyrene	129-00-0	1/1	1.3	NB	Yes	Detected Organic	1.3

Notes:

BOLD chemical detected above background, not an essential nutrient.

ID = identification

J = Estimated value less than reporting limits.

mg/kg = milligrams per kilogram NB = No background

REG = Regular TPH = Total Petroleum Hydrocarbons

U = Not detected.

UJ = Not detected and the reported limit is estimated.

SRC = Site-related chemical



 Table 4-1e Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

Location ID:				,			70-4759-DU6-SS	70-4740	-SB107	70-4740-SS108
Field Sample ID:				Beekground			070SS-0005M-0001-SO	070SS-107-0075-S0	070SS-107-9075-S0	070SS-108-0081-SO
Lab Sample ID:		Frequency of	Max Detect	Background	SRC-	CDC Institution	240-17230-5	160-26639-4	160-26639-10	160-26663-5
Sample Date:	CAS Number	Detection	Concentration	Screening	Yes/No	SRC Justification	11/5/2012	2/5/2018	2/5/2018	2/6/2018
Sample Depth:				Value			0-1	0-1	0-1	0-0.5
Sample Type:							REG	REG	FD	REG
Explosives / Propellants (mg/kg)										
2,6-Dinitrotoluene	606-20-2	1/4	0.05 J	NB	Yes	Detected Organic	0.05 J	0.016 UJ	0.016 UJ	0.015 U
Polychlorinated Biphenyls (PCBs) (mg/kg)										
Aroclor-1260	11096-82-5	1/4	0.07 J	NB	Yes	Detected Organic	0.07 J	0.012 U	0.011 U	0.013 U
Semivolatile Organic Compounds (mg/kg)										
1,2-Dichlorobenzene	95-50-1	1/4	0.081 J	NB	Yes	Detected Organic	0.081 J	2.3 U	0.11 U	3.2 U
2-Methylnaphthalene	91-57-6	1/4	0.69	NB	Yes	Detected Organic	0.69	2.3 U	0.11 U	3.2 U
Acenaphthylene	208-96-8	1/4	0.066	NB	Yes	Detected Organic	0.066	2.3 U	0.11 U	3.2 U
Anthracene	120-12-7	1/4	0.08	NB	Yes	Detected Organic	0.08	2.3 U	0.11 U	3.2 U
Benzo(a)anthracene	56-55-3	1/4	0.21	NB	Yes	Detected Organic	0.21	2.3 U	0.11 U	3.2 U
Benzo(a)pyrene	50-32-8	1/4	0.21	NB	Yes	Detected Organic	0.21	2.3 U	0.11 U	3.2 U
Benzo(b)fluoranthene	205-99-2	1/4	0.36	NB	Yes	Detected Organic	0.36	2.3 U	0.11 U	3.2 U
Benzo(g,h,i)perylene	191-24-2	1/4	0.38	NB	Yes	Detected Organic	0.38	2.3 U	0.11 U	3.2 U
Benzo(k)fluoranthene	207-08-9	1/4	0.19	NB	Yes	Detected Organic	0.19	2.3 U	0.11 U	3.2 U
Benzoic acid	65-85-0	1/4	12 J	NB	Yes	Detected Organic	1.3 U	12 J	0.75 UJ	21 U
Chrysene	218-01-9	1/4	0.32	NB	Yes	Detected Organic	0.32	2.3 U	0.11 U	3.2 U
Dibenzofuran	132-64-9	1/4	0.16 J	NB	Yes	Detected Organic	0.16 J	2.3 U	0.11 U	3.2 U
Fluoranthene	206-44-0	1/4	0.41	NB	Yes	Detected Organic	0.41	2.3 U	0.11 U	3.2 U
Indeno(1,2,3-cd)pyrene	193-39-5	1/4	0.17	NB	Yes	Detected Organic	0.17	2.3 U	0.11 U	3.2 U
Naphthalene	91-20-3	1/4	0.49	NB	Yes	Detected Organic	0.49	2.3 U	0.11 U	3.2 U
Phenanthrene	85-01-8	1/4	0.32	NB	Yes	Detected Organic	0.32	2.3 U	0.11 U	3.2 U
Pyrene	129-00-0	1/4	0.33	NB	Yes	Detected Organic	0.33	2.3 U	0.11 U	3.2 U

Notes:

BOLD chemical detected above background, not an essential nutrient.

FD = Field Duplicate

ID = identification

J = Estimated value less than reporting limits.

mg/kg = milligrams per kilogram NB = No background REG = Regular TPH = Total Petroleum Hydrocarbons

U = Not detected.

UJ = Not detected and the reported limit is estimated.

SRC = Site-related chemical

Table 4-11 Site-Related Chemicals in Surface							70-CDD	-DU7-SS
Field Sample I	D:			Deelewaya			070SS-0006M-0001-SO	070SS-0007M-0001-SO
Lab Sample II	D: CAS Number	Frequency of	Max Detect	Background	SRC-	SPC Justification	240-17230-6	240-17230-7
Sample Dat	e: CAS Number	Detection	Concentration	Screening Value	Yes/No	SRC Justification	11/5/2012	11/5/2012
Sample Dept	h:			Value			0-1	0-1
Sample Typ	e:						REG	FD
TAL Metals (mg/kg)					-			
Aluminum	7429-90-5	2/2	15,000 J	17,700	No	Below Background	15,000 J	14,000
Antimony	7440-36-0	2/2	2.1 J -	0.96	Yes	Exceeds Background	2.1 J -	1.5
Arsenic	7440-38-2	2/2	29	15.4	Yes	Exceeds Background	29	27
Barium	7440-39-3	2/2	110	88.4	Yes	Exceeds Background	110	94
Beryllium	7440-41-7	2/2	1.1	0.88	Yes	Exceeds Background	1.1	1
Cadmium	7440-43-9	2/2	0.47 J	0	Yes	Exceeds Background	0.47 J	0.44
Calcium	7440-70-2	2/2	9,400 J	15,800	No	Essential Nutrient	9,400 J	6,300
Chromium	7440-47-3	2/2	83 J -	17.4	Yes	Exceeds Background	83 J -	30 J
Cobalt	7440-48-4	2/2	14	10.4	Yes	Exceeds Background	14	12
Copper	7440-50-8	2/2	43 J-	17.7	Yes	Exceeds Background	43 J-	31
Iron	7439-89-6	2/2	37,000 J	23,100	No	Essential Nutrient	37,000 J	31,000
Lead	7439-92-1	2/2	270 J	26.1	Yes	Exceeds Background	270 J	59 J
Magnesium	7439-95-4	2/2	4,200	3,030	No	Essential Nutrient	4,200	3,400
Manganese	7439-96-5	2/2	780 J	1,450	No	Below Background	780 J	610
Nickel	7440-02-0	2/2	49 J	21.1	Yes	Exceeds Background	49 J	38
Potassium	7440-09-7	2/2	1,400	NB	No	Essential Nutrient	1,400 J+	1,400
Selenium	7782-49-2	2/2	1.7	1.4	Yes	Exceeds Background	1.4 J-	1.7
Silver	7440-22-4	2/2	0.054 J	0	Yes	Exceeds Background	0.054 J	0.052 J
Sodium	7440-23-5	1/2	69 J	NB	No	Essential Nutrient	150 U	69 J
Thallium	7440-28-0	2/2	0.35	0	Yes	Exceeds Background	0.35	0.27
Vanadium	7440-62-2	2/2	23	31.1	No	Below Background	23 J+	23
Zinc	7440-66-6	2/2	160	61.8	Yes	Exceeds Background	160	150
Explosives / Propellants (mg/kg)		-	•	•	•	• 		
Nitrocellulose	9004-70-0	2/2	1.6 J	NB	Yes	Detected Organic	1.6 J	1.3 J
Total Petroleum Hydrocarbons (mg/kg)		-	•	•	•	·		
TPH (C10-C20)	68476-34-6	2/2	42	NB	Yes	Detected Organic	36	42
TPH (C20-C34)	100664-65-1	2/2	210 M	NB	Yes	Detected Organic	170 M	210 M
Organochlorine Pesticides (mg/kg)							·	
4,4'-DDE	72-55-9	1/1	0.014 J	NB	Yes	Detected Organic	0.014 J	_
4,4'-DDT	50-29-3	1/1	0.037 J	NB	Yes	Detected Organic	0.037 J	_
Polychlorinated Biphenyls (PCBs) (mg/kg)						· · ·	•	
Aroclor-1242	53469-21-9	1/2	0.59 J	NB	Yes	Detected Organic	0.59 J	0.035 U
Aroclor-1248	12672-29-6	1/2	0.17	NB	Yes	Detected Organic	0.19 U	0.17
Aroclor-1260	11096-82-5	1/2	0.061 J	NB	Yes	Detected Organic	0.19 U	0.061 J

 Table 4-1f Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch East of Building 47-40 (DU07)

Table 4-1f Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch East of Building 47-40 (DU07) Cont.

Location ID:							70-CDD	DU7-SS		
Field Sample ID:				Pookground			070SS-0006M-0001-SO	070SS-0007M-0001-SO		
Lab Sample ID:	CAS Number	Frequency of	Max Detect	Background	SRC-	SRC Justification	240-17230-6	240-17230-7		
Sample Date:	CAS Number	Detection	Concentration	Screening Value	Yes/No	SRC Justification	11/5/2012	11/5/2012		
Sample Depth:				value			0-1	0-1		
Sample Type:							REG	FD		
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	91-57-6	2/2	0.44	NB	Yes	Detected Organic	0.44	0.37		
Acenaphthene	83-32-9	2/2	0.096 J	NB	Yes	Detected Organic	0.063 J	0.096 J		
Anthracene	120-12-7	2/2	0.15	NB	Yes	Detected Organic	0.12	0.15		
Benzo(a)anthracene	56-55-3	2/2	0.32	NB	Yes	Detected Organic	0.25	0.32		
Benzo(a)pyrene	50-32-8	2/2	0.27	NB	Yes	Detected Organic	0.2	0.27		
Benzo(b)fluoranthene	205-99-2	2/2	0.42	NB	Yes	Detected Organic	0.31	0.42		
Benzo(g,h,i)perylene	191-24-2	2/2	0.27	NB	Yes	Detected Organic	0.2	0.27		
Benzo(k)fluoranthene	207-08-9	2/2	0.17	NB	Yes	Detected Organic	0.14	0.17		
Chrysene	218-01-9	2/2	0.38	NB	Yes	Detected Organic	0.31	0.38		
Dibenzofuran	132-64-9	2/2	0.14 J	NB	Yes	Detected Organic	0.14 J	0.14 J		
Fluoranthene	206-44-0	2/2	0.86	NB	Yes	Detected Organic	0.58 J	0.86		
Fluorene	86-73-7	2/2	0.11 J	NB	Yes	Detected Organic	0.059	0.11 J		
Indeno(1,2,3-cd)pyrene	193-39-5	2/2	0.15	NB	Yes	Detected Organic	0.14	0.15		
Naphthalene	91-20-3	2/2	0.34	NB	Yes	Detected Organic	0.34	0.31		
Phenanthrene	85-01-8	2/2	0.92	NB	Yes	Detected Organic	0.66 J	0.92		
Pyrene	129-00-0	2/2	0.68 J	NB	Yes	Detected Organic	0.44	0.68 J		
Volatile Organic Compounds (mg/kg)	Volatile Organic Compounds (mg/kg)									
Acetone	67-64-1	1/2	0.028 J	NB	Yes	Detected Organic	0.011 UJ	0.028 J		

Notes:

BOLD chemical detected above background, not an essential nutrient.

DDE = dichlorodiphenyldichloroethylene

DDT = dichlorodiphenyltrichloroethane

FD = Field Duplicate

ID = identification

J = Estimated value less than reporting limits.

J- = Estimated value with a low bias.

M = manually integrated compound

mg/kg = milligrams per kilogram NB = No background

REG = Regular

TPH = Total Petroleum Hydrocarbons

U = Not detected.

UJ = Not detected and the reported limit is estimated.

SRC = Site-related chemical

## Table 4-2a Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID							70-4744	I-DU1-SB	70-4744-DU1-SB1	70-4744-DU1-SB2	70-4744-DU1-SB3	70-4744-DU1-SB4	70-474
Field Sample ID	:			Background			070SB-0011M-0001-SO	070SB-0012M-0001-SO	070SB-0013M-0001-SO	070SB-0014M-0001-SO	070SB-0015M-0001-SO	070SB-0016M-0001-SO	070SB-00
Lab Sample ID		Frequency of	Max Detect	Screening	SRC-	SRC Justification	240-17768-1	240-17768-2	240-17768-3	240-17768-4	240-17768-5	240-17768-6	240-
Sample Date	-	Detection	Concentration	Value	Yes/No	Site Sustilication	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/*
Sample Depth				Value			1-4	4-7	1-7	1-7	1-7	1-7	
Sample Type	:				_		REG	REG	REG	REG	REG	REG	
TAL Metals (mg/kg)							4						_
Aluminum	7429-90-5	1/1	15,000	19,500	No	Below Background	-	-	-	-	-	-	_
Antimony	7440-36-0	1/1	0.12 U	0.96	No	Below Background	-	-	•	-	-	-	_
Arsenic	7440-38-2	1/1	12	19.8	No	Below Background	-	-	-	-	-	-	-
Barium	7440-39-3	1/1	110	124	No	Below Background	-	-	-	-	-	-	-
Beryllium	7440-41-7	1/1	0.85	0.88	No	Below Background	-	-	-	-	-	-	_
Cadmium	7440-43-9	1/1	0.26	0	Yes	Exceeds Background	-	-	-	-	-	-	-
Calcium	7440-70-2	1/1	8,600	35,500	No	Essential Nutrient	-	-	-	-	-		-
Chromium	7440-47-3 7440-48-4	1/1	21	27.2	No	Below Background	-	-				-	-
Cobalt	7440-48-4	1/1	16	23.2 32.3	No	Below Background	-	-	-	-	-	-	_
Copper		1/1	23		No	Below Background		-	-	-	-		
Iron Lead	7439-89-6 7439-92-1	1/1	33,000 17	35,200 19.1	No No	Essential Nutrient Below Background		-	-	-			
				-	-		-	-	-	-	-	-	_
Magnesium	7439-95-4	1/1	5,100	8,790	No	Essential Nutrient	-	-	-	-	-	-	_
Manganese Mercurv	7439-96-5 7439-97-6	1/1	630 0.022 J	3,030	No No	Below Background Below Background		-	-	-	-	-	
Nickel	7439-97-6			60.7	-	0	-	-	-	-	-	-	_
Potassium	7440-02-0	1/1	32 1,400	NB	No No	Below Background Essential Nutrient	-	-	-				
Selenium	7782-49-2	1/1	0.67	1.5	No	Below Background	-				-		
Silver	7440-22-4	1/1	0.07 0.041 J	0	Yes	Exceeds Background		-	-	-		-	-
Sodium	7440-22-4	1/1	74	NB	No	Essential Nutrient	-	-	-			-	
Thallium	7440-23-5	1/1	0.2	0.91	No	Below Background	-	-	-	-	-	-	
Vanadium	7440-28-0	1/1	23	37.6	No	Below Background		-					+
Zinc	7440-62-2	1/1	70	93.3	No	Below Background	-	-	-		-		
Explosives / Propellants (mg/kg)	7440-00-0	1/1	70	93.3	INO	Below Background		-	-	-	-		-
Nitrobenzene	98-95-3	1/1	0.096 J	NB	Yes	Detected Organic		-	-	-	-		-
Total Petroleum Hydrocarbons (mg/kg)	30-33-3	171	0.030 0		163	Detected Organic		-	-	-	-	-	
TPH (C6-C12)	68439-45-2	4/9	190	NB	Yes	Detected Organic	0.053 U	160	0.14	190	0.051 U	0.055 U	0
TPH (C10-C20)	68476-34-6	9/9	4.000	NB	Yes	Detected Organic	34	900	46	4,000	34	46	0
TPH (C20-C34)	100664-65-1	2/2	430	NB	Yes	Detected Organic			40	4,000		40	
Semivolatile Organic Compounds (mg/kg)	100004 00 1	2/2	400	110	103	Deteoted organic							
2-Methylnaphthalene	91-57-6	5/9	18	NB	Yes	Detected Organic	0.02 J	3.7	0.021 U	18	0.026 J	0.041 U	(
4-Nitroaniline	100-01-6	1/9	0.33 J	NB	Yes	Detected Organic	0.13 U	0.67 U	0.17 U	0.65 U	0.18 U	0.33 J	(
Acenaphthene	83-32-9	4/9	4.6	NB	Yes	Detected Organic	0.015 U	1.1	0.021 U	4.6	0.022 U	0.041 U	(
Acenaphthylene	208-96-8	2/9	0.098	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 U	(
Anthracene	120-12-7	1/9	0.71	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.71	0.022 U	0.041 U	(
Benzo(a)anthracene	56-55-3	4/9	1.7	NB	Yes	Detected Organic	0.015 U	0.44	0.021 U	1.7	0.022 U	0.041 U	(
Benzo(a)pyrene	50-32-8	5/9	0.88	NB	Yes	Detected Organic	0.015 U	0.4	0.077	0.88	0.022 U	0.041 U	(
Benzo(b)fluoranthene	205-99-2	3/9	0.37	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.37	0.022 U	0.041 U	(
Benzo(g,h,i)perylene	191-24-2	4/9	0.7	NB	Yes	Detected Organic	0.015 U	0.17	0.056	0.7	0.022 U	0.041 U	(
Chrysene	218-01-9	4/9	1.9	NB	Yes	Detected Organic	0.015 U	0.38	0.021 U	1.9	0.022 U	0.041 U	(
Dibenz(a,h)anthracene	53-70-3	1/9	0.041 J	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 J	
Dibenzofuran	132-64-9	4/9	2.8	NB	Yes	Detected Organic	0.015 U	0.58 J	0.021 U	2.8	0.022 U	0.041 U	(
Fluoranthene	206-44-0	6/9	1.8	NB	Yes	Detected Organic	0.017 J	0.47	0.022 J	1.8	0.022 U	0.041 U	
Fluorene Naphthalene	86-73-7 91-20-3	3/9 4/9	7.6	NB NB	Yes Yes	Detected Organic Detected Organic	0.015 U 0.015 U	1.7 0.22	0.021 U 0.021 U	7.6	0.022 U 0.022 U	0.041 U 0.041 U	
n-Nitrosodiphenylamine	91-20-3 86-30-6	4/9	0.33 J	NB	Yes	Detected Organic	0.015 U	0.22 0.67 U	0.021 U 0.17 U	0.65 U	0.022 U 0.18 U	0.041 0	
Phenanthrene	85-01-8	6/9	12	NB	Yes	Detected Organic	0.13 0	3	0.17 0	12	0.18 U	0.03 J 0.041 U	-
Pyrene	129-00-0	6/9	12	NB	Yes	Detected Organic	0.03 J	2.7	0.044 0.035 J	12	0.022 U	0.041 U	-
Volatile Organic Compounds (mg/kg)	.20 00 0	0/0					0.000		0.000 0		0.022 0	0.0410	
2-Butanone (MEK)	78-93-3	2/9	0.0062 J	NB	Yes	Detected Organic	0.0022 UJ	0.19 UJ	0.0021 UJ	0.093 UJ	0.002 U	0.0022 U	0.0
Acetone	67-64-1	1/9	0.024	NB	Yes	Detected Organic	0.0068 UJ	0.39 UJ	0.0065 UJ	0.19 UJ	0.0065 U	0.0071 U	0.0
Benzene	71-43-2	2/9	0.00084 J	NB	Yes	Detected Organic	0.00054 UJ	0.048 UJ	0.00052 UJ	0.023 UJ	0.00051 UJ	0.00056 UJ	0.0
Carbon disulfide	75-15-0	3/9	0.0036 J	NB	Yes	Detected Organic	0.00054 UJ	0.048 UJ	0.0031 J	0.023 UJ	0.00051 UJ	0.0036 J	0.
Ethylbenzene	100-41-4	3/9	0.79 J	NB	Yes	Detected Organic	0.00054 UJ	0.79 J	0.00052 UJ	0.35 J	0.00051 UJ	0.00056 UJ	0.00
Methylene chloride	75-09-2	3/9	0.0025 J	NB	Yes	Detected Organic	0.00091 J	0.19 UJ	0.0022 J	0.093 UJ	0.0025 J	0.0011 UJ	0.0
Methylene chlonde													
Toluene	108-88-3 1330-20-7	4/9 4/9	0.063 J 2.6 J	NB NB	Yes Yes	Detected Organic Detected Organic	0.00054 UJ 0.0016 UJ	0.063 J 2.6 J	0.00052 UJ 0.0016 UJ	0.026 J 1.2 J	0.00051 UJ 0.0015 UJ	0.00056 UJ 0.0017 UJ	0.00

Notes: BOLD chemical detected above background, not an essential nutrient. FD = Field Duplicate

FD = Field Duplicate ID = identification J = Estimated value less than reporting limits. J- = Estimated value with a low bias. M = manually integrated compound mg/kg = milligrams per kilogram NB = No background R = Rejected. REG = Regular TPH = Total Petroleum Hydrocarbons U = Not detected

U = Not detected. UJ = Not detected and the reported limit is estimated. SRC = Site-related chemical

-4744-DU1-SB5		70-4744-DU1-SB6	
B-0017M-0001-SO		12M-0001-SO	070SB-0043M-0001-SO
240-17768-7	240-18581-1	240-18735-1	240-18581-2
11/14/2012	12/7/2012	12/12/2012	12/7/2012
1-7	1-7	1-7	1-7
REG	REG	REG	FD
-	15,000	-	-
-	0.12 U	-	-
-	12	-	-
-	110	-	-
	0.85	-	-
	0.26		-
-	8,600	-	-
	21		-
-		-	-
	16		
-	23	-	-
-	33,000	-	-
-	17	-	-
-	5,100	-	-
-	630	-	-
-	0.022 J	-	-
-	32	-	-
-	1,400	-	-
-	0.67	-	-
-	0.041 J	-	-
-	74	-	-
-	0.2	-	-
-	23		-
-	70		
· ·	70	-	-
	0.096 J		
-	0.096 J		· ·
0.050.11		0.04011	
0.058 U	-	0.049 U	0.98
38	370	-	350
-	430	-	400
0.02 U	0.84 J	-	0.83
0.16 U	0.33 U	-	0.34 U
0.02 U	0.47	-	0.33
0.02 U	0.098	-	0.076 J
0.02 U	0.041 U	-	0.041 U
0.02 U	0.17	-	0.19
0.02 U	0.051 J	-	0.064 J
0.02 U	0.042 J	-	0.041 J
0.02 U	0.07 J	-	0.041 UJ
0.02 U	0.23 J	-	0.12 J
0.02 U	0.041 UJ	-	0.041 U
0.02 U	0.31 J	-	0.23 J
0.02 U	0.21 J	-	0.15 J
0.02 U	0.8 J	-	0.63
0.02 U	0.062 J	-	0.064 J
	0.33 UJ	-	0.34 UJ
0.16 U		-	1
0.16 U 0.02 U	1.2		
	1.2	-	0.91
0.02 U		-	0.91
0.02 U		-	0.91 0.0055 J
0.02 U 0.02 U	1.2		
0.02 U 0.02 U 0.0024 U	1.2 0.0062 J	-	0.0055 J
0.02 U 0.02 U 0.0024 U 0.0077 U 0.00061 UJ	1.2 0.0062 J 0.024 0.00073 J	-	0.0055 J 0.0068 U 0.00084 J
0.02 U 0.02 U 0.0024 U 0.0077 U 0.00061 UJ 0.0036 J	1.2 0.0062 J 0.024 0.00073 J 0.00045 U		0.0055 J 0.0068 U 0.00084 J 0.00054 U
0.02 U 0.02 U 0.0024 U 0.0077 U 0.00061 UJ 0.0006 J 0.00061 UJ	1.2 0.0062 J 0.024 0.00073 J 0.00045 U 0.00047		0.0055 J 0.0068 U 0.00084 J 0.00054 U 0.00054 U
0.02 U 0.02 U 0.0024 U 0.0077 U 0.00061 UJ 0.0036 J	1.2 0.0062 J 0.024 0.00073 J 0.00045 U		0.0055 J 0.0068 U 0.00084 J 0.00054 U

## Table 4-2b Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID:							70-4740	-DU3-SB	70-4740-	DU3-SB1	70-4740-DU3-SB2	70-4740-DU3-SB3	70-4740-DU3-SB4	70-4740-DU3-SB5	70-4740-	DI 13-SB6
Field Sample ID:							070SB-0019M-0001-SO		070SB-0021M-0001-SO	070SB-0026-0001-SO	070SB-0022M-0001-SO	070SB-0023M-0001-SO	070SB-0024M-0001-SO	070SB-0025M-0001-SO	070SB-0046M-0001-SO	
Lab Sample ID:		Frequency of	Max Detect	Background	SRC-		240-17669-1	240-17669-2	240-17669-3	240-17669-8	240-17669-4	240-17669-5	240-17669-6	240-17669-7	240-18581-5	240-18581-6
Sample Date:	CAS Number	Detection	Concentration	Screening	Yes/No	SRC Justification	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012
Sample Depth:				Value			1-4	4-7	1-7	7-13	1-13	1-7	1-7	1-7	1-7	1-7
Sample Type:							REG	REG	REG	REG	REG	REG	REG	REG	REG	FD
TAL Metals (mg/kg)				•							•					
Aluminum	7429-90-5	10 / 10	13,000	19,500	No	Below Background	10,000	10,000	12,000	990	8,300	9,000	13,000	13,000	7,800	9,900
Antimony	7440-36-0	7 / 10	0.1 J	0.96	No	Below Background	0.093 J	0.071 J	0.076 J	0.086 U	0.1 J	0.071 J	0.077 J	0.063 J	0.11 U	0.1 U
Arsenic	7440-38-2	10 / 10	13	19.8	No	Below Background	12	10	9.3	0.39	13	9.5	11	9.5	8.9	8.2
Barium	7440-39-3	10 / 10	75	124	No	Below Background	65	66	70	6.3	50	61	75	68	44	56
Beryllium	7440-41-7	10 / 10	0.73	0.88	No	Below Background	0.57	0.59	0.61	0.056 J	0.51	0.49	0.72	0.73	0.4	0.5
Cadmium	7440-43-9	10 / 10	0.21	0	Yes	Exceeds Background	0.19	0.18	0.16	0.024 J	0.17	0.18	0.21	0.21	0.17	0.17
Calcium	7440-70-2	10 / 10	11,000	35,500	No	Essential Nutrient	2,800	8,400	4,100	160	1,700	1,100	8,500	11,000	1,800	1,500
Chromium	7440-47-3	10 / 10	20	27.2	No	Below Background	20	17	18	2.9	16	15	20	20	11	14
Cobalt	7440-48-4	10 / 10	12	23.2	Yes	Exceeds Background	11	10	8.1	0.36	8.9	9.1	11	12	6.3	7.7
Copper	7440-50-8	10 / 10	19	32.3	No	Below Background	18	17	14	1.6	17	16	19	18	16	16
Iron	7439-89-6	10 / 10	27,000	35,200	No	Essential Nutrient	24,000	23,000	22,000	960	27,000	21,000	27,000	27,000	18,000	20,000
Lead	7439-92-1	10 / 10	16	19.1	No	Below Background	16	12	13	3.9	16	11	13	12	14	14
Magnesium	7439-95-4	10 / 10	5,100	8,790	No	Essential Nutrient	2,900	4,000	3,100	110	2,000	2,200	4,500	5,100	1,900	2,500
Manganese	7439-96-5	10 / 10	420	3,030	No	Below Background	420	280	270	9	430	310	310	330	250	270
Mercury	7439-97-6	8/10	0.037 J	0.044	No	Below Background	0.028 J	0.019 J	0.024 J	0.039 U	0.037 J	0.032 J	0.033 J	0.033 U	0.02 J	0.021 J
Nickel	7440-02-0	10 / 10	31	60.7	No	Below Background	23	25	19	1.2	18	19	29	31	14	17
Potassium	7440-09-7	10 / 10	2,100	NB	No	Essential Nutrient	1,000	1,500	1,200	210	750	810	1,800	2,100	720	860
Selenium	7782-49-2	10 / 10	0.57	1.5	No	Below Background	0.57	0.42 J	0.5	0.066 J	0.47	0.43 J	0.51	0.48	0.35 J	0.41 J
Silver	7440-22-4	9/10	0.039 J	0	Yes	Exceeds Background	0.032 J	0.026 J	0.039 J	0.026 U	0.021 J	0.03 J	0.032 J	0.029 J	0.03 J	0.029 J
Sodium	7440-23-5	10 / 10	92	NB	No	Essential Nutrient	59	70	57	9.6	46	41	86	86	78	92
Thallium	7440-28-0	19 / 26	0.18	0.91	No	Below Background	0.16	0.14	0.16	0.018 J	0.13	0.14	0.18	0.18	0.11	0.13
Vanadium	7440-62-2	10 / 10	22	37.6	No	Below Background	18	16	22	1.6	15	16	20	20	14	16
Zinc	7440-66-6	10 / 10	64	93.3	No	Below Background	55	54	46	3.2	64	49	56	58	42	46
Semivolatile Organic Compounds (mg/kg)																
2-Methylnaphthalene	91-57-6	4 / 10	0.035 J	NB	Yes	Detected Organic	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0044 J	0.0054 J	0.0034 U	0.0044 J	0.037 U	0.035 J
Acenaphthene	83-32-9	1 / 10	0.0047 J	NB	Yes	Detected Organic	0.016 U	0.0047 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Anthracene	120-12-7	2/10	0.019 J	NB	Yes	Detected Organic	0.019 J	0.0049 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Benzo(a)anthracene	56-55-3	4 / 10	0.09	NB	Yes	Detected Organic	0.09	0.0063 J	0.031 J	0.0037 U	0.0033 U	0.0034 U	0.0084	0.0034 U	0.037 U	0.034 U
Benzo(a)pyrene	50-32-8	3/10	0.09	NB	Yes	Detected Organic	0.09	0.0043 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0069	0.0034 U	0.037 U	0.034 U
Benzo(b)fluoranthene	205-99-2	3/10	0.13	NB	Yes	Detected Organic	0.13	0.0063 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.013	0.0034 U	0.037 U	0.034 U
Benzo(g,h,i)perylene	191-24-2 207-08-9	3 / 10 3 / 10	0.055 0.062	NB NB	Yes	Detected Organic Detected Organic	0.055 0.062	0.0052 J 0.0043 J	0.016 U 0.016 U	0.0037 U 0.0037 U	0.0033 U 0.0033 U	0.0034 U 0.0034 U	0.0055 J 0.008	0.0034 U 0.0034 U	0.037 UJ 0.037 U	0.034 UJ 0.034 U
Benzo(k)fluoranthene Bis(2-ethylhexyl)phthalate	117-81-7	3/10	0.029 J	NB NB	Yes	Detected Organic	0.13 U	0.0043 J 0.027 J	0.016 U 0.13 U	0.0037 0 0.029 J	0.0033 U 0.027 U	0.0034 0 0.019 J	0.008 0.028 U	0.0034 U 0.028 U	0.037 U 0.31 U	0.034 U 0.27 U
Chrysene	218-01-9	3/10	0.029 J	NB	Yes	Detected Organic	0.13 0	0.027 J 0.0058 J	0.13 U 0.016 U	0.0037 U	0.027 U 0.0033 U	0.0034 U	0.028 0	0.028 U	0.037 U	0.27 U 0.034 U
Dibenzofuran	132-64-9	1/10	0.0054 J	NB	Yes	Detected Organic	0.016 U	0.0058 J 0.0054 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0021 0.0034 U	0.0034 U	0.037 U	0.034 U
Fluoranthene	206-44-0	4/10	0.22	NB	Yes	Detected Organic	0.22	0.0049 J	0.010 0	0.0037 U	0.0033 U	0.0034 U	0.0034 0	0.0034 U	0.037 UJ	0.034 UJ
Fluorene	86-73-7	1/10	0.0044 J	NB	Yes	Detected Organic	0.016 U	0.0044 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Indeno(1,2,3-cd)pyrene	193-39-5	3/10	0.053	NB	Yes	Detected Organic	0.053	0.0049 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0052 J	0.0034 U	0.037 U	0.034 U
Naphthalene	91-20-3	4/10	0.0056 J	NB	Yes	Detected Organic	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0048 J	0.0044 J	0.0052 J	0.0056 J	0.037 U	0.034 U
Phenanthrene	85-01-8	5/10	0.1	NB	Yes	Detected Organic	0.1	0.0069	0.017 J	0.0037 U	0.0033 U	0.0043 J	0.0058 J	0.0034 U	0.037 U	0.034 U
Pyrene	129-00-0	4 /10	0.16	NB	Yes	Detected Organic	0.16	0.0048 J	0.034	0.0037 U	0.0033 U	0.0034 U	0.012	0.0034 U	0.037 U	0.034 U
Volatile Organic Compounds (mg/kg)				•		· •	•	•	•		·	•	•	•	•	
2-Butanone (MEK)	78-93-3	1/1	0.0046 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.0046 J	-
Acetone	67-64-1	1/1	0.019 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.019 J	-
Benzene	71-43-2	1/1	0.0004 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.0004 J	-
Carbon disulfide	75-15-0	1/1	0.00063 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.00063 J	-
Toluene	108-88-3	1/1	0.0025 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.0025 J	-

 Inductive
 Indexes-s

 Notes:
 BOLD chemical detected above background, not an essential nutrient.

 FD = Field Duplicate
 ID = identification

 J = Estimated value less than reporting limits.
 J = Estimated value with a low bias.

 M = manually integrated compound
 mg/kg = milligrams per kilogram

 NB = No background
 R = Rejected.

 REG = Regular
 TPH = Total Petroleum Hydrocarbons

 U = Not detected.
 UJ = Not detected and the reported limit is estimated.

 SRC = Site-related chemical
 SRC = Site-related chemical

## Table 4-2c Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04)

Locati	ion ID:						70-4740	)-DU4-SB	70-4740-DU4-SB1	70-4740-DU4-SB2	70-4740-DU4-SB3	70-4740
Field Sam	ple ID:						070SS-0048M-0001-SO	070SB-0049M-0001-SO	070SB-0050M-0001-SO	070SB-0051M-0001-SO	070SB-0052M-0001-SO	070SB-00
Lab Sam	ple ID:	Frequency of	Max Detect	Background	SRC-		240-18581-17	240-18581-18	240-18581-19	240-18581-20	240-18581-21	240-1
Sample	Date: CAS Number	Detection	Concentration	Screening	Yes/No	SRC Justification	12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7
Sample I	Depth:			Value			0-1	0-1	0-1	0-1.25	0-4	0-
Sample	Type:						REG	REG	REG	REG	REG	F
TAL Metals (mg/kg)			•							•		
Aluminum	7429-90-5	14 / 14	15,000	19,500	No	Below Background	9,800	5,900	8,200	3,900	7,800	7
Arsenic	7440-38-2	14 / 14	17	19.8	No	Below Background	9	5.9	5.9	1.8	8.1	
Barium	7440-39-3	14 / 14	71	124	No	Below Background	65	31	71	33	44	
Beryllium	7440-41-7	14 / 14	0.76	0.88	No	Below Background	0.58	0.32	0.53	0.34	0.43	(
Cadmium	7440-43-9	8/14	0.17	0	Yes	Exceeds Background	0.17	0.099 J	0.13	0.12	0.13	(
Calcium	7440-70-2	14 / 14	16,000	35,500	No	Essential Nutrient	15,000	6,900	6,300	13,000	5,200	11
Chromium	7440-47-3	14 / 14	22	27.2	No	Below Background	14	9.2	12	6.1	12	
Cobalt	7440-48-4	14/14	50	23.2	Yes	Exceeds Background	50	7.3	28	32	14	
Copper	7440-50-8	14 / 14	27	32.3	No	Below Background	16	10	12	4.7	13	
Iron	7439-89-6	14 / 14	35,000	35,200	No	Essential Nutrient	21,000	14,000	17,000	5,200	18,000	17
Lead	7439-92-1	14/14	14	19.1	No	Below Background	12	6.6	8.3	9.2	9.1	
Magnesium	7439-95-4	14/14	6,300	8,790	No	Essential Nutrient	4,400	2,700	3,300	1,800	3,200	3
Manganese	7439-96-5	14/14	460	3,030	No	Below Background	390	200	280	260	270	
Mercury	7439-97-6	3/14	0.024 J	0.044	No	Below Background	0.032 U	0.03 U	0.032 U	0.037 U	0.033 U	0.0
Nickel	7440-02-0	14 / 14	34	60.7	No	Below Background	23	15	22	5.8	20	
Potassium	7440-09-7	14 / 14	1,900	NB	No	Essential Nutrient	1,300	930	1,200	530	1,100	1.
Selenium	7782-49-2	14/14	1.8	1.5	Yes	Exceeds Background	0.35 J	0.24 J	0.33 J	0.26 J	0.27 J	0.
Silver	7440-22-4	7/14	0.03 J	0	Yes	Exceeds Background	0.03 J	0.015 J	0.018 J	0.017 J	0.02 J	0.0
Sodium	7440-23-5	14 / 14	190	NB	No	Essential Nutrient	150	75	110	110	77	
Thallium	7440-28-0	7/14	0.13	0.91	No	Below Background	0.11	0.076 J	0.075 J	0.03 J	0.098 J	0.0
Vanadium	7440-62-2	14 / 14	22	37.6	No	Below Background	13	8.8	11	4.7	11	
Zinc	7440-66-6	14 / 14	70	93.3	No	Below Background	47	27	34	18	38	
Semivolatile Organic Compounds (mg/kg)										•		
2-Methylnaphthalene	91-57-6	1/14	0.0053 J	NB	Yes	Detected Organic	0.0034 U	0.0033 U	0.0053 J	0.033 UJ	0.033 UJ	0.0
Acenaphthene	83-32-9	1/14	0.012	NB	Yes	Detected Organic	0.012	0.0033 U	0.0033 U	0.033 UJ	0.033 UJ	0.0
Butyl benzyl phthalate	85-68-7	1/14	0.016 J	NB	Yes	Detected Organic	0.016 J	0.027 U	0.027 U	0.27 UJ	0.27 UJ	0.
Dibenzofuran	132-64-9	1/14	0.0039 J	NB	Yes	Detected Organic	0.0034 U	0.0033 U	0.0039 J	0.033 UJ	0.033 UJ	0.0
Fluoranthene	206-44-0	2/14	0.008 J	NB	Yes	Detected Organic	0.0078 J	0.0033 UJ	0.008 J	0.033 UJ	0.033 UJ	0.0
Fluorene	86-73-7	2/14	0.0034 J	NB	Yes	Detected Organic	0.019	0.0033 U	0.0034 J	0.033 UJ	0.033 UJ	0.0
Naphthalene	91-20-3	2/14	0.0057 J	NB	Yes	Detected Organic	0.0034 U	0.0039 J	0.0057 J	0.033 UJ	0.033 UJ	0.0
Phenanthrene	85-01-8	2/14	0.039	NB	Yes	Detected Organic	0.039	0.0033 U	0.014	0.033 UJ	0.033 UJ	0.0
Pyrene	129-00-0	2/14	0.0089	NB	Yes	Detected Organic	0.0089	0.0033 U	0.0043 J	0.033 UJ	0.033 UJ	0.0
Volatile Organic Compounds (mg/kg)						<b>-</b>	1		1	1	1	-
Acetone	67-64-1	3/8	0.041 J	NB	Yes	Detected Organic	-	-	-	-	-	
Carbon disulfide	75-15-0	1/10	0.0036 J	NB	Yes	Detected Organic	-	-	-	-	-	
Chlorobenzene	108-90-7	2/10	0.003 J	NB	Yes	Detected Organic	-	-	-	-	-	
Trichloroethene (TCE)	79-01-6	2/10	0.00054 J	NB	Yes	Detected Organic	-	-	-	-	-	L

4740-DU4-SB4	70-4740-DU4-SB5
3-0053M-0001-SO	070SB-0054M-0001-SO
240-18581-22	240-18581-23
12/7/2012	12/7/2012
0-3.75	0-2.8
REG	REG
7,400	10,000
6.6	11
38	51
0.38	0.56
0.11	0.16
11,000	16,000
12	16
8.7	12
13	18
17,000	25,000
7.7	11
3,400	5,500
220	310
0.031 U	0.034 U
19	26
1,100	1,400
0.24 J	0.43 J
0.017 J	0.027 J
87	160
0.092 J	0.13
11	15
34	52
0.013 U	0.013 U
0.013 U	0.013 U
0.11 U	0.11 U
0.013 U	0.013 U
0.013 UJ	0.013 UJ
0.013 U	0.013 U
-	-
-	-
-	-
-	-

# Table 4-2c Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04) Cont.

Location ID:								70-4740-SB101			70-474	0-SB102		70-4740	70-4740-SB104	
Field Sample ID:							070SB-101-0062-SO	070SB-101-0063-SO	070SB-101-0064-SO	070SB-102-0065-SO	070SB-102-0066-SQ	070SB-102-9066-SO	070SB-102-0067-SO	070SB-103-0069-SO	070SB-103-0070-SO	070SB-104-0072-S0
Lab Sample ID:		Frequency of	Max Detect	Background	SRC-		160-26618-1	160-26618-2	160-26618-3	160-26618-4	160-26618-5	160-26618-6	160-26618-7	160-26663-2	160-26663-3	160-26639-1
Sample Date:	CAS Number	Detection	Concentration	Screening	Yes/No	SRC Justification	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/6/2018	2/6/2018	2/5/2018
Sample Depth:		2010011011	Conconnation	Value			2-4	4-6	6-7	2-4	4-6	4-6	6-8	2-4	4-7	2-4
Sample Type:							REG	REG	REG	REG	REG	FD	REG	REG	REG	REG
TAL Metals (mg/kg)																
Aluminum	7429-90-5	14 / 14	15,000	19,500	No	Below Background	14,000	15,000	13,000	11,000	13,000	13,000	13,000	-	-	-
Arsenic	7440-38-2	14 / 14	17	19.8	No	Below Background	14	15	17	12	15	12	14	-	-	-
Barium	7440-39-3	14 / 14	71	124	No	Below Background	64	65	62	57 J	62	62	62	-	-	-
Beryllium	7440-41-7	14 / 14	0.76	0.88	No	Below Background	0.67	0.79	0.76	0.65	0.73	0.68	0.74	-	-	-
Cadmium	7440-43-9	8 / 14	0.17	0	Yes	Exceeds Background	0.12 U	0.13 U	0.13 U	0.089 J	0.14 U	0.13 U	0.13 U	-	-	-
Calcium	7440-70-2	14 / 14	16,000	35,500	No	Essential Nutrient	1,300	2,800	4,600	8,500	15,000 J	2,200 J	15,000	-	-	-
Chromium	7440-47-3	14 / 14	22	27.2	No	Below Background	18	22	20	15	20	20	20	-	-	-
Cobalt	7440-48-4	14 / 14	50	23.2	Yes	Exceeds Background	8.7	11	14	8.9	14	12	13	-	-	-
Copper	7440-50-8	14 / 14	27	32.3	No	Below Background	27	23	24	22	23	23	23	-	-	-
Iron	7439-89-6	14 / 14	35,000	35,200	No	Essential Nutrient	30,000	35,000	33,000	26,000	34,000	30,000	32,000	-	-	-
Lead	7439-92-1	14 / 14	14	19.1	No	Below Background	13	12	14	13	13	13	13	-	-	-
Magnesium	7439-95-4	14 / 14	6,300	8,790	No	Essential Nutrient	3,400	5,100	5,100	3,200 J	6,100	4,600	6,300	-	-	-
Manganese	7439-96-5	14 / 14	460	3,030	No	Below Background	190	190	310	460	280	300	350	-	-	-
Mercury	7439-97-6	3 / 14	0.024 J	0.044	No	Below Background	0.019 J	0.039 U	0.041 U	0.024 J	0.013 J	0.036 U	0.036 U	-	-	-
Nickel	7440-02-0	14 / 14	34	60.7	No	Below Background	25	32	34	24	33	33	33	-	-	-
Potassium	7440-09-7	14 / 14	1,900	NB	No	Essential Nutrient	1,100	1,600	1,600	940 J	1,900	1,700	1,900	-	-	-
Selenium	7782-49-2	14 / 14	1.8	1.5	Yes	Exceeds Background	1.3	1.8	1.8	1.4	1.4	1.5	1.3	-	-	-
Silver	7440-22-4	7/14	0.03 J	0	Yes	Exceeds Background	0.38 U	0.41 U	0.4 U	0.41 U	0.43 U	0.39 U	0.39 U	-	-	-
Sodium	7440-23-5	14 / 14	190	NB	No	Essential Nutrient	100	190	140	100	110	98	110	-	-	-
Thallium	7440-28-0	7 / 14	0.13	0.91	No	Below Background	1 U	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	-	-	-
Vanadium	7440-62-2	14 / 14	22	37.6	No	Below Background	19	22	20	18	20	19	20	-	-	-
Zinc	7440-66-6	14 / 14	70	93.3	No	Below Background	59	70	67	64	66	66	64	-	-	-
Semivolatile Organic Compounds (mg/kg)									•			•	•	•		
2-Methylnaphthalene	91-57-6	1/14	0.0053 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Acenaphthene	83-32-9	1/14	0.012	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Butyl benzyl phthalate	85-68-7 132-64-9	1/14	0.016 J 0.0039 J	NB NB	Yes	Detected Organic	0.11 U 0.11 U	0.11 U 0.11 U	0.12 U 0.12 U	0.12 U 0.12 U	0.12 U 0.12 U	0.12 U 0.12 U	0.11 U 0.11 U	-	-	-
Dibenzofuran Fluoranthene	206-44-0	2/14	0.0039 J	NB	Yes	Detected Organic	0.11 U 0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U 0.12 U	0.11 U 0.11 U	-	-	-
Fluoranthene	206-44-0 86-73-7	2/14	0.008 J 0.0034 J	NB	Yes Yes	Detected Organic Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U 0.12 U	0.11 U	-	-	-
Naphthalene	91-20-3	2/14	0.0057 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U		-	-
Phenanthrene	85-01-8	2/14	0.039	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	_		
Pyrene	129-00-0	2/14	0.0089	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Volatile Organic Compounds (mg/kg)						guine										
Acetone	67-64-1	3/8	0.041 J	NB	Yes	Detected Organic	0.015 J	0.01 U	0.014 J	0.0092 U	0.0099 U	0.011 U	0.011 U	-	0.023 J	-
Carbon disulfide	75-15-0	1/10	0.0036 J	NB	Yes	Detected Organic	0.0012 J	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U
Chlorobenzene	108-90-7	2 / 10	0.003 J	NB	Yes	Detected Organic	0.001 J	0.001 U	0.003 J	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U
Trichloroethene (TCE)	79-01-6	2 / 10	0.00054 J	NB	Yes	Detected Organic	0.00095 U	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00041 J	0.00075 U	0.00054 J

Notes: **BOLD chemical detected above background, not an essential nutrient.** FD = Field Duplicate ID = identification J = Estimated value less than reporting limits. J - = Estimated value with a low bias. M = manually integrated compound mg/kg = milligrams per kilogram NB = No background R = Rejected. REG = Regular TPH = Total Petroleum Hydrocarbons U = Not detected. UJ = Not detected and the reported limit is estimated. SRC = Site-related chemical

## Table 4-2d Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID:							70 /76	)-DU5-SB	70-4760-DU5-SB1	70-4760-DU5-SB2	70-4760-DU5-SB3	70-4760-DU5-SB4	70-4760-DU5-SB5	70-4760-DU5-SB6	
Field Sample ID:							070SB-0027M-0001-SO	070SB-0028M-0001-SO	070SB-0029M-0001-SO	070SB-0030M-0001-SO	070SB-0031M-0001-SO	070SB-0032M-0001-SO	070SB-0033M-0001-SO	070SB-0044M-0001-SO	070SB-0045M-0001-SO
Lab Sample ID:		Frequency of	Max Detect	Background	SRC-		240-17669-9	240-17669-10	240-17669-11	240-17669-12	240-17669-13	240-17669-14	240-17669-15	240-18581-3	240-18581-4
Sample Date:		Detection	Concentration	Screening	Yes/No	SRC Justification	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012
Sample Depth:		Deteotion	Concentration	Value	103/110		1-4	4-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7
Sample Depth.							REG	REG	REG	REG	REG	REG	REG	REG	FD
TAL Metals (mg/kg)															
Aluminum	7429-90-5	1/1	13,000	19,500	No	Below Background	-	-	-	-	-	-	-	13,000	-
Arsenic	7440-38-2	1/1	9.6	19.8	No	Below Background	-	-	-	-	-	-	-	9.6	-
Barium	7440-39-3	1/1	80 J	124	No	Below Background	-	-	-	-	-	-	-	80 J	-
Bervllium	7440-41-7	1/1	0.85	0.88	No	Below Background	-	-	-	-	-	-	-	0.85	-
Cadmium	7440-43-9	1/1	0.24	0	Yes	Exceeds Background	-	-	-	-	-	-	-	0.24	-
Calcium	7440-70-2	1/1	8.800	35,500	No	Essential Nutrient	-	-	-	-	-	-	-	8,800	-
Chromium	7440-47-3	1/1	18	27.2	No	Below Background	-	-	-	-	-	-	-	18	-
Cobalt	7440-48-4	1/1	10	23.2	No	Below Background	-	-	-	-	-	-	-	10	-
Copper	7440-50-8	1/1	19	32.3	No	Below Background	-	-	-	-	-	-	-	19	-
Iron	7439-89-6	1/1	25,000	35,200	No	Essential Nutrient	-	_	-	-	-	_	-	25,000	-
Lead	7439-92-1	1/1	15	19.1	No	Below Background	· .	-	-	-	-	-	-	15	<u> </u>
Magnesium	7439-95-4	1/1	4.300	8.790	No	Essential Nutrient	-	-	-	-		-	-	4.300	
Magnesidin Manganese	7439-96-5	1/1	430	3.030	No	Below Background								430	
Mercury	7439-97-6	1/1	0.021 J	0.044	No	Below Background					-			430 0.021 J	
Nickel	7440-02-0	1/1	24	60.7	No	Below Background								24	
Potassium	7440-02-0	1/1	1.000	NB	No	Essential Nutrient	-	-						1.000	
Selenium	7782-49-2	1/1	0.59 J+	1.5	No	Below Background		-	-			-	-	0.59 J+	
Silver	7440-22-4	1/1	0.029 J	0	Yes	Exceeds Background	-	-				-		0.029 J	
Sodium	7440-23-5	1/1	110	NB	No	Essential Nutrient	-	-	-	-		-	-	110	
Thallium	7440-23-3	1/1	0.16	0.91	No	Below Background						-	-	0.16	
Vanadium	7440-28-0	1/1	18	37.6	No	Below Background								18	
Zino	7440-62-2	1/1	55	93.3	No	Below Background	-	-	-			-	-	55	-
Total Petroleum Hydrocarbons (mg/kg)	7440-00-0	1/1		33.5	INO	Delow Dackground	-	-		-	-	_	-		-
TPH (C10-C20)	68476-34-6	1/1	39	NB	Vas	Detected Organic	-	-	-	39	-	-	-	_	
Organochlorine Pesticides (mg/kg)	00470-34-0	1 1/1	53		163	Detected organic	-	-	-		-	_	-	-	-
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	2/9	0.086	NB	Yes	Detected Organic	0.0085 U	0.049	0.0086 U	0.086	0.0086 U	0.0085 U	0.0084 U	0.01 U	0.0084 U
Semivolatile Organic Compounds (mg/kg)		-/ •	0.000			20100104 Organio	0.0000 0	010.10	0.0000 0	0.000	0.0000 0	0.0000 0	0.00010	0.01 0	0.0001.0
1.2-Dichlorobenzene	95-50-1	1/9	0.029 J	NB	Yes	Detected Organic	0.029 J	0.13 U	0.13 U	0.03 U	0.028 U	0.14 U	0.13 U	0.34 UJ	0.27 U
2,4,5-Trichlorophenol	95-95-4	1/9	0.14 J	NB	Yes	Detected Organic	0.028 U	0.13 U	0.13 U	0.14 J	0.028 U	0.14 U	0.13 U	0.34 U	0.27 U
2-Methylnaphthalene	91-57-6	6/9	0.082	NB	Yes	Detected Organic	0.0034 U	0.036	0.029 J	0.07	0.0055 J	0.057	0.016 U	0.041 U	0.082
Acenaphthylene	208-96-8	1/9	0.017 J	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.017 J	0.016 U	0.041 U	0.034 U
Anthracene	120-12-7	1/9	0.019 J	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.019 J	0.016 U	0.041 U	0.034 U
Benzo(a)anthracene	56-55-3	3/9	0.053	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.032 J	0.004 J	0.0034 U	0.053	0.016 U	0.041 U	0.034 U
Benzo(a)pyrene	50-32-8	2/9	0.059	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.034	0.0037 U	0.0034 U	0.059	0.016 U	0.041 U	0.034 U
Benzo(b)fluoranthene	205-99-2	4/9	0.1	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.052	0.0089	0.0052 J	0.1	0.016 U	0.041 U	0.034 U
Benzo(g,h,i)perylene	191-24-2	2/9	0.051	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.031 J	0.0037 U	0.0034 U	0.051	0.016 U	0.041 UJ	0.034 UJ
Benzo(k)fluoranthene	207-08-9	1/9	0.04	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.04	0.016 U	0.041 U	0.034 U
Chrysene	218-01-9	4/9	0.097	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.04	0.009	0.0054 J	0.097	0.016 U	0.041 U	0.034 U
Fluoranthene	206-44-0	5/9	0.12	NB	Yes	Detected Organic	0.0082	0.016 U	0.065	0.008	0.0045 J	0.12	0.016 U	0.041 U	0.034 UJ
	86-73-7	1/9	0.018	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.018	0.0034 U	0.017 U	0.016 U	0.041 U	0.034 U
Indeno(1,2,3-cd)pyrene	193-39-5 91-20-3	1/9 6/9	0.043	NB NB	Yes	Detected Organic	0.0034 U 0.0034 U	0.016 U 0.022 J	0.016 U 0.017 J	0.0037 U 0.021	0.0034 U 0.0063 J	0.043	0.016 U 0.016 U	0.041 U 0.041 U	0.034 U 0.07
Naphthalene Phenanthrene	91-20-3 85-01-8	5/9	0.07	NB	Yes Yes	Detected Organic Detected Organic	0.0034 U 0.0034 U	0.022 J 0.061	0.017 3	0.021	0.0063 J 0.0043 J	0.05	0.016 U	0.041 U	0.07 0.046 J
Phenanthrene Pyrene	85-01-8 129-00-0	3/9	0.07	NB NB	Yes	Detected Organic Detected Organic	0.0034 0 0.0057 J	0.061 0.016 U	0.036	0.07	0.0043 J 0.0034 U	0.056	0.016 U	0.041 U 0.041 U	0.046 J 0.034 U
Volatile Organic Compounds (mg/kg)	125-00-0	3/3	0.005		165		0.0057 5	0.010 0	0.031	0.0078	0.0034 0	0.009	0.010 0	0.041 0	0.034 0
2-Butanone (MEK)	78-93-3	1/2	0.012 J	NB	Yes	Detected Organic	· ·	· ·	· ·	0.0017 U	-	1 .	· ·	0.012 J	-
Acetone	67-64-1	1/2	0.012 J 0.041 J	NB	Yes	Detected Organic		-		0.0055 U		-	-	0.012 J	
Benzene	71-43-2	1/2	0.0013 J	NB	Yes	Detected Organic	-	-	-	0.00044 U	-	-	-	0.0013 J	-
Carbon disulfide	75-15-0	1/2	0.0027 J	NB	Yes	Detected Organic	-	-	-	0.0027 J	-	-	-	0.00057 UJ	-
Ethylbenzene	100-41-4	1/2	0.0018 J	NB	Yes	Detected Organic	-	-	-	0.00044 U	-	-	-	0.0018 J	-
Toluene	108-88-3	1/2	0.0033 J	NB	Yes	Detected Organic			-	0.00044 U	-	-	-	0.0033 J	
L									•						·

Notes: **BOLD chemical detected above background, not an essential nutrient.** FD = Field Duplicate ID = identification J = Estimated value less than reporting limits. J = Estimated value with a low bias. M = manually integrated compound mg/kg = milligrams per kilogram NB = No background R = Rejected. REG = Regular TPH = Total Petroleum Hydrocarbons U = Not detected.

U = Not detected. UJ = Not detected and the reported limit is estimated. SRC = Site-related chemical

## Table 4-2e Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

Location ID:	-						70-4759	DUIC CD	70-4759-DU6-SB1	70-4759-DU6-SB2	70-4759-DU6-SB3	70-4759-DU6-SB4	70-4759-DU6-SB5
Field Sample ID:							070SB-0034M-0001-SO	070SB-0035M-0001-SO	070SB-0036M-0001-SO	070SB-0037M-0001-SO	070SB-0038M-0001-SO	070SB-0039M-0001-SO	070SB-0040M-0001-SO
	<u>.</u>	Eronuonou of	Max Detect	Background	SRC-		240-17669-16	240-17669-17					
Lab Sample ID: Sample Date:	CAS Number	Frequency of		Screening	Yes/No	SRC Justification	11/13/2012	11/13/2012	240-17669-18 11/13/2012	240-17669-19 11/13/2012	240-17669-20 11/13/2012	240-17669-21 11/13/2012	240-17669-22 11/13/2012
	<u>.</u>	Detection	Concentration	Value	Tes/NO								
Sample Depth:							1-4	4-7	1-7	1-7	1-7	1-7	1-7
Sample Type:							REG	REG	REG	REG	REG	REG	REG
TAL Metals (mg/kg)													
Explosives / Propellants (mg/kg)	170.45.0	4 ( 4 0	0.004.1	ND	N		0.0511	0.05.11	0.054.11	0.054.11	0.0511	0.004	0.050.11
Tetryl	479-45-8	1/12	0.021 J	NB	Yes	Detected Organic	0.05 U	0.05 U	0.051 U	0.051 U	0.05 U	0.021 J	0.058 U
Total Petroleum Hydrocarbons (mg/kg)	1	1	r	-									
TPH (C10-C20)	68476-34-6	1/1	83	NB	Yes	Detected Organic	-	-	-	-	-	-	83
Polychlorinated Biphenyls (PCBs) (mg/kg)													
Aroclor-1260	11096-82-5	1 / 12	0.018 J	NB	Yes	Detected Organic	0.025 U	0.025 U	0.025 U	0.026 U	0.025 U	0.018 J	0.029 U
Semivolatile Organic Compounds (mg/kg)													
1,2-Dichlorobenzene	95-50-1	2/12	0.2 J	NB	Yes	Detected Organic	0.052 J	0.13 U	0.13 U	0.14 U	0.14 U	0.2 J	0.15 U
2-Methylnaphthalene	91-57-6	2/12	0.19	NB	Yes	Detected Organic	0.091	0.016 U	0.016 U	0.017 U	0.017 U	0.19	0.019 U
Anthracene	120-12-7	1 / 12	0.022 J	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.022 J	0.019 U
Benzo(a)anthracene	56-55-3	1 / 12	0.045	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.045	0.019 U
Benzo(a)pyrene	50-32-8	2/12	0.071	NB	Yes	Detected Organic	0.059	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U
Benzo(b)fluoranthene	205-99-2	2/12	0.071	NB	Yes	Detected Organic	0.04	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U
Benzo(g,h,i)perylene	191-24-2	2/12	0.059	NB	Yes	Detected Organic	0.041	0.016 U	0.016 U	0.017 U	0.017 U	0.059	0.019 U
Chrysene	218-01-9	1 / 12	0.056	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.056	0.019 U
Dibenzofuran	132-64-9	2/12	0.052 J	NB	Yes	Detected Organic	0.028 J	0.016 U	0.016 U	0.017 U	0.017 U	0.052 J	0.019 U
Fluoranthene	206-44-0	3 / 12	0.069	NB	Yes	Detected Organic	0.04	0.016 U	0.016 U	0.018 J	0.017 U	0.069	0.019 U
Isophorone	78-59-1	1/12	0.068 J	NB	Yes	Detected Organic	0.068 J	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U	0.15 U
Naphthalene	91-20-3	2/12	0.13	NB	Yes	Detected Organic	0.066	0.016 U	0.016 U	0.017 U	0.017 U	0.13	0.019 U
Phenanthrene	85-01-8	1 / 12	0.12	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.12	0.019 U
Pyrene	129-00-0	3/12	0.11	NB	Yes	Detected Organic	0.046	0.016 U	0.016 U	0.017 J	0.017 U	0.11	0.019 U
Volatile Organic Compounds (mg/kg)													
Acetone	67-64-1	1/4	0.031 J	NB	Yes	Detected Organic	-	-	-	-	-	-	0.0055 U
Trichloroethene (TCE)	79-01-6	1/8	0.00032 J	NB	Yes	Detected Organic	-	-	-	-	-	-	0.00043 U

#### Table 4-2e Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06) Cont.

Locatio	n ID:						70-4740-SB105	70-4740-SB106			70-4740-SB107		
Field Sam							070SB-105-0073-S0	070SB-106-0074-S0	070SB-107-0076-S0	070SB-107-0077-S0	070SB-107-0078-S0	070SB-107-0079-S0	070SB-107-0080-S0
Lab Samp	e ID:	Frequency of	Max Detect	Background	SRC-		160-26639-2	160-26639-3	160-26639-5	160-26639-6	160-26639-7	160-26639-8	160-26639-9
Sample		Detection	Concentration	Screening	Yes/No	SRC Justification	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018
Sample D	epth:			Value			6-7	6-7	1-3	3-5	5-7	7-9	9-10
Sample							REG						
TAL Metals (mg/kg)				•		•		•			•		
Explosives / Propellants (mg/kg)													
Tetryl	479-45-8	1 / 12	0.021 J	NB	Yes	Detected Organic	-	-	0.016 UJ	0.016 UJ	0.015 UJ	0.015 UJ	0.016 UJ
Total Petroleum Hydrocarbons (mg/kg)													
TPH (C10-C20)	68476-34-6	1/1	83	NB	Yes	Detected Organic	-	-	-	-	-	-	-
Polychlorinated Biphenyls (PCBs) (mg/kg)			• •										
Aroclor-1260	11096-82-5	1 / 12	0.018 J	NB	Yes	Detected Organic	-	-	0.012 U	0.012 U	0.011 U	0.011 U	0.011 U
Semivolatile Organic Compounds (mg/kg)													
1,2-Dichlorobenzene	95-50-1	2/12	0.2 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
2-Methylnaphthalene	91-57-6	2/12	0.19	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Anthracene	120-12-7	1 / 12	0.022 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)anthracene	56-55-3	1 / 12	0.045	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)pyrene	50-32-8	2/12	0.071	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(b)fluoranthene	205-99-2	2/12	0.071	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(g,h,i)perylene	191-24-2	2 / 12	0.059	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Chrysene	218-01-9	1 / 12	0.056	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Dibenzofuran	132-64-9	2 / 12	0.052 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Fluoranthene	206-44-0	3 / 12	0.069	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Isophorone	78-59-1	1 / 12	0.068 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Naphthalene	91-20-3	2/12	0.13	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Phenanthrene	85-01-8	1 / 12	0.12	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Pyrene	129-00-0	3 / 12	0.11	NB	Yes	Detected Organic	· ·	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Volatile Organic Compounds (mg/kg)									0.000 D			0.044.5	
Acetone	67-64-1	1/4	0.031 J	NB		Detected Organic	-	-	0.022 B	-	0.031 J	0.011 B	-
Trichloroethene (TCE)	79-01-6	1/8	0.00032 J	NB	Yes	Detected Organic	0.043 U	0.00032 J	0.00097 U	0.00085 U	0.00087 U	0.00088 U	0.0011 U

Notes: BOLD chemical detected above background, not an essential nutrient.

FD = Field Duplicate

FD = Field Duplicate ID = identification J = Estimated value less than reporting limits. J- = Estimated value with a low bias. M = manually integrated compound mg/kg = milligrams per kilogram NB = No background R = Rejected. REG = Regular

REG = Regular

TPH = Total Petroleum Hydrocarbons

U = Not detected.

UJ = Not detected and the reported limit is estimated. SRC = Site-related chemical

CC RVAAP-70 East Classification Yard

Table 4-3a Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID: Field Sample ID:				vel (HQ = 0.1 o	r Risk = 10 <sup>-6</sup> )	Risk	Screening			70-4744-DU1-SS 070SS-0001M-0001-SO
Lab Sample ID:	CAS Number	Max Detect	FWCUG	FWCUG	_	Screening Level	Level	Exceed?	Exceedance Justification	240-17230-1
Sample Date:		Concentration	Resident	Resident	Resident RSL <sup>(c)</sup>		Source	Yes/No		11/5/2012
Sample Depth:			Receptor	Receptor						0-1
Sample Type:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>						REG
Total Petroleum Hydrocarbons (mg/kg)										
TPH (C10-C20)	68476-34-6	57 J	NG	NG	NA	NA	NA <sup>(g)</sup>	No	Below Risk Screening Criteria	57 J
TPH (C20-C34)	100664-65-1	540 M	NG	NG	NA	NA	NA <sup>(g)</sup>	No	Below Risk Screening Criteria	540 M
Semivolatile Organic Compounds (mg/kg)										
Benzo(a)anthracene	56-55-3	0.097	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.097
Benzo(a)pyrene	50-32-8	0.13	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	0.13
Benzo(b)fluoranthene	205-99-2	0.13	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.13
Benzo(g,h,i)perylene	191-24-2	0.31	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.31
Benzo(k)fluoranthene	207-08-9	0.04	2.21	6.5	11	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.04
Chrysene	218-01-9	0.15	22.1	65	110	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.15
Fluoranthene	206-44-0	0.13	276	163	-	163	RC	No	Below Risk Screening Criteria	0.13
Indeno(1,2,3-cd)pyrene	193-39-5	0.054	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.054
Phenanthrene	85-01-8	0.15	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.15
Pyrene	129-00-0	0.21	207	122	-	122	RC	No	Below Risk Screening Criteria	0.21

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

g. See main text for discussion about TPH.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility-Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

M = manually integrated compound

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

TPH = Total Petroleum Hydrocarbons

Table 4-3b Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch West of Building 47-40 (DU02)

Location ID: Field Sample ID:			Screening Le	evel (HQ = 0.1 or	Risk = 10 <sup>-6</sup> )	Risk	Sorooning			70-DD-DU2-SS 070SS-0002M-0001-SO
Lab Sample ID:	CAS Number	Max Detect	FWCUG	FWCUG		Screening	Screening Level	Exceed?	Exceedance Justification	240-17230-2
Sample Date:	CAS Number	Concentration	Receptor Receptor C	Resident	Resident	Level	Source	Yes/No		11/5/2012
Sample Depth:				<b>Receptor Child</b>	RSL <sup>(c)</sup>	Level	Source			0-1
Sample Type:			Adult <sup>(a)</sup>	(b)						REG
Total Petroleum Hydrocarbons (mg/kg)										
TPH (C10-C20)	68476-34-6	120 J	NG	NG	NA	NA	NA <sup>(g)</sup>	No	Below Risk Screening Criteria	120 J
TPH (C20-C34)	100664-65-1	750 M	NG	NG	NA	NA	NA <sup>(g)</sup>	No	Below Risk Screening Criteria	750 M
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	91-57-6	0.042 J	238	30.6	-	30.6	RC		Below Risk Screening Criteria	0.042 J
Anthracene	120-12-7	0.03 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.03 J
Benzo(a)anthracene	56-55-3	0.18	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.18
Benzo(a)pyrene	50-32-8	0.22	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	0.22
Benzo(b)fluoranthene	205-99-2	0.27	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.27
Benzo(g,h,i)perylene	191-24-2	0.4	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.4
Benzo(k)fluoranthene	207-08-9	0.12	2.21	6.5	11	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.12
Chrysene	218-01-9	0.23	22.1	65	110	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.23
Fluoranthene	206-44-0	0.3	276	163	-	163	RC	No	Below Risk Screening Criteria	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	0.17	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>		Below Risk Screening Criteria	0.17
Naphthalene	91-20-3	0.035 J	368	122	-	122	RC		Below Risk Screening Criteria	0.035 J
Phenanthrene	85-01-8	0.12	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.12
Pyrene	129-00-0	0.28	207	122	-	122	RC	No	Below Risk Screening Criteria	0.28

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x  $10^{-6}$ .

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

g. See main text for discussion about TPH.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

M = manually integrated compound

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

TPH = Total Petroleum Hydrocarbons

Table 4-3c Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID:			Screening Lev	el (HO – 0.1 or	Risk - 10 <sup>-6</sup> )					70-4740-DU3-SS
Field Sample ID:					$\operatorname{Risk} = 10^{\circ}$	Risk	Screening			070SS-0003M-0001-SO
Lab Sample ID:	CAS Number	Max Detect	FWCUG	FWCUG		Screening	Level	Exceed?	Exceedance Justification	240-17230-3
Sample Date:		Concentration	Resident	Resident	Resident	Level	Source	Yes/No		11/5/2012
Sample Depth:			Receptor Adult	Receptor	RSL <sup>(c)</sup>					0-1
Sample Type:			(a)	Child <sup>(b)</sup>						REG
TAL Metals (mg/kg)								·		
Barium	7440-39-3	93	8,966	1,413	-	1,413	RC		Below Risk Screening Criteria	93
Beryllium	7440-41-7	0.91	NG	NG	16	16	RRSL		Below Risk Screening Criteria	0.91
Cadmium	7440-43-9	0.26	22.3	6.41	-	6.41	RC		Below Risk Screening Criteria	0.26
Chromium	7440-47-3	26	19,694	8,147	-	8,147	RC		Below Risk Screening Criteria	26
Copper	7440-50-8	21	2,714	311	-	311	RC		Below Risk Screening Criteria	21
Lead	7439-92-1	45	NG	NG	400	400	RRSL		Below Risk Screening Criteria	45
Nickel	7440-02-0	29	1,346	155	-	155	RC	No	Below Risk Screening Criteria	29
Silver	7440-22-4	0.035 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.035 J
Thallium	7440-28-0	0.17 J	4.76	0.612	-	0.612	RC	No	Below Risk Screening Criteria	0.17 J
Zinc	7440-66-6	76	19,659	2,321	-	2,321	RC	No	Below Risk Screening Criteria	76
Polychlorinated Biphenyls (PCBs) (mg/kg)			· · · ·			•	•			
Aroclor-1254	11097-69-1	0.047 J	0.203	0.12	-		RC	No	Below Risk Screening Criteria	0.047 J
Semivolatile Organic Compounds (mg/kg)			• •			•	•		·	
2-Methylnaphthalene	91-57-6	0.69	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.54
Acenaphthene	83-32-9	0.55	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.55
Acenaphthylene	208-96-8	0.066	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.047 J
Anthracene	120-12-7	2.5	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	2.5
Benzo(a)anthracene	56-55-3	3.2	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	3.2
Benzo(a)pyrene	50-32-8	1.9	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	1.9
Benzo(b)fluoranthene	205-99-2	3.1	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	3.1
Benzo(g,h,i)perylene	191-24-2	1.1	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	1.1
Benzo(k)fluoranthene	207-08-9	0.98	2.21	11	-	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.98
Carbazole	86-74-8	0.34 J	69.4	44.6	-	44.6	RC	No	Below Risk Screening Criteria	0.34 J
Chrysene	218-01-9	3.3	22.1	110	-	110	RRSL (f)	No	Below Risk Screening Criteria	3.3
Dibenzofuran	132-64-9	0.42 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.42 J
Fluoranthene	206-44-0	8.4	276	163	-	163	RC	No	Below Risk Screening Criteria	8.4
Fluorene	86-73-7	0.71	737	243	-	243	RC	No	Below Risk Screening Criteria	0.71
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	1
Naphthalene	91-20-3	0.49	368	122	-	122	RC	No	Below Risk Screening Criteria	0.48
Phenanthrene	85-01-8	5.9	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	5.9
Pyrene	129-00-0	5.7	207	122	-	122	RC		Below Risk Screening Criteria	5.7

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x  $10^{-6}$ . Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL. Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk FWCUG = Facility Wide Cleanup Goal HQ = Hazard Quotient ID = identification J = Estimated value M = manually integrated compound mg/kg = milligrams per kilogram NA = not available NG = No FWCUG. RSL used if available. RA = Resident Receptor Adult RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

Table 4-3d Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID: Field Sample ID:			Screening Lev	/el (HQ = 0.1 or	Risk = 10 <sup>-6</sup> )	Diele	Concenting			70-4760-DU5-SS 070SS-0004M-0001-SO
Lab Sample ID:	CAS Number	Max Detect	FWCUG	FWCUG		Risk	Screening	Exceed?	Exceedance Justification	240-17230-4
Sample Date:	CAS Number	Concentration	Resident	Resident	Resident	Screening	Level	Yes/No	Exceedance Justification	11/5/2012
Sample Depth:			Receptor	Receptor	RSL <sup>(c)</sup>	Level	Source			0-1
Sample Type:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>						REG
Organochlorine Pesticides (mg/kg)										
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	0.01 J	NG	NG	63	63	RRS:	No	Below Risk Screening Criteria	0.01 J
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	91-57-6	0.42	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.42
Acenaphthene	83-32-9	0.14	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.14
Acenaphthylene	208-96-8	0.065	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.065
Anthracene	120-12-7	0.42	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.42
Benzo(a)anthracene	56-55-3	0.75	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.75
Benzo(a)pyrene	50-32-8	0.46	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	0.46
Benzo(b)fluoranthene	205-99-2	0.95	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.95
Benzo(g,h,i)perylene	191-24-2	0.31	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.31
Benzo(k)fluoranthene	207-08-9	0.31	2.21	11	-	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.31
Chrysene	218-01-9	1.1	22.1	110	-	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	1.1
Dibenzofuran	132-64-9	0.17 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.17 J
Fluoranthene	206-44-0	1.8	276	163	-	163	RC	No	Below Risk Screening Criteria	1.8
Fluorene	86-73-7	0.16	737	243	-	243	RC	No	Below Risk Screening Criteria	0.16
Indeno(1,2,3-cd)pyrene	193-39-5	0.28	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.28
Naphthalene	91-20-3	0.27	368	122	-	122	RC	No	Below Risk Screening Criteria	0.27
Phenanthrene	85-01-8	1.2	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	1.2
Pyrene	129-00-0	1.3	207	122	-	122	RC	No	Below Risk Screening Criteria	1.3

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

M = manually integrated compound

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

## Table 4-3e Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

			_										
Location ID:				reening Level						70-4759-DU6-SS	70-4740		70-4740-SS108
Field Sample ID:			•	0.1 or Risk =	10 °	Risk	Screening			070SS-0005M-0001-SO	070SS-107-0075-S0	070SS-107-9075-S0	070SS-108-0081-SO
Lab Sample ID:	CAS Number	Max Detect	FWCUG	FWCUG		Screening	Level	Exceed?	Exceedance Justification	240-17230-5	160-26639-4	160-26639-10	160-26663-5
Sample Date:	CAS Number	Concentration	Resident	Resident	Resident	Level	Source	Yes/No		11/5/2012	2/5/2018	2/5/2018	2/6/2018
Sample Depth:			Receptor	Receptor	RSL <sup>(c)</sup>	Level	Source			0-1	0-1	0-1	0-0.5
Sample Type:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>						REG	REG	FD	REG
Explosives / Propellants (mg/kg)													
2,6-Dinitrotoluene	606-20-2	0.05 J	0.769	1.1	-	0.769	RC	No	Below Risk Screening Criteria	0.05 J	0.016 UJ	0.016 UJ	0.015 U
Polychlorinated Biphenyls (PCBs) (mg/kg)									· · · · · · · · · · · · · · · · · · ·	· ·			
Aroclor-1260	11096-82-5	0.07 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.07 J	0.012 U	0.011 U	0.013 U
Semivolatile Organic Compounds (mg/kg)									· · · · · · · · · · · · · · · · · · ·	· ·			
1,2-Dichlorobenzene	95-50-1	0.081 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	0.081 J	2.3 U	0.11 U	3.2 U
2-Methylnaphthalene	91-57-6	0.69	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.69	2.3 U	0.11 U	3.2 U
Acenaphthylene	208-96-8	0.066	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.066	2.3 U	0.11 U	3.2 U
Anthracene	120-12-7	0.08	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.08	2.3 U	0.11 U	3.2 U
Benzo(a)anthracene	56-55-3	0.21	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.21	2.3 U	0.11 U	3.2 U
Benzo(a)pyrene	50-32-8	0.21	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	0.21	2.3 U	0.11 U	3.2 U
Benzo(b)fluoranthene	205-99-2	0.36	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.36	2.3 U	0.11 U	3.2 U
Benzo(g,h,i)perylene	191-24-2	0.38	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.38	2.3 U	0.11 U	3.2 U
Benzo(k)fluoranthene	207-08-9	0.19	2.21	11	-	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.19	2.3 U	0.11 U	3.2 U
Benzoic acid	65-85-0	12 J	NG	NG	25,000	25,000	RRSL	No	Below Risk Screening Criteria	1.3 U	12 J	0.75 UJ	21 U
Chrysene	218-01-9	0.32	22.1	110	-	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.32	2.3 U	0.11 U	3.2 U
Dibenzofuran	132-64-9	0.16 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.16 J	2.3 U	0.11 U	3.2 U
Fluoranthene	206-44-0	0.41	276	163	-	163	RC	No	Below Risk Screening Criteria	0.41	2.3 U	0.11 U	3.2 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.17	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.17	2.3 U	0.11 U	3.2 U
Naphthalene	91-20-3	0.49	368	122	-	122	RC	No	Below Risk Screening Criteria	0.49	2.3 U	0.11 U	3.2 U
Phenanthrene	85-01-8	0.32	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.32	2.3 U	0.11 U	3.2 U
Pyrene	129-00-0	0.33	207	122	-	122	RC	No	Below Risk Screening Criteria	0.33	2.3 U	0.11 U	3.2 U

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL. Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

M = manually integrated compound

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available. RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

## Table 4-3f Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch East of Building 47-40 (DU07)

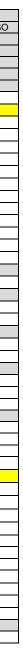
Location ID:					<b>-</b>					70-CDD	-DU7-SS
Field Sample ID:				vel (HQ = 0.1 or	$r Risk = 10^{\circ}$	Dist	<b>O</b>			070SS-0006M-0001-SO	070SS-0007M-0001-SO
Lab Sample ID:	CAC Number	Max Detect	FWCUG	FWCUG		Risk	Screening	Exceed?	Evenedence Justification	240-17230-6	240-17230-7
Sample Date:	CAS Number	Concentration	Resident	Resident	Resident	Screening Level	Level Source	Yes/No	Exceedance Justification	11/5/2012	11/5/2012
Sample Depth:			Receptor	Receptor	RSL (c)	Level	Source			0-1	0-1
Sample Type:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>						REG	FD
TAL Metals (mg/kg)											
Antimony	7440-36-0	2.1 J -	13.6	2.82	-	2.82	RC	No	Below Risk Screening Criteria	2.1 J -	1.5
Arsenic	7440-38-2	29	0.425	0.524	0.68	0.425	RA	Yes	Exceeds Risk Screening Level	29	27
Barium	7440-39-3	110	8,966	1,413	-	1,413	RC	No	Below Risk Screening Criteria	110	94
Beryllium	7440-41-7	1.1	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	1.1	1
Cadmium	7440-43-9	0.47 J	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.47 J	0.44
Chromium	7440-47-3	83 J -	19,694	8,147	-	8,147	RC	No	Below Risk Screening Criteria	83 J -	30 J
Cobalt	7440-48-4	14	803	131	-	131	RC	No	Below Risk Screening Criteria	14	12
Copper	7440-50-8	43 J-	2,714	311	-	311	RC	No	Below Risk Screening Criteria	43 J-	31
Lead	7439-92-1	270 J	NG	NG	400	400	RRSL	No	Below Risk Screening Criteria	270 J	59 J
Nickel	7440-02-0	49 J	1,346	155	-	155	RC	No	Below Risk Screening Criteria	49 J	38
Selenium	7782-49-2	1.7	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	1.4 J-	1.7
Silver	7440-22-4	0.054 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.054 J	0.052 J
Thallium	7440-28-0	0.35	4.76	0.612	-	0.612	RC	No	Below Risk Screening Criteria	0.35	0.27
Zinc	7440-66-6	160	19,659	2,321	-	2,321	RC	No	Below Risk Screening Criteria	160	150
Explosives / Propellants (mg/kg)			, <u>,</u>	<u> </u>					U		•
Nitrocellulose	9004-70-0	1.6 J	NG	NG	19,000,000	19,000,000	RRSL	No	Below Risk Screening Criteria	1.6 J	1.3 J
Total Petroleum Hydrocarbons (mg/kg)					· · ·	, ,					
TPH (C10-C20)	68476-34-6	42	NG	NG	NA	NA	ΝΔ <sup>(g)</sup>	No	Below Risk Screening Criteria	36	42
TPH (C20-C34)	100664-65-1	210 M	NG	NG	NA	NA	ΝΔ <sup>(g)</sup>	No	Below Risk Screening Criteria	170 M	210 M
Organochlorine Pesticides (mg/kg)		•		•						•	•
4,4'-DDE	72-55-9	0.014 J	4.08	2.63	-	2.63	RC	No	Below Risk Screening Criteria	0.014 J	-
4,4'-DDT	50-29-3	0.037 J	NG	NG	1.9	1.9	RRSL	No	Below Risk Screening Criteria	0.037 J	-
Polychlorinated Biphenyls (PCBs) (mg/kg)		•		•			•			•	•
Aroclor-1242	53469-21-9	0.59 J	NG	NG	0.23	0.23	RRSL	No	Below Risk Screening Criteria	0.59 J	0.035 U
Aroclor-1248	12672-29-6	0.17	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.19 U	0.17
Aroclor-1260	11096-82-5	0.061 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.19 U	0.061 J
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	91-57-6	0.44	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.44	0.37
Acenaphthene	83-32-9	0.096 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.063 J	0.096 J
Anthracene	120-12-7	0.15	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.12	0.15
Benzo(a)anthracene	56-55-3	0.32	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.25	0.32
Benzo(a)pyrene	50-32-8	0.27	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Detected Organic	0.2	0.27
Benzo(b)fluoranthene	205-99-2	0.42	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.31	0.42
Benzo(g,h,i)perylene	191-24-2	0.27	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.2	0.27
Benzo(k)fluoranthene	207-08-9	0.17	2.21	11	-	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.14	0.17
Chrysene	218-01-9	0.38	22.1	110	-	110	RRSL (f)	No	Below Risk Screening Criteria	0.31	0.38
Dibenzofuran	132-64-9	0.14 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.14 J	0.14 J
Fluoranthene	206-44-0	0.86	276	163	-	163	RC	No	Below Risk Screening Criteria	0.58 J	0.86
Fluorene	86-73-7	0.11 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.059	0.11 J
Indeno(1,2,3-cd)pyrene	193-39-5	0.15	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.14	0.15
Naphthalene	91-20-3	0.34	368	122	-	122	RC	No	Below Risk Screening Criteria	0.34	0.31
Phenanthrene	85-01-8	0.92	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.66 J	0.92
Pyrene	129-00-0	0.68 J	207	122	-	122	RC	No	Below Risk Screening Criteria	0.44	0.68 J
Volatile Organic Compounds (mg/kg)			•		•	·	•			•	<u>.</u>
Acetone	67-64-1	0.028 J	NG	NG	6.100	6.100	RRSL	No	Below Risk Screening Criteria	0.011 UJ	0.028 J

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.
c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
d. Pyrene was used as a surrogate.
e. Anthracene was used as a surrogate.
f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
Vellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyldichloroethylene
ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
M = manually integrated compound
mg/kg = milligrams per klogram
NA = not available
NG = No FWCUG, RSL used if available.
RA = Resident Receptor Child
RRSL = Resident Receptor Child
RRSL = Resident Regional Screening Level
TPH = Total Petroleum Hydrocarbons



## Table 4-4a Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID:	•		Screening	Level (HQ = 0.1 o	r Risk = 10 <sup>-6</sup> )					70-474	14-DU1-SB	70-4744-DU1-SB1	70-4744-DU1-SB2	70-4744-DU1-SB3	70-4744-DU1-SB4	70-4744-DU1-SB5		70-4744-DU1-SB6	
Field Sample ID:				1	1					070SB-0011M-0001-SO				070SB-0015M-0001-SO	070SB-0016M-0001-SO	070SB-0017M-0001-SO	070SB-004	42M-0001-SO	070SB-0043M-0001-SO
Lab Sample ID:		Max Detect	FWCUG	FWCUG Resident	Resident RSL	Risk Screening	Screening Level	Exceed?		240-17768-1	240-17768-2	240-17768-3	240-17768-4	240-17768-5	240-17768-6	240-17768-7	240-18581-1	240-18735-1	240-18581-2
Sample Date:	CAS Number	Concentration	Resident		Resident RSL	Level	Source	Yes/No	Exceedance Justification	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	12/7/2012	12/12/2012	12/7/2012
Sample Depth:	:		Receptor Adult	Receptor Child	(0)					1-4	4-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7
Sample Type:	:		(a)	(0)						REG	REG	REG	REG	REG	REG	REG	REG	REG	FD
TAL Metals (mg/kg)																			
Cadmium	7440-43-9	0.26	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.26	-	
Silver	7440-22-4	0.041 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.041 J	-	-
Explosives / Propellants (mg/k	(g)																		
Nitrobenzene	98-95-3	0.096 J	NG	NG	5.1	5.1	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.096 J	-	-
Total Petroleum Hydrocarbons	s (ma/ka)								Ť.										
TPH (C6-C12)	68439-45-2	190	NG	NG	NA	NA		No	Below Risk Screening Criteria	0.053 U	160	0.14	190	0.051 U	0.055 U	0.058 U	-	0.049 U	0.98
TPH (C10-C20)	68476-34-6	4.000	NG	NG	NA	NA	NA (9)	No	Below Risk Screening Criteria	34	900	46	4.000	34	46	38	370		350
TPH (C20-C34)	100664-65-1	430	NG	NG	NA	NA	NA (0)	No	Below Risk Screening Criteria				.,				430		400
Semivolatile Organic Compou		100					NA (9/		Bolow Hart Corocining Ontolia								100		
2-Methylnaphthalene	91-57-6	18	238	30.6	· ·	30.6	RC	No	Below Risk Screening Criteria	0.02 J	3.7	0.021 U	18	0.026 J	0.041 U	0.02 U	0.84 J	-	0.83
4-Nitroaniline	100-01-6	0.33 J	NG	NG	25	25	RRSL	No	Below Risk Screening Criteria	0.13 U	0.67 U	0.17 U	0.65 U	0.18 U	0.33 J	0.16 U	0.33 U	-	0.34 U
Acenaphthene	83-32-9	4.6	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.015 U	1.1	0.021 U	4.6	0.022 U	0.041 U	0.02 U	0.47	-	0.33
Acenaphthylene	208-96-8	0.098	NG	NG	1.800	1.800	RRSL	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 U	0.02 U	0.098	-	0.076 J
Anthracene	120-12-7	0.71	NG	NG	1.800	1,800	RRSL	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.71	0.022 U	0.041 U	0.02 U	0.041 U	-	0.041 U
Benzo(a)anthracene	56-55-3	1.7	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	0.015 U	0.44	0.021 U	1.7	0.022 U	0.041 U	0.02 U	0.17	-	0.19
Benzo(a)pyrene	50-32-8	0.88	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	Yes	Exceeds Risk Screening Level	0.015 U	0.4	0.077	0.88	0.022 U	0.041 U	0.02 U	0.051 J		0.064 J
Benzo(b)fluoranthene	205-99-2	0.37	0.221	0.65	1.1	1.1	RRSL <sup>(1)</sup>	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.37	0.022 U	0.041 U	0.02 U	0.042 J		0.041 J
Benzo(g,h,i)perylene	191-24-2	0.7	207 (d)	100 (d)	-	122 (d)	RC	No	Below Risk Screening Criteria	0.015 U	0.17	0.056	0.7	0.022 U	0.041 U	0.02 U	0.07 J		0.041 UJ
Chrvsene	218-01-9	1.9	207 (0)	122 <sup>(0)</sup> 65	110	122 (0)	RRSL (7)	No	Below Risk Screening Criteria	0.015 U	0.38	0.021 U	1.9	0.022 U	0.041 U	0.02 U	0.07 J		0.12 J
	53-70-3	0.041 J		0.065	0.11	0.11	RRSL <sup>(7)</sup>	No	, , , , , , , , , , , , , , , , , , ,	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 J	0.02 U	0.041 UJ	-	0.041 U
Dibenz(a,h)anthracene Dibenzofuran	132-64-9	2.8	0.022	15.3	-	15.3	RC	NO	Below Risk Screening Criteria Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	2.8	0.022 U	0.041 U	0.02 U	0.041 0J		0.041 0
Fluoranthene	206-44-0	1.8	276	163	-	163	RC	No	Below Risk Screening Criteria	0.015 U	0.58 5	0.021 0	1.8	0.022 U	0.041 U	0.02 U	0.31 J		0.25 J
Fluorene	86-73-7	7.6	737	243	-	243	RC	No	Below Risk Screening Criteria	0.017 J	1.7	0.022 J 0.021 U	7.6	0.022 U	0.041 U	0.02 U	0.21 J	-	0.15 5
Naphthalene	91-20-3	1.0	368	122	-	122	RC	No	Below Risk Screening Criteria	0.015 U	0.22	0.021 U	1.0	0.022 U	0.041 U	0.02 U	0.05 J		0.064 J
n-Nitrosodiphenvlamine	86-30-6	0.33 J	NG	NG	110	110	RRSL	No	Below Risk Screening Criteria	0.13 U	0.67 U	0.021 U	0.65 U	0.18 U	0.33 J	0.16 U	0.33 UJ	-	0.34 UJ
Phenanthrene	85-01-8	12	NG	NG	1.800 <sup>(e)</sup>	1.800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.033	0.07 0	0.044	12	0.022 U	0.041 U	0.02 U	1.2		0.04 00
Pyrene	129-00-0	12	207	122	1,000	122	RC	No	Below Risk Screening Criteria	0.033 0.03 J	2.7	0.035 J	12	0.022 U	0.041 U	0.02 U	1.2		0.91
Volatile Organic Compounds (		11	201	122	-	122	NO NO	INU	Delow Max Ocleening Chiena	0.05 5	2.1	0.035 5		0.022 0	0.0410	0.02 0	1.2	-	0.91
2-Butanone (MEK)	78-93-3	0.0062 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	0.0022 UJ	0.19 UJ	0.0021 UJ	0.093 UJ	0.002 U	0.0022 U	0.0024 U	0.0062 J		0.0055 J
Acetone	67-64-1	0.024	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	0.0068 UJ	0.39 UJ	0.0065 UJ	0.19 UJ	0.0065 U	0.0022 0	0.0024 U	0.024	-	0.0068 U
Benzene	71-43-2	0.00084 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.048 UJ	0.00052 UJ	0.023 UJ	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0073 J		0.0008 U
Carbon disulfide	75-15-0	0.0036 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.048 UJ	0.0031 J	0.023 UJ	0.00051 UJ	0.0036 J	0.0036 J	0.00045 U		0.00054 U
Ethylbenzene	100-41-4	0.79 J	NG	NG	5.8	5.8	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.79 J	0.00052 UJ	0.35 J	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0047		0.0047 J
Methylene chloride	75-09-2	0.0025 J	NG	NG	35	35	RRSL	No	Below Risk Screening Criteria	0.00091 J	0.19 UJ	0.0022 J	0.093 UJ	0.0025 J	0.0011 UJ	0.0012 UJ	0.00089 U		0.0011 U
Toluene	108-88-3	0.063 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.063 J	0.00052 UJ	0.026 J	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0027 J	-	0.0019 J
Xylenes, Total	1330-20-7	2.6 J	NG	NG	58	58	RRSL	No	Below Risk Screening Criteria	0.0016 UJ	2.6 J	0.0016 UJ	1.2 J	0.0015 UJ	0.0017 UJ	0.0018 UJ	0.02	-	0.02

 Kylenes, Total
 1330-20-7
 2.6 J
 NG
 NG
 58
 58
 RRSL

 Notes:
 a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>4</sup>.
 b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>4</sup>.
 c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>4</sup>.

 a. Pyrene was used as a surrogate.
 c. Anthracene was used as a surrogate.
 f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
 g. See main text for discussion about TPH.

 Vellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.
 ELCR = Excess Lifetime Cancer Risk

 FWCUG = Facility Wide Cleanup Goal
 HQ = Hazard Quotient

 ID = identification
 J = Estimated value

 mg/kg = milligrams per kilogram
 NA = not available

 NA = not available
 RA = Resident Receptor Adult

 RC = Resident Receptor Adult
 RC = Resident Receptor Adult

 RC = Resident Receptor Adult
 RC = Resident Receptor Adult

 RC = Resident Receptor Adult
 RC = Resident Receptor Adult

 RC = Resident Receptor Adult
 RCreening Level

 TPH = Total Petroleum Hydrocarbons
 See main Receptor Child

# Table 4-4b Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID:			Screening Lev	vel (HQ = 0.1 or	Pick - 10					70-4740	-DU3-SB	70-4740-		70-4740-DU3-SB2
Field Sample ID:										070SB-0019M-0001-SO	070SB-0020M-0001-SO	070SB-0021M-0001-SO	070SB-0026-0001-SO	070SB-0022M-0001-SO
Lab Sample ID:		Max Detect	FWCUG	FWCUG		Risk	Screening	Exceed?		240-17669-1	240-17669-2	240-17669-3	240-17669-8	240-17669-4
Sample Date:	CAS Number	Concentration	Resident	Resident	Resident	Screening	Level Source	Yes/No	Exceedance Justification	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012
Sample Depth:			Receptor	Receptor	RSL <sup>(c)</sup>	Level				1-4	4-7	1-7	7-13	1-13
Sample Type:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>						REG	REG	REG	REG	REG
TAL Metals (mg/kg)				•		•								
Cadmium	7440-43-9	0.21	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.19	0.18	0.16	0.024 J	0.17
Silver	7440-22-4	0.039 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.032 J	0.026 J	0.039 J	0.026 U	0.021 J
Semivolatile Organic Compounds	s (mg/kg)								•					
2-Methylnaphthalene	91-57-6	0.035 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0044 J
Acenaphthene	83-32-9	0.0047 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.016 U	0.0047 J	0.016 U	0.0037 U	0.0033 U
Anthracene	120-12-7	0.019 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.019 J	0.0049 J	0.016 U	0.0037 U	0.0033 U
Benzo(a)anthracene	56-55-3	0.09	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.09	0.0063 J	0.031 J	0.0037 U	0.0033 U
Benzo(a)pyrene	50-32-8	0.09	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.09	0.0043 J	0.016 U	0.0037 U	0.0033 U
Benzo(b)fluoranthene	205-99-2	0.13	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.13	0.0063 J	0.016 U	0.0037 U	0.0033 U
Benzo(g,h,i)perylene	191-24-2	0.055	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.055	0.0052 J	0.016 U	0.0037 U	0.0033 U
Benzo(k)fluoranthene	207-08-9	0.062	2.21	6.5	11	11	RRSL (f)	No	Below Risk Screening Criteria	0.062	0.0043 J	0.016 U	0.0037 U	0.0033 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.029 J	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	0.13 U	0.027 J	0.13 U	0.029 J	0.027 U
Chrysene	218-01-9	0.029 J	22.1	65	110	110	RRSL (f)	No	Below Risk Screening Criteria	0.11	0.0058 J	0.016 U	0.0037 U	0.0033 U
Dibenzofuran	132-64-9	0.0054 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.016 U	0.0054 J	0.016 U	0.0037 U	0.0033 U
Fluoranthene	206-44-0	0.22	276	163	-	163	RC	No	Below Risk Screening Criteria	0.22	0.0049 J	0.043	0.0037 U	0.0033 U
Fluorene	86-73-7	0.0044 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.016 U	0.0044 J	0.016 U	0.0037 U	0.0033 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.053	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.053	0.0049 J	0.016 U	0.0037 U	0.0033 U
Naphthalene	91-20-3	0.0056 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0048 J
Phenanthrene	85-01-8	0.1	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.1	0.0069	0.017 J	0.0037 U	0.0033 U
Pyrene	129-00-0	0.16	207	122	-	122	RC	No	Below Risk Screening Criteria	0.16	0.0048 J	0.034	0.0037 U	0.0033 U
Volatile Organic Compounds (mg	j/kg)													
2-Butanone (MEK)	78-93-3	0.0046 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-
Acetone	67-64-1	0.019 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-
Benzene	71-43-2	0.0004 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-
Carbon disulfide	75-15-0	0.00063 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-
Toluene	108-88-3	0.0025 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-

## Table 4-4b Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03) Cont.

Location ID:			Screening Lev	vel (HQ = 0.1 or	Risk = 10					70-4740-DU3-SB3	70-4740-DU3-SB4	70-4740-DU3-SB5	70-4740-	DU3-SB6
Field Sample ID:	1		FWCUG	FWCUG		1 <u>.</u>				070SB-0023M-0001-SO	070SB-0024M-0001-SO	070SB-0025M-0001-SO	070SB-0046M-0001-SO	070SB-0047M-0001-SO
Lab Sample ID:	CAS Number	Max Detect	Resident	Resident	Resident	Risk	Screening	Exceed?		240-17669-5	240-17669-6	240-17669-7	240-18581-5	240-18581-6
Sample Date:	CAS Number	Concentration	Receptor	Receptor	Resident RSL <sup>(c)</sup>	Screening	Level Source	Yes/No	Exceedance Justification	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012
Sample Depth:					RSL	Level				1-7	1-7	1-7	1-7	1-7
Sample Type:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>						REG	REG	REG	REG	FD
TAL Metals (mg/kg)		•									•			•
Cadmium	7440-43-9	0.21	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.18	0.21	0.21	0.17	0.17
Silver	7440-22-4	0.039 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.03 J	0.032 J	0.029 J	0.03 J	0.029 J
Semivolatile Organic Compound	ls (mg/kg)													
2-Methylnaphthalene	91-57-6	0.035 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.0054 J	0.0034 U	0.0044 J	0.037 U	0.035 J
Acenaphthene	83-32-9	0.0047 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Anthracene	120-12-7	0.019 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Benzo(a)anthracene	56-55-3	0.09	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.0084	0.0034 U	0.037 U	0.034 U
Benzo(a)pyrene	50-32-8	0.09	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.0069	0.0034 U	0.037 U	0.034 U
Benzo(b)fluoranthene	205-99-2	0.13	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.013	0.0034 U	0.037 U	0.034 U
Benzo(g,h,i)perylene	191-24-2	0.055	207 <sup>(d)</sup>	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.0034 U	0.0055 J	0.0034 U	0.037 UJ	0.034 UJ
Benzo(k)fluoranthene	207-08-9	0.062	2.21	6.5	11	11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.008	0.0034 U	0.037 U	0.034 U
Bis(2-ethylhexyl)phthalate	117-81-7	0.029 J	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	0.019 J	0.028 U	0.028 U	0.31 U	0.27 U
Chrysene	218-01-9	0.029 J	22.1	65	110	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.021	0.0034 U	0.037 U	0.034 U
Dibenzofuran	132-64-9	0.0054 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Fluoranthene	206-44-0	0.22	276	163	-	163	RC	No	Below Risk Screening Criteria	0.0034 U	0.016	0.0034 U	0.037 UJ	0.034 UJ
Fluorene	86-73-7	0.0044 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.053	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.0052 J	0.0034 U	0.037 U	0.034 U
Naphthalene	91-20-3	0.0056 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.0044 J	0.0052 J	0.0056 J	0.037 U	0.034 U
Phenanthrene	85-01-8	0.1	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.0043 J	0.0058 J	0.0034 U	0.037 U	0.034 U
Pyrene	129-00-0	0.16	207	122	-	122	RC	No	Below Risk Screening Criteria	0.0034 U	0.012	0.0034 U	0.037 U	0.034 U
Volatile Organic Compounds (m	g/kg)		•				•							•
2-Butanone (MEK)	78-93-3	0.0046 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0046 J	-
Acetone	67-64-1	0.019 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	0.019 J	-
Benzene	71-43-2	0.0004 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0004 J	-
Carbon disulfide	75-15-0	0.00063 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00063 J	-
Toluene	108-88-3	0.0025 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0025 J	-

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration

exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL. Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

#### ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification J = Estimated value

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

					,											
Location ID:			Screening Lev	/el (HQ = 0.1 or	Risk = 10 <sup>-</sup>						-DU4-SB	70-4740-DU4-SB1	70-4740-DU4-SB2	70-4740-DU4-SB3	70-4740-DU4-SB4	70-4740-DU4-SB5
Field Sample ID:			FWCUG	FWCUG		Risk	Screening			070SS-0048M-0001-SO	070SB-0049M-0001-SO	070SB-0050M-0001-SO	070SB-0051M-0001-SO	070SB-0052M-0001-SO	070SB-0053M-0001-SO	070SB-0054M-0001-SO
Lab Sample ID:	CAS Number	Max Detect	Resident	Resident	Resident	Screening	Level	Exceed?	Exceedance Justification	240-18581-17	240-18581-18	240-18581-19	240-18581-20	240-18581-21	240-18581-22	240-18581-23
Sample Date:	0.101111100	Concentration	Receptor	Receptor	RSL (c)	Level	Source	Yes/No		12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012
Sample Depth:			Adult <sup>(a)</sup>	Child <sup>(b)</sup>	KOL	Level	Source			0-1	0-1	0-1	0-1.25	0-4	0-3.75	0-2.8
Sample Type:			Adult	Child						REG						
TAL Metals (mg/kg)																
Cadmium	7440-43-9	0.17	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.17	0.099 J	0.13	0.12	0.13	0.11	0.16
Cobalt	7440-48-4	50	803	131	-	131	RC	No	Below Risk Screening Criteria	50	7.3	28	32	14	8.7	12
Selenium	7782-49-2	1.8	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	0.35 J	0.24 J	0.33 J	0.26 J	0.27 J	0.24 J	0.43 J
Silver	7440-22-4	0.03 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.03 J	0.015 J	0.018 J	0.017 J	0.02 J	0.017 J	0.027 J
Semivolatile Organic Comp	pounds (mg/kg)											•				
2-Methylnaphthalene	91-57-6	0.0053 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.0034 U	0.0033 U	0.0053 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Acenaphthene	83-32-9	0.012	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.012	0.0033 U	0.0033 U	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Butyl benzyl phthalate	85-68-7	0.016 J	NG	NG	290	290	RRSL	No	Below Risk Screening Criteria	0.016 J	0.027 U	0.027 U	0.27 UJ	0.27 UJ	0.11 U	0.11 U
Dibenzofuran	132-64-9	0.0039 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.0034 U	0.0033 U	0.0039 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Fluoranthene	206-44-0	0.008 J	276	163	-	163	RC	No	Below Risk Screening Criteria	0.0078 J	0.0033 UJ	0.008 J	0.033 UJ	0.033 UJ	0.013 UJ	0.013 UJ
Fluorene	86-73-7	0.0034 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.019	0.0033 U	0.0034 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Naphthalene	91-20-3	0.0057 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.0034 U	0.0039 J	0.0057 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Phenanthrene	85-01-8	0.039	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.039	0.0033 U	0.014	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Pyrene	129-00-0	0.0089	207	122	-	122	RC	No	Below Risk Screening Criteria	0.0089	0.0033 U	0.0043 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Volatile Organic Compound	ds (mg/kg)											•				
Acetone	67-64-1	0.041 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-
Carbon disulfide	75-15-0	0.0036 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-
Chlorobenzene	108-90-7	0.003 J	NG	NG	28	28	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-
Trichloroethene (TCE)	79-01-6	0.00054 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-

# )4)

# Table 4-4c Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04) Cont.

Location ID	D:		Screening Lev	/el (HQ = 0.1 oi	r Risk = 10 <sup>-6</sup> )	)					70-4740-SB101			70-4740	0-SB102		70-4740	0-SB103	70-4740-SB104
Field Sample ID	D:		FWCUG	FWCUG		Risk	Screening			070SB-101-0062-SO	070SB-101-0063-SO	070SB-101-0064-SO	070SB-102-0065-SO	070SB-102-0066-SO	070SB-102-9066-SO	070SB-102-0067-SO	070SB-103-0069-SO	070SB-103-0070-SO	070SB-104-0072-S0
Lab Sample ID	CAS Number	Max Detect	Resident	Resident	Resident	Screening	•	Exceed?	Exceedance Justification	160-26618-1	160-26618-2	160-26618-3	160-26618-4	160-26618-5	160-26618-6	160-26618-7	160-26663-2	160-26663-3	160-26639-1
Sample Date	e: CAS Number	Concentration	Receptor	Receptor	RSL (c)		Level	Yes/No	Exceedance Justification	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/6/2018	2/6/2018	2/5/2018
Sample Depth	1:		(-)		RSL "	Level	Source			2-4	4-6	6-7	2-4	4-6	4-6	6-8	2-4	4-7	2-4
Sample Type			Adult (a)	Child (b)						REG	REG	REG	REG	REG	FD	REG	REG	REG	REG
TAL Metals (mg/kg)																			
Cadmium	7440-43-9	0.17	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.12 U	0.13 U	0.13 U	0.089 J	0.14 U	0.13 U	0.13 U	-	-	-
Cobalt	7440-48-4	50	803	131	-	131	RC	No	Below Risk Screening Criteria	8.7	11	14	8.9	14	12	13	-	-	-
Selenium	7782-49-2	1.8	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	1.3	1.8	1.8	1.4	1.4	1.5	1.3	-	-	-
Silver	7440-22-4	0.03 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.38 U	0.41 U	0.4 U	0.41 U	0.43 U	0.39 U	0.39 U	-	-	-
Semivolatile Organic Cor	mpounds (mg/kg)		•												•	•			
2-Methylnaphthalene	91-57-6	0.0053 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Acenaphthene	83-32-9	0.012	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Butyl benzyl phthalate	85-68-7	0.016 J	NG	NG	290	290	RRSL	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Dibenzofuran	132-64-9	0.0039 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Fluoranthene	206-44-0	0.008 J	276	163	-	163	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Fluorene	86-73-7	0.0034 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Naphthalene	91-20-3	0.0057 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Phenanthrene	85-01-8	0.039	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Pyrene	129-00-0	0.0089	207	122	-	122	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Volatile Organic Compou	ınds (mg/kg)																		
Acetone	67-64-1	0.041 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	0.015 J	0.01 U	0.014 J	0.0092 U	0.0099 U	0.011 U	0.011 U	-	0.023 J	-
Carbon disulfide	75-15-0	0.0036 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	0.0012 J	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U
Chlorobenzene	108-90-7	0.003 J	NG	NG	28	28	RRSL	No	Below Risk Screening Criteria	0.001 J	0.001 U	0.003 J	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U
Trichloroethene (TCE)	79-01-6	0.00054 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	0.00095 U	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00041 J	0.00075 U	0.00054 J

Notes:

Notes: a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-1</sup>. Only shown if there is no Reside.
 e. Anthracene was used as a surrogate.
 f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
 Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.
 ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient ID = identification J = Estimated value

mg/kg = milligrams per kilogram

NA = not available NG = No FWCUG. RSL used if available. RA = Resident Receptor Adult RC = Resident Receptor Child RRSL = Residential Regional Screening Level

CC RVAAP-70 East Classification Yard

# Table 4-4d Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID:			Screening Lev	(1/10 - 0.1 or)	$Biok = 10^{-6}$					70-4760	DUESE	70-4760-DU5-SB1	70-4760-DU5-SB2	70-4760-DU5-SB3	70-4760-DU5-SB4	70-4760-DU5-SB5	70.4760	-DU5-SB6
Field Sample ID:					RISK = 10	-				070SB-0027M-0001-SO	070SB-0028M-0001-SO	070SB-0029M-0001-SO	070SB-0030M-0001-SO	070SB-0031M-0001-SO	070SB-0032M-0001-SO	070SB-0033M-0001-SO	070SB-0044M-0001-SO	070SB-0045M-0001-SO
Lab Sample ID:		Max Detect	FWCUG	FWCUG		Risk	Screening	Exceed?		240-17669-9	240-17669-10	240-17669-11	240-17669-12	240-17669-13	240-17669-14	240-17669-15	240-18581-3	240-18581-4
Sample Date:	CAS Number	Concentration	Resident	Resident	Resident	Screening	Level Source		Exceedance Justification	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012
Sample Depth:			Receptor Adult	Receptor	RSL (c)	Level				1-4	4-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7
Sample Dopuis			(a)	Child <sup>(b)</sup>						REG	FD							
TAL Metals (mg/kg)									•									
Cadmium	7440-43-9	0.24	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.24	-
Silver	7440-22-4	0.029 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.029 J	-
Total Petroleum Hydrocarbons (mg/kg)												•		•				
TPH (C10-C20)	68476-34-6	39	NG	NG	NA	NA	NA (9)	No	Below Risk Screening Criteria	-	-	-	39	-	-	-	-	-
Organochlorine Pesticides (mg/kg)		1					I NA 🗤											
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	0.086	NG	NG	63	63	RRSL	No	Below Risk Screening Criteria	0.0085 U	0.049	0.0086 U	0.086	0.0086 U	0.0085 U	0.0084 U	0.01 U	0.0084 U
Semivolatile Organic Compounds (mg	/kg)		•				•					•		•			•	•
1,2-Dichlorobenzene	95-50-1	0.029 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	0.029 J	0.13 U	0.13 U	0.03 U	0.028 U	0.14 U	0.13 U	0.34 UJ	0.27 U
2,4,5-Trichlorophenol	95-95-4	0.14 J	NG	NG	630	630	RRSL	No	Below Risk Screening Criteria	0.028 U	0.13 U	0.13 U	0.14 J	0.028 U	0.14 U	0.13 U	0.34 U	0.27 U
2-Methylnaphthalene	91-57-6	0.082	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.0034 U	0.036	0.029 J	0.07	0.0055 J	0.057	0.016 U	0.041 U	0.082
Acenaphthylene	208-96-8	0.017 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.017 J	0.016 U	0.041 U	0.034 U
Anthracene	120-12-7	0.019 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.019 J	0.016 U	0.041 U	0.034 U
Benzo(a)anthracene	56-55-3	0.053	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.032 J	0.004 J	0.0034 U	0.053	0.016 U	0.041 U	0.034 U
Benzo(a)pyrene	50-32-8	0.059	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.034	0.0037 U	0.0034 U	0.059	0.016 U	0.041 U	0.034 U
Benzo(b)fluoranthene	205-99-2	0.1	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.052	0.0089	0.0052 J	0.1	0.016 U	0.041 U	0.034 U
Benzo(g,h,i)perylene	191-24-2	0.051	207 (d)	122 (d)	-	100 (d)	RC	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.031 J	0.0037 U	0.0034 U	0.051	0.016 U	0.041 UJ	0.034 UJ
Benzo(k)fluoranthene	207-08-9	0.04	2.21	6.5	11	11	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.04	0.016 U	0.041 U	0.034 U
Chrysene	218-01-9	0.097	22.1	65	110	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.04	0.009	0.0054 J	0.097	0.016 U	0.041 U	0.034 U
Fluoranthene	206-44-0	0.12	276	163	-	163	RC	No	Below Risk Screening Criteria	0.0082	0.016 U	0.065	0.008	0.0045 J	0.12	0.016 U	0.041 U	0.034 UJ
Fluorene	86-73-7	0.018	737	243	-	243	RC	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.018	0.0034 U	0.017 U	0.016 U	0.041 U	0.034 U
Indeno(1.2.3-cd)pyrene	193-39-5	0.043	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.043	0.016 U	0.041 U	0.034 U
Naphthalene	91-20-3	0.07	368	122	-	122	RC	No	Below Risk Screening Criteria	0.0034 U	0.022 J	0.017 J	0.021	0.0063 J	0.05	0.016 U	0.041 U	0.07
Phenanthrene	85-01-8	0.07	NG	NG	1.800 <sup>(e)</sup>	1.800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.061	0.036	0.07	0.0043 J	0.056	0.016 U	0.041 U	0.046 J
Pyrene	129-00-0	0.089	207	122	-	122	RC	No	Below Risk Screening Criteria	0.0057 J	0.016 U	0.051	0.0078	0.0034 U	0.089	0.016 U	0.041 U	0.034 U
Volatile Organic Compounds (mg/kg)					1				,									
2-Butanone (MEK)	78-93-3	0.012 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	_	-	-	0.0017 U	-	-	-	0.012 J	-
Acetone	67-64-1	0.041 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0055 U	-	-	-	0.041 J	-
Benzene	71-43-2	0.0013 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00044 U	-	-	-	0.0013 J	-
Carbon disulfide	75-15-0	0.0027 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0027 J	-	-	-	0.00057 UJ	-
Ethylbenzene	100-41-4	0.0018 J	NG	NG	5.8	5.8	RRSL	No	Below Risk Screening Criteria		-	-	0.00044 U	-	-	-	0.0018 J	-
Toluene	108-88-3	0.0033 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00044 U	-	-	-	0.0033 J	-

Notes:

Notes: a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>6</sup>. b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>6</sup>. c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG. d. Pyrene was used as a surrogate. e. Anthracene was used as a surrogate. f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL. g. See main text for discussion about TPH. **Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.** ELCR = Excess Lifetime Cancer Risk FWCUG = Facility Wide Cleanup Goal HQ = Hazard Quotient ID = identification J = Estimated value mg/kg = milligrams per kliogram NA = not available NG = No FWCUG, RSL used if available. RA = Resident Receptor Child RRSL = Residentia Regional Screening Level TPH = Total Petroleum Hydrocarbons

Table 4-4e Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Ra	ck Area (DU06)
Tuble The blie Related Chemicals Encoding The Colds in Substitute Son for Cold Relation Fund, Outdoor Hash Ra	

Location			Screening Leve							/	-DU6-SB	70-4759-DU6-SB1	70-4759-DU6-SB2	70-4759-DU6-SB3	70-4759-DU6-SB4	70-4759-DU6-SB5
Field Sample I				1	risk = 10					070SB-0034M-0001-SO	070SB-0035M-0001-SO	070SB-0036M-0001-SO			070SB-0039M-0001-SO	
		Max Detect	FWCUG	FWCUG		Risk	Screening	Exceed?		240-17669-16	240-17669-17	240-17669-18	240-17669-19	240-17669-20	240-17669-21	240-17669-22
Lab Sample I Sample Dat	CAS Number	Concentration	Resident	Resident	Resident	Screening	Level Source		Exceedance Justification	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012
Sample Dept		Contechtration	Receptor Adult	Receptor	RSL (c)	Level	Level Oculoe	100/110		1-4	4-7	1-7	1-7	1-7	1-7	1-7
Sample Typ			(a)	Child <sup>(b)</sup>						REG	REG	REG	REG	REG	REG	REG
TAL Metals (mg/kg)																
Explosives / Propellants (mg/kg)																
Tetryl	479-45-8	0.021 J	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	0.05 U	0.05 U	0.051 U	0.051 U	0.05 U	0.021 J	0.058 U
Total Petroleum Hydrocarbons (mg/kg)							-									
TPH (C10-C20)	68476-34-6	83	NG	NG	NA	NA		No	Below Risk Screening Criteria	-	-	-	-	-	-	83
Polychlorinated Biphenyls (PCBs) (mg/kg)		•		•		•			• •	•		•	•	•	•	•
Aroclor-1260	11096-82-5	0.018 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.025 U	0.025 U	0.025 U	0.026 U	0.025 U	0.018 J	0.029 U
Semivolatile Organic Compounds (mg/kg)									· · ·	<u>.</u>	-	•	•	•	•	•
1,2-Dichlorobenzene	95-50-1	0.2 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	0.052 J	0.13 U	0.13 U	0.14 U	0.14 U	0.2 J	0.15 U
2-Methylnaphthalene	91-57-6	0.19	238	30.6	-	30.6	RC		Below Risk Screening Criteria	0.091	0.016 U	0.016 U	0.017 U	0.017 U	0.19	0.019 U
Anthracene	120-12-7	0.022 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.022 J	0.019 U
Benzo(a)anthracene	56-55-3	0.045	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.045	0.019 U
Benzo(a)pyrene	50-32-8	0.071	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	0.059	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U
Benzo(b)fluoranthene	205-99-2	0.071	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.04	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U
Benzo(g,h,i)perylene	191-24-2	0.059	207 (d)	122 <sup>(d)</sup>	-	122 <sup>(d)</sup>	RC	No	Below Risk Screening Criteria	0.041	0.016 U	0.016 U	0.017 U	0.017 U	0.059	0.019 U
Chrysene	218-01-9	0.056	22.1	65	110	110	RRSL (f)	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.056	0.019 U
Dibenzofuran	132-64-9	0.052 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.028 J	0.016 U	0.016 U	0.017 U	0.017 U	0.052 J	0.019 U
Fluoranthene	206-44-0	0.069	276	163	-	163	RC	No	Below Risk Screening Criteria	0.04	0.016 U	0.016 U	0.018 J	0.017 U	0.069	0.019 U
Isophorone	78-59-1	0.068 J	NG	NG	570	570	RRSL	No	Below Risk Screening Criteria	0.068 J	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U	0.15 U
Naphthalene	91-20-3	0.13	368	122	-	122	RC	No	Below Risk Screening Criteria	0.066	0.016 U	0.016 U	0.017 U	0.017 U	0.13	0.019 U
Phenanthrene	85-01-8	0.12	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.12	0.019 U
Pyrene	129-00-0	0.11	207	122	-	122	RC	No	Below Risk Screening Criteria	0.046	0.016 U	0.016 U	0.017 J	0.017 U	0.11	0.019 U
Volatile Organic Compounds (mg/kg)																
Acetone	67-64-1	0.031 J	NG	NG	6,100	6,100	RRSL	-	Below Risk Screening Criteria	-	-	-	-	-	-	0.0055 U
Trichloroethene (TCE)	79-01-6	0.00032 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	0.00043 U

## Table 4-4e Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06) Cont.

	Location ID:			Screening Leve		2 al 40 <sup>-6</sup>					70-4740-SB105	70-4740-SB106			70-4740-SB107		
	Field Sample ID:					kisk = 10					070SB-105-0073-S0	070SB-106-0074-S0	070SB-107-0076-S0	070SB-107-0077-S0	070SB-107-0078-S0	070SB-107-0079-S0	070SB-107-0080-S0
	Lab Sample ID:		Max Detect	FWCUG	FWCUG		Risk	Screening	Exceed?		160-26639-2	160-26639-3	160-26639-5	160-26639-6	160-26639-7	160-26639-8	160-26639-9
	Sample Date: C	CAS Number	Concentration	Resident	Resident	Resident	Screening	Level Source		Exceedance Justification	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018
	Sample Depth:		Concentration	Receptor Adult	Receptor	RSL (c)	Level	Level Source	res/NO		6-7	6-7	1-3	3-5	5-7	7-9	9-10
	Sample Depth: Sample Type:			(a)	Child <sup>(b)</sup>						REG						
TAL Metals (mg/kg)	Sample Type.									1	REG						
Explosives / Propellants (m	na/ka)																
Tetryl	<u> </u>	479-45-8	0.021 J	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	_		0.016 UJ	0.016 UJ	0.015 UJ	0.015 UJ	0.016 UJ
Total Petroleum Hydrocarb		473-43-0	0.0210	110	NO	10	10	TRIVOL	110	Delow Risk Screening Onteria	-	-	0.010.03	0.010 05	0.013 00	0.010 00	0.010.03
TPH (C10-C20)		68476-34-6	83	NG	NG	ΝΔ	NA		No	Below Risk Screening Criteria							
Polychlorinated Biphenyls		00470-34-0	05	110	NO			NA (g)	INO	Delow Max Ocreening Ontena		-		-	-	-	
Aroclor-1260	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	11096-82-5	0.018 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria			0.012 U	0.012 U	0.011 U	0.011 U	0.011 U
Semivolatile Organic Comp		11000 02 0	0.0100	0.200	0.010		0.200	101		Deleti i tiek bereennig enterid		l	01012 0	0.012 0	0.011 0	0.011 0	0.011 0
1.2-Dichlorobenzene	,	95-50-1	0.2 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
2-Methylnaphthalene		91-57-6	0.19	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Anthracene		120-12-7	0.022 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria		-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)anthracene		56-55-3	0.045	0.221	0.65	1.1	1.1	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)pyrene		50-32-8	0.071	0.022	0.065	0.11	0.11	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(b)fluoranthene		205-99-2	0.071	0.221	0.65	1.1	1.1	RRSL (*)	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(g,h,i)perylene		191-24-2	0.059	207 (d)	100 (d)	-	122 (d)	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Chrysene		218-01-9	0.056	22.1	65	110	110	RRSL <sup>(f)</sup>	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Dibenzofuran		132-64-9	0.052 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria		-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Fluoranthene		206-44-0	0.069	276	163	-	163	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Isophorone		78-59-1	0.068 J	NG	NG	570	570	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Naphthalene		91-20-3	0.13	368	122	-	122	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Phenanthrene		85-01-8	0.12	NG	NG	1,800 <sup>(e)</sup>	1,800 <sup>(e)</sup>	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Pyrene		129-00-0	0.11	207	122	-	122	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Volatile Organic Compound	ds (mg/kg)			•	•		•	•	•			•					
Acetone		67-64-1	0.031 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	0.022 B	-	0.031 J	0.011 B	-
Trichloroethene (TCE)		79-01-6	0.00032 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	0.043 U	0.00032 J	0.00097 U	0.00085 U	0.00087 U	0.00088 U	0.0011 U

Notes:

a FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>.

c May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10<sup>-6</sup>. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d Pyrene was used as a surrogate.

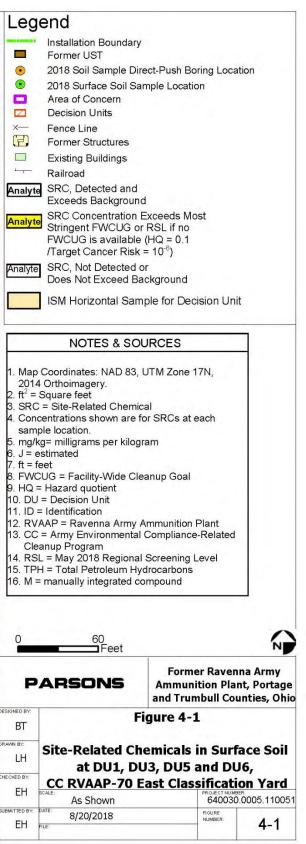
e. Anthracene was used as a surrogate.

f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

- See main text for discussion about TPH.
   Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.
   ELCR = Excess Lifetime Cancer Risk FWCUG = Facility Wide Cleanup Goal HQ = Hazard Quotient ID = identification J = Estimated value mg/kg = milligrams per kilogram NA = not available NG = No FWCUG. RSL used if available. RA = Resident Receptor Adult RC = Resident Receptor Child RRSL = Residential Regional Screening Level TPH = Total Petroleum Hydrocarbons

eastion ID	70 4744 014 00	X I I I			Lanction ID	70 4760 DUE 00
ocation ID	70-4744-DU1-SS				Location ID	70-4760-DU5-SS
ield Sample ID	070SS-0001M-0001-SO				Field Sample ID	070SS-0004M-0001-SO
ample Date	11/5/2012	A REALIZED DES			Sample Date	11/5/2012
nple Depth (ft)	0-1	file 1 states in the			Sample Depth (ft)	0-1
nple Type	REG	A REAL PROPERTY AND A REAL PROPERTY AND A			Sample Type	REG
Total Petroleum Hydrocarbon		A CANADA AND AND A CANADA AND AND AND AND AND AND AND AND AN	A ISAA A A A A A A A A A A A A A A A A A		Pesticides (mg/kg)	
(C10-C20)	57 J	A STATE OF A DESCRIPTION			2,4,5-T (Trichlorophenoxyacetic Acid)	0.01 J
I (C20-C34)	540 M				Semivolatile Organic Compound	
Semivolatile Organic Compour	ids (mg/kg)	- 228 2 Company 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			2-Methylnaphthalene	0.42
nzo(a)anthracene	0.097				Acenaphthene	0.14
co(a)pyrene	0.13				Acenaphthylene	0.065
		COLUMN AND A COLUMN AND A				
o(b)fluoranthene	0.13				Anthracene	0.42
o(g,h,i)perylene	0.31				Benzo(a)anthracene	0.75
o(k)fluoranthene	0.04	DOLLAR THE OWNER WITH THE			Benzo(a)pyrene	0.46
sene	0.15		CC RVAAP-70 DU05		Benzo(b)fluoranthene	0.95
ranthene	0.13		CC RVAAP-70 DU05 Herbicide Storage Shed		Benzo(g,h,i)perylene	0.31
no(1,2,3-cd)pyrene	0.054				Benzo(k)fluoranthene	0.31
nanthrene	0.15				Chrysene	1.1
ne	0.21				Dibenzofuran	0.17 J
The Alexander of the second	ALL AND				Fluoranthene	1.8
A State of the sta	A TOTAL STATE OF STATE	A REAL PROPERTY AND A REAL			Fluorene	0.16
	THE REPORT OF TH	and the second				0.18
		Contraction of the second second			Indeno(1,2,3-cd)pyrene	
CHEROSAL FOLLOWING	TO A TIME SERVER TAKEN	A CONTRACTOR OF A CONTRACT			Naphthalene	0.27
AND	THE PARAMETERS AND A DESCRIPTION	A REAL PROPERTY AND A REAL PROPERTY.			Phenanthrene	1.2
		And the second s			Pyrene	1.3
A DECK OF A DECK OF A DECK		AND DESCRIPTION OF A DE				
	US A CARDINAL AND A CARD		CCIRVAA	P-70 DU03 Building 47-40		
2 A REAL PROPERTY AND	CINE MERSING AND		Rou	ind House Exterior		
	and the second second second second second	A CONTRACTOR OF	VIIIITIANS			
LANS AND A REAL PROPERTY AND A	A REAL PROPERTY AND A REAL	State of the second				
	The local sector of the sector	AND A DESCRIPTION OF A				
Contraction of the States	CONTRACTOR OF THE OWNER WAT	TANK DECEMBER OF THE REAL PROPERTY OF				
	THE REPORT OF A DEPARTMENT OF A	Contraction of the second s				
	THE OPPOST SUPPORT					
	C. COLES A BARRIERS P.	Contraction of the second				
ALS - 2000 ALC ADDRESS 121	And the second	THE SECONDER				
	THE REPORT OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIP	Participation of the second second				
	- ALITA		Repair Pit			
	CO EVANDER EURO					
	CC RVAAP-70 DU01				± ++   = +  +  ++ ++  +  + ++	
CALL AND	Former Fuel Oil Spill Area	AT A STATE OF A STATE				
	11/1/1/1000	00 500 00 50				
	A STATISTICS STATIST	CC RVAAP-70			Location ID	70-4740-DU3-SS
ALL ALL SERVICE AND		<b>East Classification</b> Y	and		Field Sample ID	070SS-0003M-0001-SO
JANES CARDINE COMPANY		Lasterassification			Sample Date	11/5/2012
THE REAL PROPERTY OF THE REAL		14-24			Sample Depth (ft)	0-1
A DALLASSAN AND AND A DALLASSAN					Sample Type	REG
		70-4740-SS108			Metals (mg/kg)	
					Barium	93
						0.91
					Beryllium	2723-2075
A COMPANY OF A COM	AND A REAL PROPERTY.	70/7/0000/07			Cadmium	0.26
	the second s	70-4740-SB107			Chromium	26
		A DECEMBER OF		H HN B	Copper	21
ation ID	70-4759-DU6-SS		RV-22 ///////////////////////////////////			
d Sample ID	070SS-0005M-0001-SO		CIRVAAP-70 DU06		Lead	45
ple Date	11/5/2012	Out	door Wash Rack Area		Nickel	29
		SEC. CONTRACTOR	RV411		Silver	0.035 J
nple Depth (ft)	0-1	The second s	11/1/1/A		Thallium	0.17 J
ple Type	REG	nth and a second se			Zinc	76
Explosives / Propellants (	ng/kg)	Construction of the second				1 10
Dinitrotoluene	0.05 J	And the second se	التبغث الأجاب بيتعلما		Pesticides (mg/kg)	
Pesticides (mg/kg)		NAME OF TAXABLE PARTY.	COLORES TO THE WAY IN		Aroclor-1254	0.047 J
		TATE STREET, ST			Semivolatile Organic Compound	s (mg/kg)
clor-1260	0.07 J	The second second second second			2-Methylnaphthalene	0.54
Semivolatile Organic Compour	ids (mg/kg)	COLUMN TO A COLUMN TO A	And the second s			0.54
Dichlorobenzene	0.081 J		And the second sec		Acenaphthene	
		The second se			Acenaphthylene	0.047 J
ethylnaphthalene	0.69				Anthracene	2.5
	0.066	0	A LOW ALL COMPANY OF A LOW ALL COMPANY		Benzo(a)anthracene	3.2
	0.08				Benzo(a)pyrene	1.9
			A STATE A		Benzo(b)fluoranthene	3.1
nracene		0				
hra ce ne nz o (a) anthra ce ne	0.21				Benzo(g,h,i)perylene	1.1
nracene zo(a)anthracene zo(a)pyrene	0.21		HTH		Benzo(k)fluoranthene	0.98
hracene izo(a)anthracene izo(a)pyrene izo(b)fluoranthene	0.21 0.21 0.36	die la			Carbazole	0.34 J
hracene izo(a)anthracene izo(a)pyrene izo(b)fluoranthene	0.21 0.21 0.36 0.38	vic	TT Les		Carbazore	
hracene nzo(a)anthracene nzo(a)pyrene nzo(b)fluoranthene nzo(g,h,i)perylene	0.21 0.21 0.36 0.38	arvio	日开			
hracene nzo(a)anthracene nzo(a)pyrene nzo(b)fluoranthene nzo(g), fi)perylene nzo(k)fluoranthene	0.21 0.21 0.36 0.38 0.19	Servic			Chrysene	3.3
hracene izo(a)anthracene izo(a)pyrene izo(g)h(ivoranthene izo(g,h,i)perylene izo(k)fluoranthene ysene	0.21 0.21 0.36 0.38 0.19 0.32	Service Road			Chrysene Dibenzofuran	3.3 0.42 J
hracene izo(a)anthracene izo(a)pyrene izo(g)fluoranthene izo(g,h,i)perylene izo(k)fluoranthene ysene enzofuran	0.21 0.21 0.36 0.38 0.19 0.32 0.32	h Servic			Chrysene Dibenzofuran Fluoranthene	3.3 0.42 J 8.4
hracene zo (a)anthracene zo (a)pyrene zo (b)fluoranthene zo (b)fluoranthene zo (k)fluoranthene ysene enzofuran oranthene	0.21 0.21 0.36 0.38 0.19 0.32	th Servic			Chrysene Dibenzofuran Fluoranthene Fluorene	3.3 0.42 J
hracene nzo(a)anthracene nzo(a)pyrene nzo(b)fluoranthene nzo(k)fluoranthene nzo(k)fluoranthene ysene enzofuran oranthene	0.21 0.21 0.36 0.38 0.19 0.32 0.41	uth Servic			Chrysene Dibenzofuran Fluoranthene Fluorene	3.3 0.42 J 8.4 0.71
hracene izo(a)anthracene izo(a)pyrene izo(b)fluoranthene izo(c),filuoranthene izo(k)fluoranthene ysene enzofuran oranthene eno(1,2,3-cd)pyrene	0.21 0.21 0.36 0.38 0.19 0.32 0.16 J 0.41 0.17	outh Servic			Chrysene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene	3.3 0.42 J 8.4 0.71 1
hracene nzo(a)anthracene nzo(a)pyrene nzo(b)fluoranthene nzo(g,h,i)perylene nzo(k)fluoranthene ysene enzofuran oranthene eno(1,2,3-cd)pyrene ohthalene	0.21 0.21 0.36 0.38 0.19 0.32 0.16 J 0.49	South Servic			Chrysene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene	3.3 0.42 J 8.4 0.71 1 0.48
thracene nzo(a)anthracene nzo(a)pyrene nzo(b)fluoranthene nzo(g,h,i)perylene nzo(k)fluoranthene rysene enzofuran oranthene eno(1,2,3-cd)pyrene phthalene enanthrene	0.21 0.21 0.36 0.38 0.19 0.32 0.16 J 0.41 0.41 0.49 0.32	South Servic			Chrysene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene	3.3 0.42 J 8.4 0.71 1 0.48 5.9
Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzofuran	0.21 0.21 0.36 0.38 0.19 0.32 0.32	th Servic			Chrysene Dibenzofuran Fluoranthene	3.3 0.42 J 8.4
racene ro(a)anthracene ro(a)pyrene ro(b)fluoranthene ro(b,i)perylene ro(k)fluoranthene rsene nzofuran ranthene no(1,2,3-cd)pyrene thalene	0.21 0.21 0.36 0.38 0.19 0.32 0.16 J 0.49	South Servic			Chrysene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene	3.3 0.42 J 8.4 0.71 1 0.48
thracene nzo(a)anthracene nzo(a)pyrene nzo(b)fluoranthene nzo(g,h,i)perylene nzo(k)fluoranthene rysene enzofuran	0.21 0.21 0.36 0.38 0.19 0.32 0.16 J 0.49	South Servic			Chrysene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene	3.3 0.42 J 8.4 0.71 1 0.48

Figure 4-1 Site-Related Chemicals in Surface Soil at DU1, DU3, DU5 and DU6



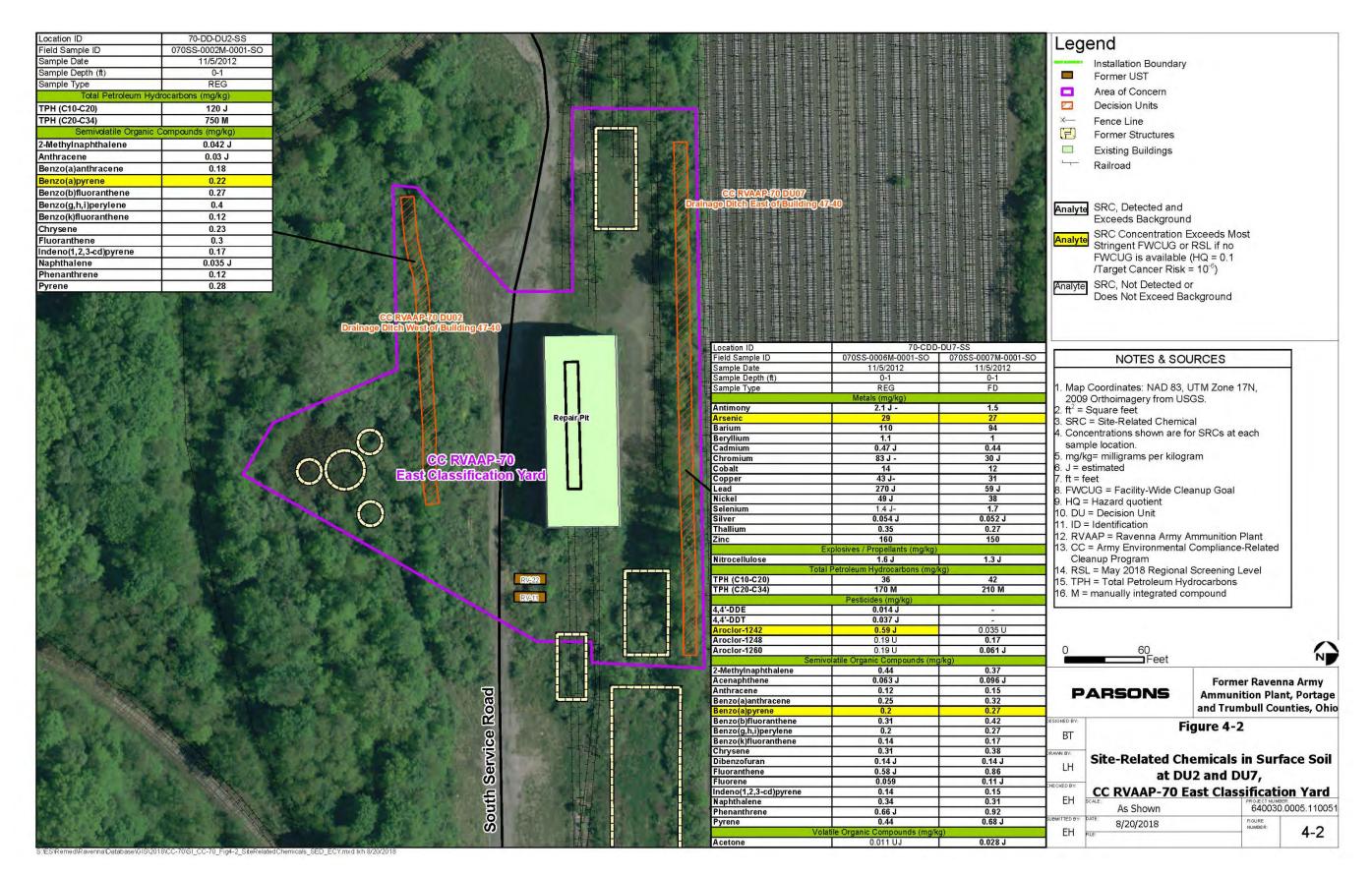
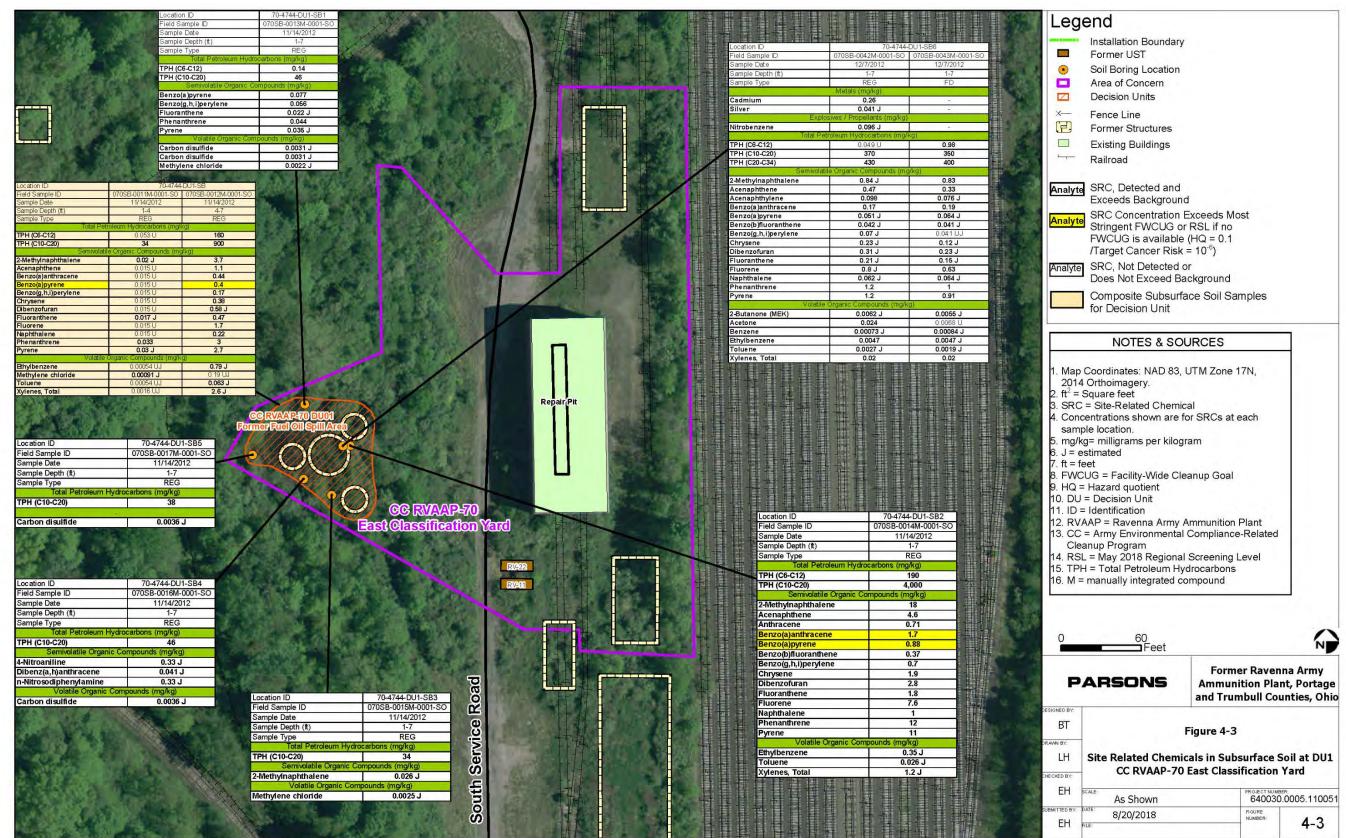
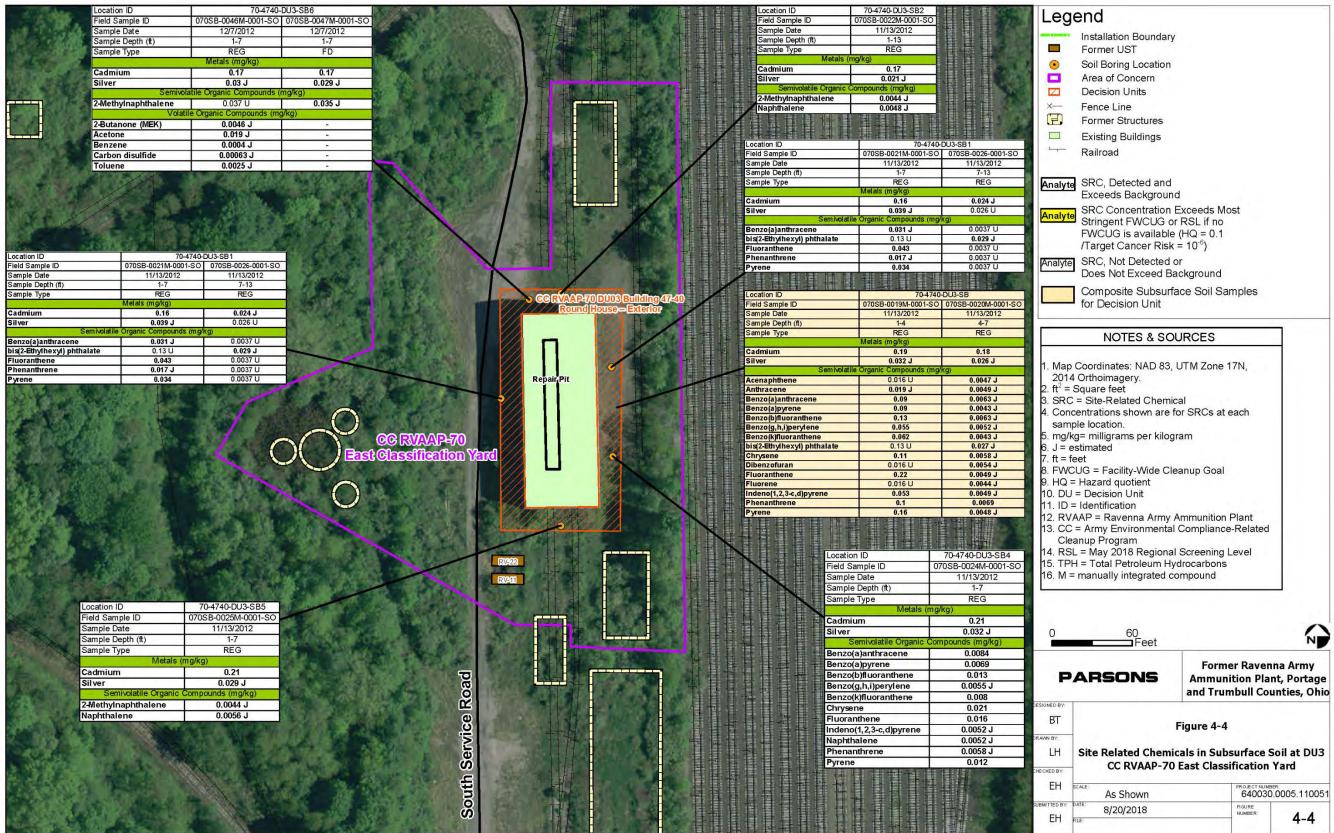


Figure 4-2 Site-Related Chemicals in Surface Soil at DU2 and DU7



S:\ES\Remed\Ravenna\Database\GIS\2018\CC-70\SI\_CC-70\_Fig4-3\_SiteRelatedChemicals\_SB\_DU1.mxd Ixh 8/20/2018

## Figure 4-3 Site-Related Chemicals in Subsurface Soil at DU1



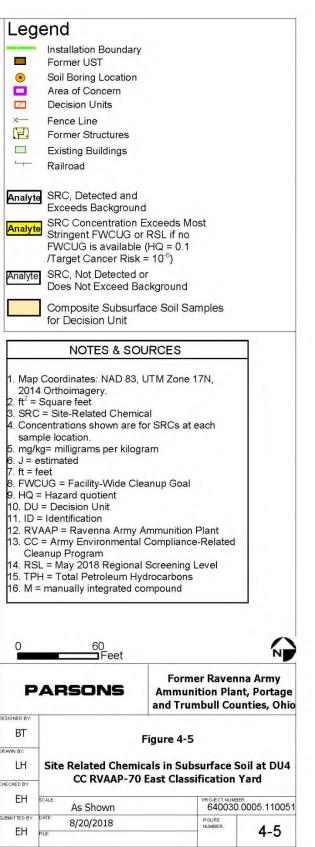
S:\ES\Remed\Ravenna\Database\GIS\2018\CC-70\SI\_CC-70\_Fig4-4\_SiteRelatedChemicals\_SB\_DU3.mxd lxh 8/20/2018

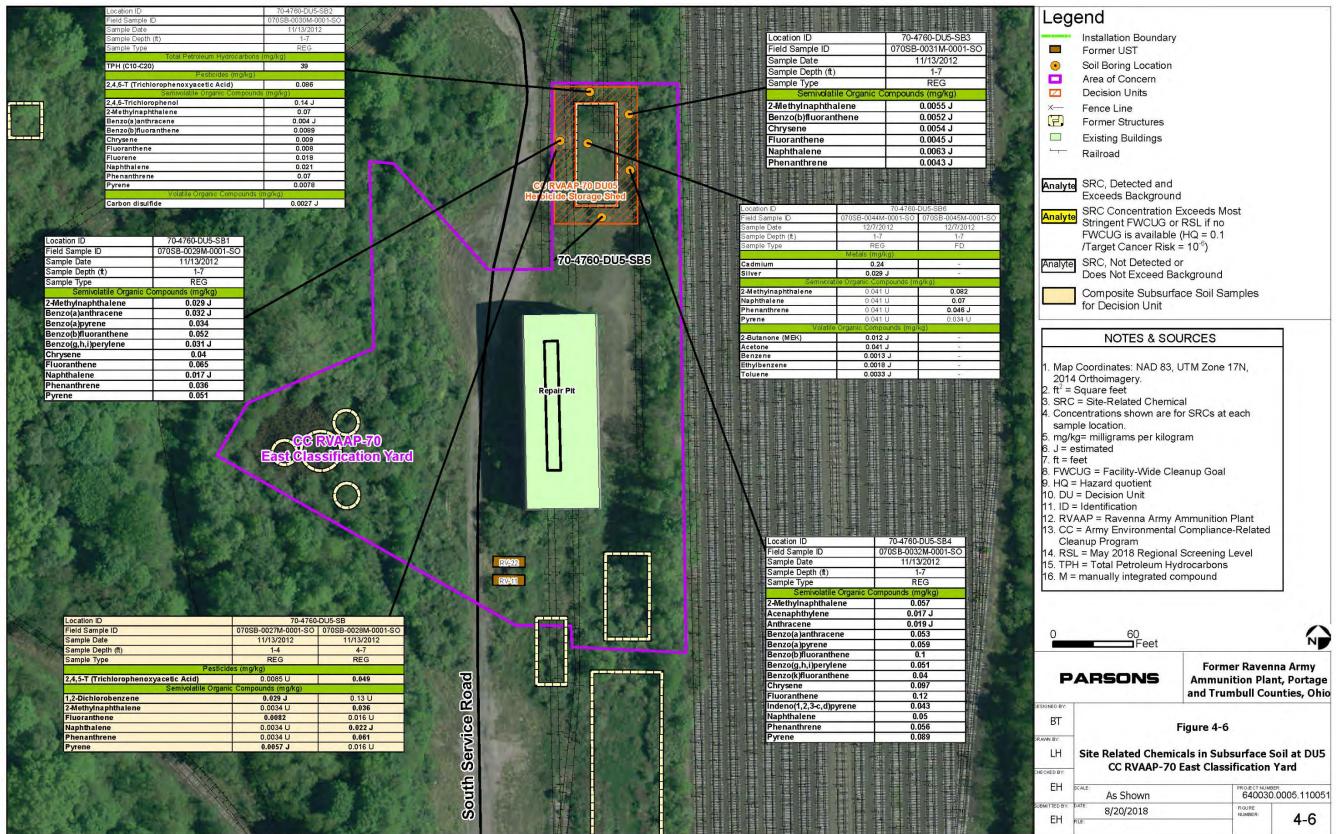
### Figure 4-4 Site-Related Chemicals in Subsurface Soil at DU3

	Location ID	70-4740-D	ILL SB
	Field Sample ID	070SS-0048M-0001-SO	
Location ID         70-4740-SB103         11         14           Field Sample ID         070SB-103-0069-SO         070SB-103-0070-SO         11         14	Sample Date	12/7/2012	12/7/2012
Field Sample ID         070SB-103-0069-SO         070SB-103-0070-SO           Sample Date         2/6/2018         2/6/2018	Sample Depth (ft)	0-1	0-1
Sample Depth (ft) 2-4 4-7	Sample Type	REG	REG
Sample Type REG REG		Metals (mg/kg)	10 A.
Volatile Organic Compounds (mg/kg) Acetone - 0.023 J	Cadmium	0.17	0.099 J
Trichloroethene (TCE) 0.00041 J 0.00075 U	Cobalt	50	7.3
	Selenium	0.35 J	0.24 J
Location ID 70-4740-DU4-SB2	Silver	0.03 J	0.015 J
Field Sample ID 070SB-0051M-0001-SO	Semivol	atile Organic Compounds (mg/	kg)
Sample Date 12/7/2012	Acenaphthene	0.012	0.0033 U
Sample Depth (ft) 0-1.25	Benzyl butyl phthalate	0.016 J	0.027 U
Sample Type REG	Fluoranthene	0.0078 J	0.0033 UJ
Metals (mg/kg)	Fluorene	0.019	0.0033 U
Cadmium 0.12 Cobalt 32	Naphthalene	0.0034 U	0.0039 J
Selenium 0.26 J	Phenanthrene	0.039	0.0033 U
Silver 0.017 J	Pyrene	0.0089	0.0033 U
	Location ID	70-4740-DU4-SE	31
Location ID 70-4740-DU4-SB3	Field Sample ID	070SB-0050M-0001	1-SO
Field Sample ID 070SB-0052M-0001-SO	Sample Date	12/7/2012	
Sample Date 12/7/2012	Sample Depth (ft) Sample Type	0-1 REG	
Sample Depth (ft) 0-4 Sample Type REG		als (mg/kg)	
Metals (mg/kg)	Cadmium	0.13	
Cadmium 0.13	Cobalt	28	
	Selenium	0.33 J	
Selenium 0.27 J	Silver Semivolatile Ora:	0.018 J anic Compounds (mg/kg)	
Silver 0.02 J	2-Methylnaphthalene	0.0053 J	
		0.0039 J	
Location ID 70-4740-DU4-SB4	Fluoranthene	0.008 J	
Field Sample ID 070SB-0053M-0001-SO	Fluorene	0.0034 J	
Sample Date 12/7/2012	Naphthalene Phenanthrene	0.0057 J 0.014	
Sample Depth (ft) 0-3.75	Pyrene	0.0043 J	
Sample Type REG C C C C C C C C C C C C C C C C C C C		11111 11 11 11 11	
Metals (mg/kg)		书目目目目	
	Location ID Field Sample ID 070SB-10	70-4740-SB1 1-0062-SO   070SB-101-006	
Cobalt 8.7		2018 2/2/2018	2/2/2018
Selenium 0.24 J		4 4-6	6-7
Silver 0.017 J		EG REG	REG
		Metals (mg/kg)	
		1.7 11 .3 1.8	14
		e Organic Compounds (mg/k	
		15 J 0.01 U	0.014 J
Location ID 70-4740-SB104	Carbon disulfide 0.00	0.001 U	0.00095 U
Field Sample ID 070SB-104-0072-S0	Chlorobenzene 0.0	01 J 0.001 U	0.003 J
Sample Date 2/5/2018			
Sample Depth (ft) 2-4	114 日 住村 住村		
Sample Type REG			
Volatile Organic Compounds (mg/kg)	N L L L L L L		
Trichloroethene (TCE) 0.00054 J			
Location ID 70-4740-DU4-SB5		70-4740-SB102	DESI
Field Sample ID 070SB-0054M-0001-SO	070SB-102-0065-SO 070SB-102- 2/2/2018 2/2/20		0 070SB-102-0067-SO 2/2/2018
Sample Date 12/7/2012 Sample Date Sample Date	2-4 4-6	4-6	6-8
Sample Depth (ft) 0-2.8	REG REG	G FD	REG
Sample Type REG	Metals (n		0.40.11
Metals (mg/kg)	0.089 J 0.14 8.9 14		0.13 U 13
Cadmium 0.16	1.4 1.4		1.3 CHEC
Cobalt 12			
Location ID 70-4740-DU4-SB5 Field Sample ID 070SB-0054M-0001-SO Sample Date 12/7/2012 Sample Depth (ft) 0-2.8 Sample Type REG Metals (mg/kg) Cadmium 0.16 Cobalt 12 Selenium 0.43 J Silver 0.027 J			
Silver 0.027 J			
		THE REAL PROPERTY OF THE PARTY	

S'ES'Remed'Ravenna/Database/GIS/2018/CC-70/SI\_CC-70\_Fig4-5\_SiteRelatedChemicals\_SB\_DU4.mxd lxh 8/20/2018

## Figure 4-5 Site-Related Chemicals in Subsurface Soil at DU4





S.\ES\Remed\Ravenna\Database\GIS\2018\CC-70\SI\_CC-70\_Fig4-6\_SiteRelatedChemicals\_SB\_DU5.mxd lxh 8/20/2018

### Figure 4-6 Site-Related Chemicals in Subsurface Soil at DU5

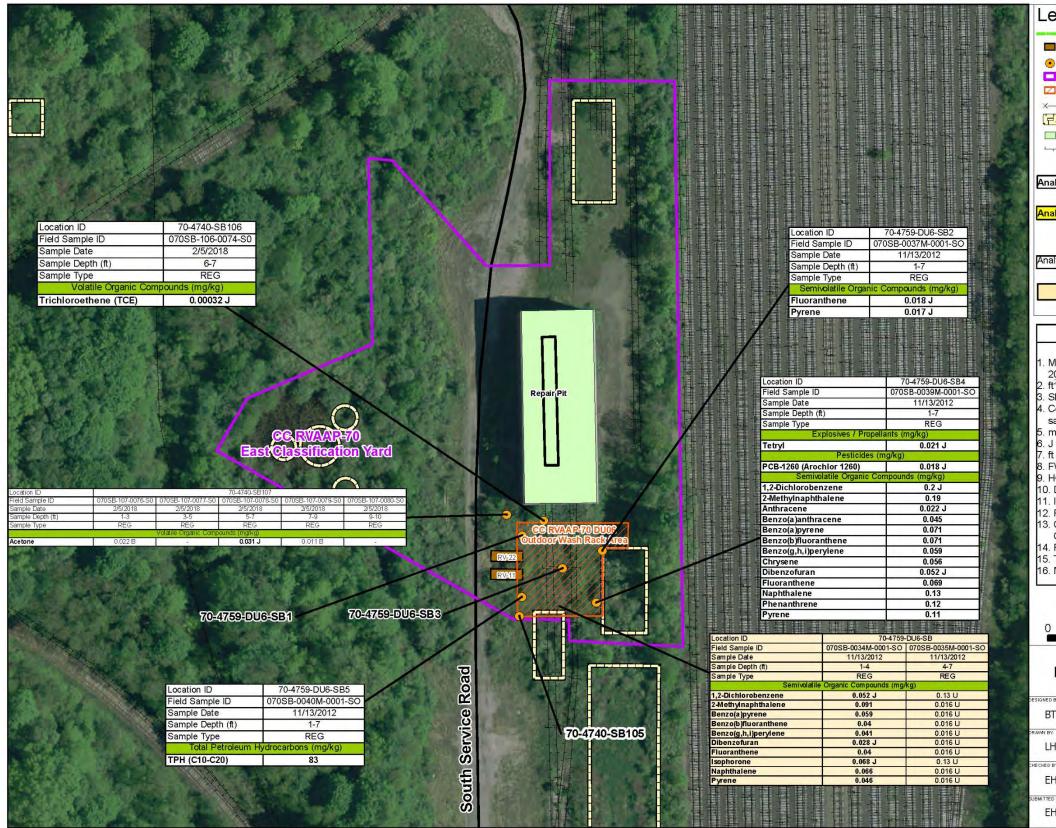
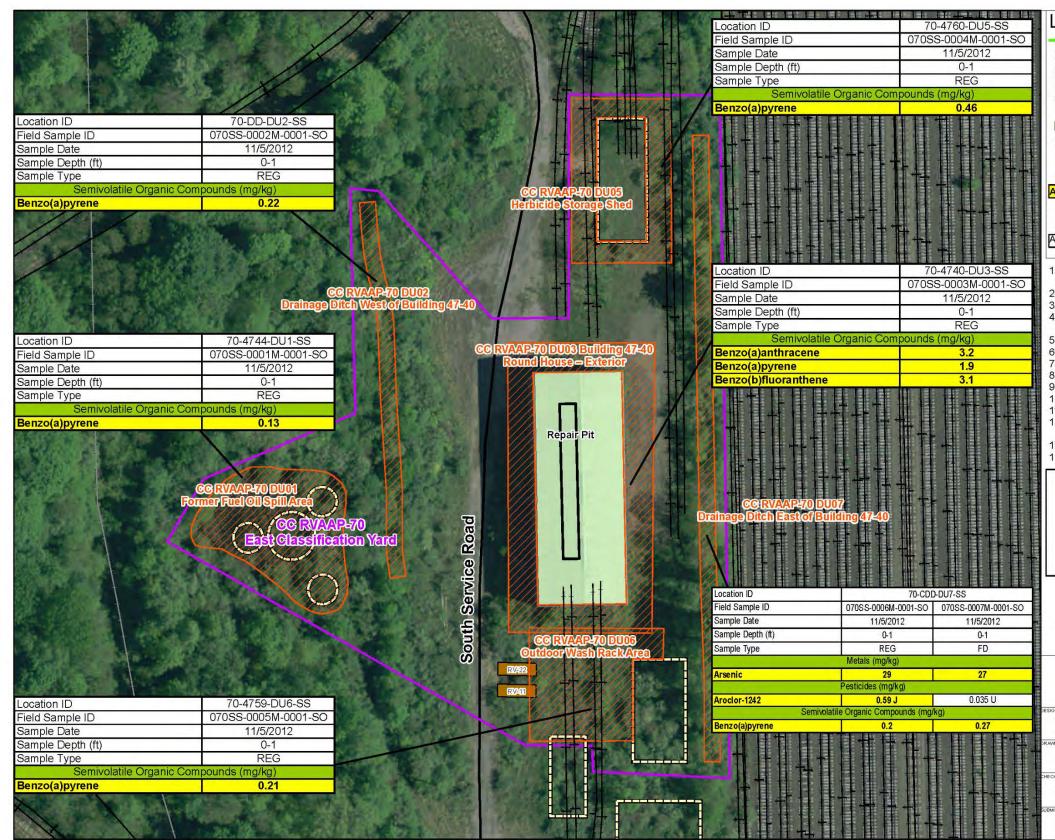


Figure 4-7 Site-Related Chemicals in Subsurface Soil at DU6

ege	end			
-	Installation Boundary			
	Former UST			
	Soil Boring Location Area of Concern			
	Decision Units			
-	Fence Line			
탄	Former Structures			
	Existing Buildings			
	Railroad			
nalyte	SRC, Detected and			
	Exceeds Background		act	
nalyte	SRC Concentration E Stringent FWCUG or		JSL	
	FWCUG is available /Target Cancer Risk =			
aluto	SRC, Not Detected o			
nalyte	Does Not Exceed Ba			
	Composite Subsurfa	ce Soil Sa	mples	
	for Decision Unit			
	NOTES & SOL	JRCES		
6	Coordinates: NAD 83, l			
SRC Concessions samp mg/kg J = es ft = fe FWC HQ = . DU = . DU = . DU = . DU = . DU = . Clea . RVA . CC = . Clea . RSL 5. TPH	Square feet = Site-Related Chemic: entrations shown are for le location. g= milligrams per kilogr. stimated uG = Facility-Wide Cle: Hazard quotient = Decision Unit Identification AP = Ravenna Army A = Army Environmental mup Program = May 2018 Regional I = Total Petroleum Hyde manually integrated co	or SRCs at am anup Goal compliance Screening drocarbons	Plant e-Related	
0	60 Feet			
		Form	or Dave	nna Army
P	ARSONS	Ammun	ition Pla	int, Portage unties, Ohio
DBY.				
BY	F	igure 4-7		
H	Site Related Chemic	als in Sub	surface	Soil at DU6
DBY.	CC RVAAP-70			
EH 🗟	CALE: As Shown		PROJECT NUM	D.0005.110051
	AS Shown ATE: 8/20/2018		FIGURE NUMBER:	
EH n	67 2 67 2 6 7 6 7 6		NOMDER:	4-7

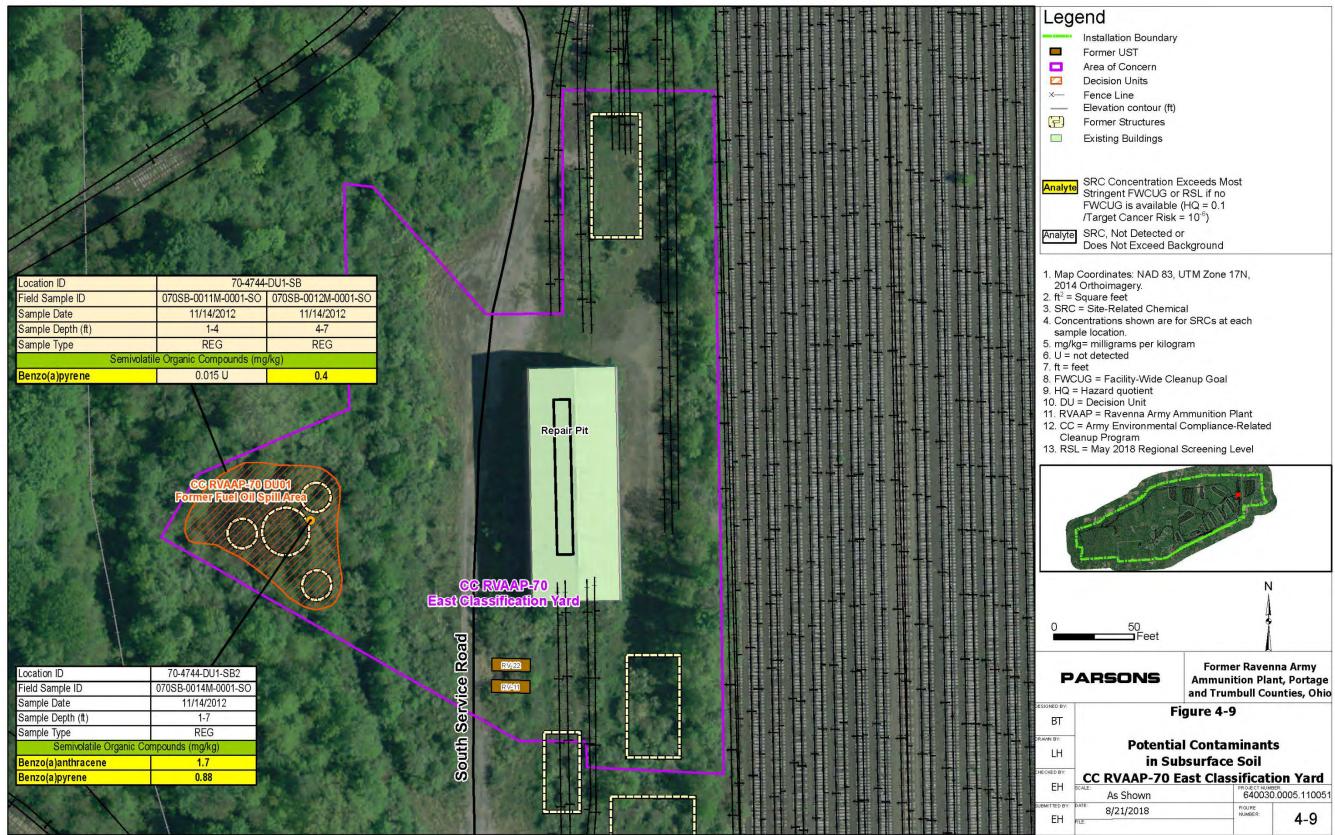


## Figure 4-8 Potential Contaminants in Surface Soil

Area of Concern Decision Units Fence Line Elevation contour (ft) Former Structures Existing Buildings SRC Concentration Exceeds Most Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 //Target Cancer Risk = 10 <sup>-6</sup> ) natyle SRC, Not Detected or Does Not Exceed Background May E SRC, Not Detected or Does Not Exceed Background May E SRC, Not Detected or Does Not Exceed Background May E SRC, Not Detected or Does Not Exceed Background May E SRC, Not Detected or Does Not Exceed Background May E SRC, Not Detected or Does Not Exceed Background May E SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. R* SRC = Stie-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg = milligrams per kilogram J = estimated It = feet FWCUG = Facility-Wide Cleanup Goal HQ = Bacentarid Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected <b>PARSONS</b> Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Potential Contaminants in Surface St C RVAAP-70 Fast Classification Yar					
Installation Boundary Former UST Area of Concern Decision Units Fence Line Elevation contour (ft) Former Structures Existing Buildings SRC Concentration Exceeds Most Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 //Target Cancer Risk = 10 <sup>-6</sup> ) RC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. RC = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg = milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient COULD = Decision Unit SRC = Site Related Chemical Concentrations shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample location. SRC = Site Related Chemical Concentration Shown are for SRCs at each sample content Compliance-Related Cleanup Program SRC = Site Related SRC = Site	ege	end			
Area of Concern  Con					
Decision Units Fence Line Elevation contour (ft) Former Structures Existing Buildings SRC Concentration Exceeds Most Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 Target Cancer Risk = 10 <sup>-6</sup> ) Target Cancer Risk = 10 <sup>-6</sup> ) Target Cancer Risk = 10 <sup>-6</sup> ) Rayer SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. tf <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg milligrams per kilogram J = estimated tf = feet FWCUG = Facility-Wide Cleanup Goal HQ = Decision Unit RVAAP = Ravenna Army Ammunition Plant C C = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level U = not detected Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Potential Contaminants in Surface Set C RVAAP-70 East Classification Yar	_	Former UST			
Fence Line Elevation contour (ft) Former Structures Existing Buildings SRC Concentration Exceeds Most Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 , Target Cancer Risk = 10 <sup>-6</sup> ) Rayre SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/Rg= milligrams per kilogram J = estimated H = feet FWCUG = Facility-Wide Cleanup Goal H = feet FWCUG = Facility-Wide Cleanup Goal H = Hazard quotient NULL = Nay 2018 Regional Screening Level U = not detected Marcine SRS = May 2018 Regional Screening Level U = not detected Feet Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Marcine H H H H H H H H H H H H H					
Former Structures         Existing Buildings         SRC Concentration Exceeds Most Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 /Target Cancer Risk = 10 <sup>-6</sup> )         Image       SRC, Not Detected or Does Not Exceed Background         Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery.         #f <sup>2</sup> = Square feet         SRC = Site-Related Chemical         Concentrations shown are for SRCs at each sample location.         mg/kg = milligrams per kilogram         J = estimated         ft = fet         FWCUG = Facility-Wide Cleanup Goal         HQ = Hazard quotient         0. DU = Decision Unit         1. WAAP = Ravenna Army Ammunition Plant         2. Cc = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         Modelee         0       50         Feet         Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O         Figure 4-8         Potential Contaminants in Surface Sc Ca RVAAP-70 East Classification Yar					
Existing Buildings   Rative SRC Concentration Exceeds Most Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 / Target Cancer Risk = 10°)   Rative SRC, Not Detected or Does Not Exceed Background   Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. Ff = Square feet   SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location.   Imple Decision Contents Stringent FWCUG = Site-Related Chemical   Concentrations shown are for SRCs at each sample location. Imple Decision Contents   Imple Decision Contents Stringent FWCUG = Facility-Wide Cleanup Goal   Imple Decision Unit HYAAP = Ravenna Army Ammunition Plant   Imple Decision Unit Imple Decision Unit   Imple Decision Unit Imple Decision Unit <td>E</td> <td></td> <td></td> <th></th> <td></td>	E				
Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 /Target Cancer Risk = 10 <sup>-6</sup> ) SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg = milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DU = Decision Unit 1. RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected		Existing Buildings			
Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 /Target Cancer Risk = 10 <sup>-6</sup> ) SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg = milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DU = Decision Unit 1. RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected					
Stringent FWCUG or RSL if no FWCUG is available (HQ = 0.1 /Target Cancer Risk = 10 <sup>-6</sup> ) SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg = milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DU = Decision Unit 1. RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected					
FWCUG is available (HQ = 0.1 /Target Cancer Risk = 10 <sup>-6</sup> ) marget SRC, Not Detected or Does Not Exceed Background Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg = milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DU = Decision Unit 1. RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected Model to the feet FORESONS Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yat	nalyte			st	
/Target Cancer Risk = 10 <sup>-6</sup> )         Inalyte       SRC, Not Detected or Does Not Exceed Background         Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery.         ft <sup>2</sup> = Square feet         SRC = Site-Related Chemical         Concentrations shown are for SRCs at each sample location.         mg/kg= milligrams per kilogram         J = estimated         ft = feet         FWCUG = Facility-Wide Cleanup Goal         HQ = Hazard quotient         0. DU = Decision Unit         1. RVAAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         May Commental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         May Commental Compliance-Related Cleanup Program         50       Feet         May Commental Compliance Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         May Commental Compliance Related Cleanup Program         The figure 4-8         PARSONS         Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O         Figure 4-8         Mathematic Conta					
Does Not Exceed Background          Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery.         ft <sup>2</sup> = Square feet         SRC = Site-Related Chemical         Concentrations shown are for SRCs at each sample location.         mg/kg= milligrams per kilogram         J = estimated         ft = feet         FWCUG = Facility-Wide Cleanup Goal         HQ = Hazard quotient         DU = Decision Unit         RVAAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         Image: State Complexity of the environmental Compliance Related Cleanup Program         S. RSL = May 2018 Regional Screening Level         4. U = not detected         Image: State Complexity of the environmental Compliance Related Cleanup Program         BT       Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O         Image: State Complexity of the environmental Complexity of the enviter the enviter the environ		/Target Cancer Risk =	· 10 <sup>-6</sup> )		
Map Coordinates: NAD 83, UTM Zone 17N, 2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg= milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DU = Decision Unit RVAAP = Ravenna Army Ammunition Plant CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected	nalyte				
2014 Orthoimagery. ft <sup>2</sup> = Square feet SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg= milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DJ = Decision Unit 1. RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected		Does Not Exceed Bac	kground		
ft <sup>2</sup> = Square feet         SRC = Site-Related Chemical         Concentrations shown are for SRCs at each sample location.         mg/kg= milligrams per kilogram         J = estimated         ft = feet         FWCUG = Facility-Wide Cleanup Goal         HQ = Hazard quotient         0. DU = Decision Unit         1. RVAAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         Image: State St	Map C	Coordinates: NAD 83, U	ITM Zone 17	7N,	
SRC = Site-Related Chemical Concentrations shown are for SRCs at each sample location. mg/kg= milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient D U = Decision Unit RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected	$2014$ ( $ft^2 = S$	guare feet			
sample location. mg/kg= milligrams per kilogram J = estimated ft = feet FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient 0. DU = Decision Unit 1. RVAAP = Ravenna Army Ammunition Plant 2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected N 0	SRC =	Site-Related Chemica			
mg/kg = milligrams per kilogram         J = estimated         .ft = feet         FWCUG = Facility-Wide Cleanup Goal         .HQ = Hazard quotient         0. DJ = Decision Unit         .RVAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         Image: Strength of the strengt of the strength of the strength of the strength of the strength o			r SRCs at ea	ach	
J = estimated         .ft = feet         FWCUG = Facility-Wide Cleanup Goal         .HQ = Hazard quotient         0. DJ = Decision Unit         .RVAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         Image: Strength of the streng strengt of the strength of the streng strengt of the			am		
FWCUG = Facility-Wide Cleanup Goal HQ = Hazard quotient D. DJ = Decision Unit RVAAP = Ravenna Army Ammunition Plant CC = Army Environmental Compliance-Related Cleanup Program RSL = May 2018 Regional Screening Level U = not detected U = not detected 0 50 Feet Feet Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar	J = es	timated			
HQ = Hazard quotient         0. DU = Decision Unit         1. RVAAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         N         0       50         Feet       N         PARSONS         Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O         Figure 4-8         Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar	ft = fe	et IG = Facility-Wide Clea	nup Goal		
1. RVAAP = Ravenna Army Ammunition Plant         2. CC = Army Environmental Compliance-Related Cleanup Program         3. RSL = May 2018 Regional Screening Level         4. U = not detected         Image: Streen of the	HQ =	Hazard quotient	andp Obdi		
2. CC = Army Environmental Compliance-Related Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected					
Cleanup Program 3. RSL = May 2018 Regional Screening Level 4. U = not detected					
4. U = not detected	Clea	nup Program			
			Screening Le	evel	
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar      EH     EALE     POCECTNUMBER	4. 0 = 1	iot detected	and the second second		
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar      EH     EALE     POCECTNUMBER					
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar  EH SCALE      PROJECT NUMBER					
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar  EH SCALE      PROJECT NUMBER			D D A		
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar  EH SCALE      PROJECT NUMBER			A		
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar  EH SCALE      PROJECT NUMBER			Same		
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar  EH SCALE      PROJECT NUMBER			A CONTRACTOR OF CONTRACTOR OFO		
O 50 Feet      Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O      Figure 4-8      Figure 4-8      Potential Contaminants in Surface Se     CC RVAAP-70 East Classification Yar  EH SCALE      PROJECT NUMBER				N	
Feet Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar EH				N	
Feet Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O Figure 4-8 Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar EH				4	
PARSONS       Former Ravenna Army Ammunition Plant, Porta and Trumbull Counties, O         VED BT       Figure 4-8         IBT       Figure 4-8         VED BT       Potential Contaminants in Surface Set CC RVAAP-70 East Classification Yar         EH       ECALE	0			1	
PARSONS       Ammunition Plant, Porta and Trumbull Counties, O         MED BT       Figure 4-8         BT       Figure 4-8         MBT       Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar         EH       ECALE		Feet		A	
PARSONS       Ammunition Plant, Porta and Trumbull Counties, O         MED BT       Figure 4-8         BT       Figure 4-8         MBT       Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar         EH       ECALE				A	han kanne
and Trumbull Counties, O BT Figure 4-8 Potential Contaminants in Surface Se CC RVAAP-70 East Classification Yar EH SCALE PROJECT NUMBER	P/				Construction of the second
BT     Figure 4-8       Imm.     Potential Contaminants in Surface Set       CC RVAAP-70 East Classification Yar       EH     SCALE	-				
HPV: LH ED BV: ED BV: EH SCALE: PROJECT NUMBER	NED BY:				
LH ED BY: ED BY: EH SCALE: PROJECT NUMBER: PROJECT NUMBER:	BT	Fi	gure 4-8		
LH ED BY: ED BY: EH SCALE: PROJECT NUMBER: PROJECT NUMBER:					
EC RVAAP-70 East Classification Yar		Potential Contar	ninants i	in Sur	face Soil
EH SCALE: PROJECT NUMBER:		CC RVAAP-70 Ea	ast Class	ificati	on Yard
			1		
TTED BY DATE-		As Shown		640030	
8/21/2018		8/21/2018			4-8
	ETT FIL	E ;			

2

3



S:\ES\Remed\Ravenna\Database\GIS\2018\CC-70\SI\_CC-70\_Fig4-9\_2018\_COCs\_SubsurfaceSoil.mxd lxh 8/21/2018

Figure 4-9 Potential Contaminants in Subsurface Soil

# 5. EXPOSURE PATHWAYS

# 5.1 SOIL EXPOSURE AND AIR PATHWAYS

# 5.1.1 Physical Conditions

The surficial soil unit at CC RVAAP-70 East Classification Yard is mapped as Mahoning silt loam or Fitchville silt loam (Figure 2-2). These soils are Hiram Till glacial deposits (Figure 2-3). The bedrock underlying the AOC is Sharon Sandstone. The elevation of bedrock at CC RVAAP-70 East Classification Yard is approximately 950 ft amsl (Figure 2-4) or less than 10 ft bgs.

# 5.1.2 Soil and Air Targets

Current and future human and ecological (animal and plant) receptors may come into direct contact with potential contaminants in the surface or subsurface soil at this AOC.

Airborne contamination (e.g., windblown dust) and soil vapor are not considered viable migration or exposure pathways at this AOC. The former RVAAP facility is located in a humid climate, and soil moisture content is typically high, which reduces the potential for dust generation. None of the potential contaminants identified for this AOC are volatile.

# 5.1.3 Soil Exposure and Air Pathway Conclusion

PAHs, arsenic, and aroclor-1242 were detected in surface soil at concentrations above FWCUGs and/or May 2018 USEPA RSLs. PAHs were also detected in subsurface soil at concentrations above May 2018 USEPA RSLs. The exposure pathway for soil is considered complete at this AOC. The exposure pathway for air is incomplete.

# 5.2 SURFACE WATER AND SEDIMENT EXPOSURE PATHWAY

# 5.2.1 Hydrological Setting

Surface water in the form of runoff may be a potential migration pathway for potential contaminants to leave the AOC, flowing overland or through natural/manmade conveyances. Ditches are located on the east and west sides of Building 47-40 (DU02 and DU07) and receive intermittent storm water runoff. There are no perennial surface water or wetland features at CC RVAAP-70 East Classification Yard. The closest perennial feature to receive drainage from the CC RVAAP-70 East Classification Yard is a tributary to the west branch of the Mahoning River and associated wetlands, located approximately 2,000 feet northeast of the AOC (Figure 2-5).

# 5.2.2 Surface Water Targets

Surface water targets include human receptors that use surface water for potable water supply or recreation, as well as environmental (e.g., streams, wetlands, and sensitive aquatic environments) and physical targets (e.g., public or private water distribution system intakes) that may be affected by potential surface water contamination on or adjacent to the AOC. No perennial streams are located at the AOC. There are no observed springs or groundwater discharge points to a surface water body in the immediate vicinity of the AOC. Intermittent surface water collects in ditches on the east and west sides of Building 47-40 (DU02 and DU07), but it is unclear if storm water runoff in the ditches reaches the wetlands or river tributary to the northeast. There does not appear to be a direct exposure pathway for human receptors or ecological targets to surface water at this AOC.

# 5.2.3 Sediment Targets

There is no sediment at CC RVAAP-70 East Classification Yard. However, surface soil in the ditches east and west of Building 47-40 (DU02 and DU07) contain potential contaminants, and this surface soil may be transported to surface water bodies by water flowing in the ditches during storm events. Current and future human and ecological (animal and plant) receptors may come into direct contact with potential contaminants in sediment if surface soil from the ditches reaches perennial surface water bodies.

# 5.2.4 Surface Water Sediment Pathway Conclusions

There are no perennial surface water streams or wetlands in the immediate vicinity of the CC RVAAP-70 East Classification Yard AOC. Benzo(a)pyrene, arsenic, and aroclor-1242 were detected in surface soil in drainage ditches at concentrations above FWCUGs and/or May 2018 Residential RSLs. The exposure pathway for surface water is incomplete because surface water is only intermittently present at the AOC. Soil transport by intermittent surface water flow may be a migration pathway for potential contaminants related to this AOC.

# 5.3 GROUNDWATER EXPOSURE PATHWAY

# 5.3.1 Hydrogeology

The overburden soils at CC RVAAP-70 East Classification Yard are Hiram Till glacial deposits (Figure 2-3). The bedrock underlying the AOC is Sharon Sandstone. The elevation of bedrock at CC RVAAP-70 East Classification Yard is approximately 950 ft amsl (Figure 2-4) or less than 10 ft bgs. Groundwater flow across Camp Ravenna is generally to the east. Soil borings reached bedrock at CC RVAAP-70 without encountering saturated conditions. Groundwater is not present in the unconsolidated soils at CC RVAAP-70 East Classification Yard.

No monitoring wells are present at the CC RVAAP-70 East Classification Yard AOC. The nearest facility monitoring well is SCFmw-005, located upgradient completed in the Sharon conglomerate and approximately 2,300 feet west of the CC RVAAP-70 East Classification Yard. No monitoring wells completed in the unconsolidated surficial aquifer exist in the vicinity of the CC RVAAP-70 East Classification Yard.

# 5.3.2 Groundwater Targets

Groundwater targets include human receptors that use groundwater for potable water supply, as well as environmental receptors (e.g., livestock or fish farms) and physical targets (e.g., springs) that may be affected by potential groundwater contamination on or adjacent to the AOC. There are no public, livestock, or commercial groundwater supply wells within the facility. Groundwater in the vicinity of Building 47-40 at CC RVAAP-70 East Classification Yard is currently not used for on-site activities.

# 5.3.3 Groundwater Pathway Conclusion

PAHs have been detected at concentrations above May 2018 Resident RSLs in subsurface soils, indicating a potential for vertical migration of contaminants to groundwater. However, PAHs have low solubility and rarely impact groundwater. Groundwater is not present in unconsolidated soils at CC RVAAP-70 East Classification Yard. The groundwater exposure pathway is not complete because no groundwater production wells are completed at or near the CC RVAAP-70 East Classification Yard.

# 6. SUMMARY AND CONCLUSIONS

# 6.1 SUMMARY OF THE SITE INVESTIGATION ACTIVITIES

Surface and subsurface soil were sampled at CC RVAAP-70 East Classification Yard to determine the presence of SRCs and identify potential contaminants within the AOC. Surface water and sediment were not present at this AOC during the SI field work in 2012 and 2018, but surface water was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

The following DUs were investigated:

- Former Fuel Oil Spill Area DU01
- Drainage Ditch West of Building 47-40 DU02
- Building 47-40 (Round House)
  - Building 47-40 Round House Exterior DU03
  - Building 47-40 Round House Interior DU04
- Former Herbicide Storage Shed DU05
- Outdoor Wash Rack Area DU06
- Drainage Ditch East of Building 47-40 DU07

# 6.2 SUMMARY AND CONCLUSIONS OF THE SITE RELATED CHEMICALS EVALUATION

Data generated during the CC RVAAP-70 East Classification Yard SI were screened to identify SRCs. A chemical detected at a concentration greater than the established BSV, that is not an essential nutrient, and has not been screened out through a frequency of detection evaluation is identified as an SRC. An SRC may, or may not be, related to the former operations at the AOC.

# 6.2.1 DU01: Former Fuel Oil Spill Area

Two petroleum hydrocarbons and 10 SVOCs (all PAHs) were identified as SRCs in surface soil. Two inorganics, one explosive, three petroleum hydrocarbons, 18 SVOCs (15 PAHs) and 8 VOCs were identified as SRCs in subsurface soil.

# 6.2.2 DU02 Drainage Ditch West of Building 47-40

Two petroleum hydrocarbons and 13 SVOCs (all PAHs) were identified as SRCs in surface soil.

# 6.2.3 DU03 Building 47-40 Round House – Exterior

Ten inorganics, 1 PCB, and 18 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, 17 SVOCs, and 5 VOCs were identified as SRCs in subsurface soil.

# 6.2.4 DU04 Building 47-40 Round House – Interior

Four inorganics, 9 SVOCs (7 PAHs), and 4 VOCs were identified as SRCs in subsurface soil.

# 6.2.5 DU05 Former Herbicide Storage Shed

One pesticide and 17 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, one petroleum hydrocarbon, one pesticide, 17 SVOCs, and 6 VOCs were identified as SRCs in subsurface soil.

# 6.2.6 DU06 Outdoor Wash Rack Area

One explosive, one PCB, and 16 SVOCs (14 PAHs) were identified as SRCs in surface soil. One explosive, one petroleum hydrocarbon, one PCB, 14 SVOCs (11 PAHs), and two VOCs were identified as SRCs in subsurface soil.

# 6.2.7 DU07 Drainage Ditch East of Building 47-40

Fourteen inorganics, one explosive, two petroleum hydrocarbons, two pesticides, three PCBs, 16 SVOCs (15 PAHs), and one VOC were identified as SRCs in surface soil.

# 6.3 SUMMARY AND CONCLUSIONS OF THE POTENTIAL CHEMICAL CONTAMINATION EVALUATION

The MDC of each SRC identified by the SI at each DU was compared to its most stringent FWCUG (SAIC, 2010) for the Resident Receptor (or May 2018 USEPA Residential RSLs if no FWCUG is established) using the target cancer risk level of 10<sup>-6</sup> or the target HQ for non-carcinogenic risks of 0.1 to determine the presence of potential contaminants. Because FWCUGs have not yet been updated with 2017 toxicity values for PAHs, PAH concentrations were also compared to May 2018 RSLs.

The MDC of the TPH SRCs were compared to BUSTR (Ohio Department of Commerce, 2017) Soil Class 2 criteria because FWCUGs have not been established for petroleum hydrocarbons.

The SRCs that exceeded the most stringent value FWCUG for the Resident Receptor (or RSLs or BUSTR if no FWCUG is established), using a target cancer risk level of  $10^{-6}$  or the target HQ = 0.1 for non-carcinogenic risks, were then evaluated using a WOE approach. The WOE evaluation considers the SRCs that exceed their FWCUGs (or RSL or BUSTR) criteria, as described above, to determine if the chemical should be identified as a potential contaminant.

Potential contaminants were identified in surface and subsurface soil at CC RVAAP-70 East Classification Yard.

# DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

# DU02 Drainage Ditch West of Building 47-40

• Surface soil: benzo(a)pyrene

# DU03 Building 47-40 Round House

- Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene
- o Subsurface soil: none

#### DU04 Building 47-40 Round House - Interior

• Subsurface soil: none

#### DU05 Former Herbicide Storage Shed

- Surface soil: benzo(a)pyrene
- Subsurface soil: none

#### DU06 Outdoor Wash Rack Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: none

#### DU07 Drainage Ditch East of Building 47-40

• Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

#### 6.4 SUMMARY AND CONCLUSIONS OF THE EXPOSURE PATHWAYS

PAHs, arsenic, and aroclor-1242 were detected in surface soil at concentrations above FWCUGs and/or May 2018 RSLs. PAHs were detected in subsurface soil at concentrations above May 2018 RSLs. The exposure pathway for soil is considered complete at this AOC. The exposure pathway for air is incomplete.

There are no perennial surface water streams or wetlands in the immediate vicinity of the CC RVAAP-70 East Classification Yard AOC. Benzo(a)pyrene, arsenic, and aroclor-1242 were detected in surface soil in drainage ditches at concentrations above FWCUGs. The exposure pathway for surface water is incomplete because surface water is only intermittently present at the AOC. Soil transport in intermittent surface water flow in the ditches may be a migration pathway for potential contaminants related to this AOC.

PAHs have been detected at concentrations above May 2018 RSLs in subsurface soils, indicating a potential for vertical migration of contaminants to groundwater. However, PAHs have low solubility and rarely impact groundwater. Groundwater is not present in unconsolidated soil at CC RVAAP-70 East Classification Yard. The groundwater exposure pathway is not complete because no groundwater production wells are completed at or near the CC RVAAP-70 East Classification Yard.

# 7. RECOMMENDATIONS

Further evaluation in a Remedial Investigation (RI) is recommended for CC RVAAP-70 East Classification Yard due to potential contaminants in surface soil and subsurface soil.

#### DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

#### DU02 Drainage Ditch West of Building 47-40

• Surface soil: benzo(a)pyrene

#### DU03 Building 47-40 Round House

• Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

#### DU05 Former Herbicide Storage Shed

• Surface soil: benzo(a)pyrene

#### DU06 Outdoor Wash Rack Area

• Surface soil: benzo(a)pyrene

#### DU07 Drainage Ditch East of Building 47-40

• Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

No further investigation is recommended for subsurface soil at DU03 Building 47-40 Round House, DU04 Building 47-40 Round House – Interior, DU05 Former Herbicide Storage Shed, and DU06 Outdoor Wash Rack Area as no potential contaminants were identified.

This Page Intentionally Left Blank

#### 8. REFERENCES

- Army Base Realignment and Closure Office (BRACO), 2009. *Installation Hazardous Waste Management Plan for RVAAP*. August 2009.
- Craig. A Cox and George H. Colvin, 1996. *Evaluation of Background Metal Concentrations in Ohio Soils*. Report submitted to Ohio Environmental Protection Agency. June 21.
- Environmental Chemical Corporation (ECC), 2012. Final Site Inspection and Remedial Investigation Work Plan at Compliance Restoration Sites, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio. October 3.
- Ohio Army National Guard (OHARNG), 2014. Integrated Natural Resources Management Plan and Environmental Assessment for the Ravenna Training and Logistics Site, Portage and Trumbull Counties, Ohio. December 2014.
- OHARNG, 2016. Camp Ravenna Waste Management Guidelines and Waste Inspection Form. May.
- Ohio Department of Commerce, Division of State Fire Marshal. 2017. Bureau of Underground Storage Tank Regulations (BUSTR). *Technical Guidance Manual for Closure, Corrective Action, and Petroleum Contaminated Soil Rules.* 1 July 2012. Revised September 2017.
- Ohio Environmental Protection Agency (Ohio EPA), 2004. Director's Final Findings and Orders for the Ravenna Army Ammunition Plant. June 2004.
- Parsons, 2017. Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Turnbull Counties, Ohio. November 30.
- Science Applications International Corporation (SAIC), 2010. *Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant, Ravenna, Ohio.* March 23.
- SAIC, 2011a. Facility-Wide Sample and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. February 24.
- SAIC, 2011b. Historical Records Review for the 2010 Phase I Remedial Investigation Services at Compliance Restoration Sites (9 Areas of Concern). December 22.
- TEC-WESTON Joint Venture, 2016. Final Facility-Wide Groundwater Monitoring Program, RVAAP-66 Facility-Wide Groundwater Annual Report for 2015, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio. May 6.
- Vista Sciences Corporation, 2015. Ravenna Army Ammunition Plant Deliverable Document Format Guidelines, Version 21. December 11.
- Winslow and White, 1966. *Geology and Ground-Water Resources of Portage County, Ohio.* Geological Survey Professional Paper 511.
- United States Environmental Protection Agency (USEPA), 1990. National Oil and Hazardous Substances Contingency Plan (NCP).
- USEPA, 1992. Interim Final Guidance for Performing Site Inspections Under CERCLA.
- USEPA, 2005a. Office of Solid Waste Emergency Response Directive 9272.0-17 Implementation of the Uniform Federal Policy for Quality Assurance Project Plans at Federal Facility Hazardous Waste Sites. June.

USEPA, 2005b. Federal Facilities Remedial Site Inspection Summary Guide.

- USEPA, 2018. Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=0.1), May.
- U.S. Geological Survey, 1968. *Mineral Resources of the Appalachian Region*. U.S. Geological Survey Professional Paper No. 580. 1968.

**APPENDICES** 

This Page Intentionally Left Blank

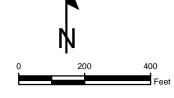
# APPENDIX A

# HISTORICAL AERIAL PHOTOGRAPHS



Map Coordinates: WGS 84, UTM Zone 17N in Meters Base map data and Aerial Photographs from SAIC







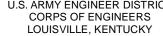
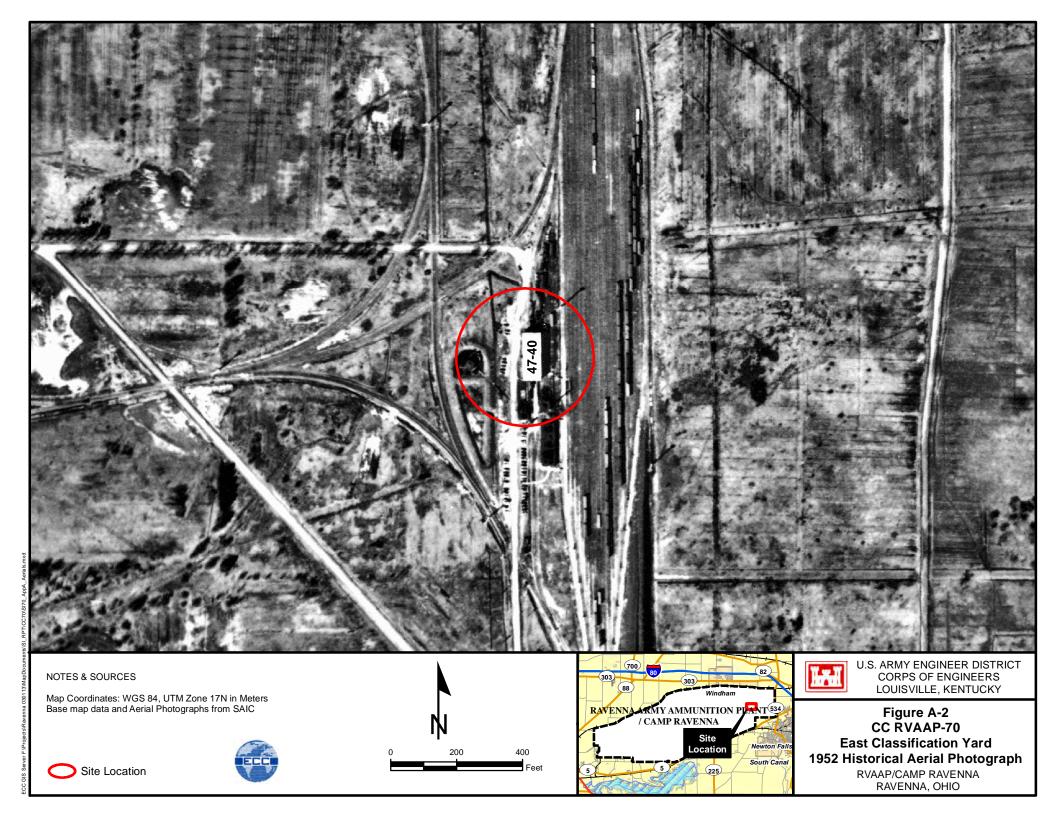
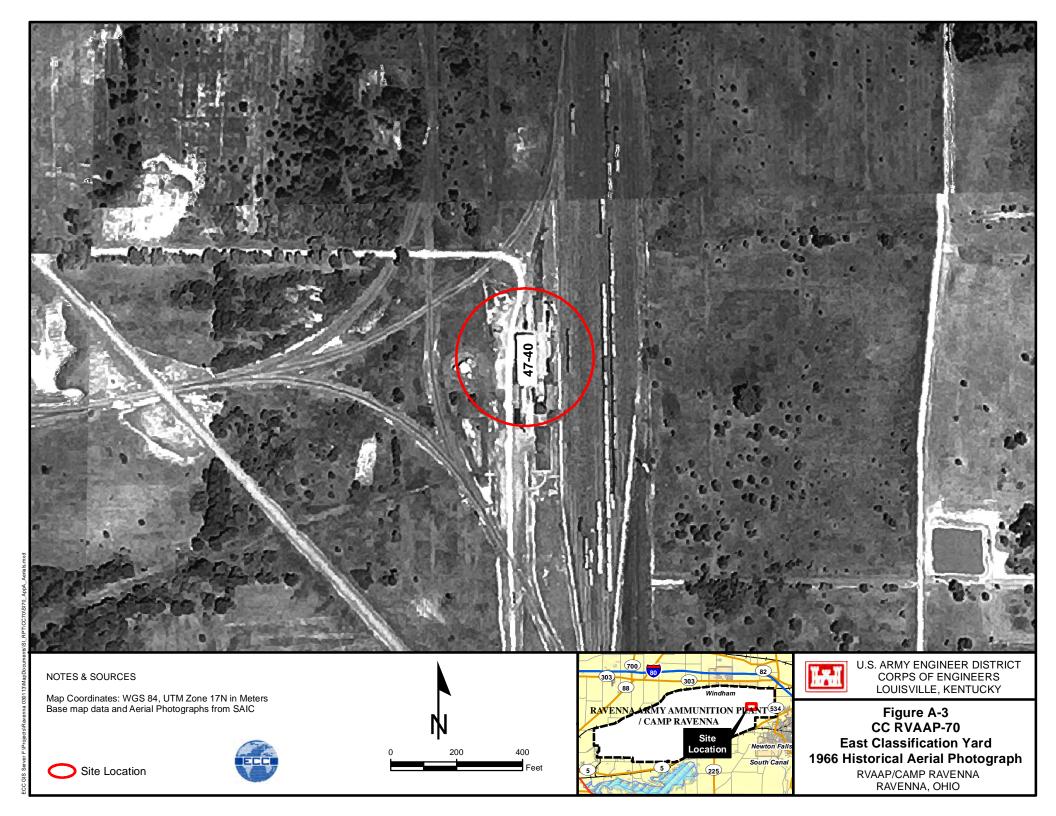
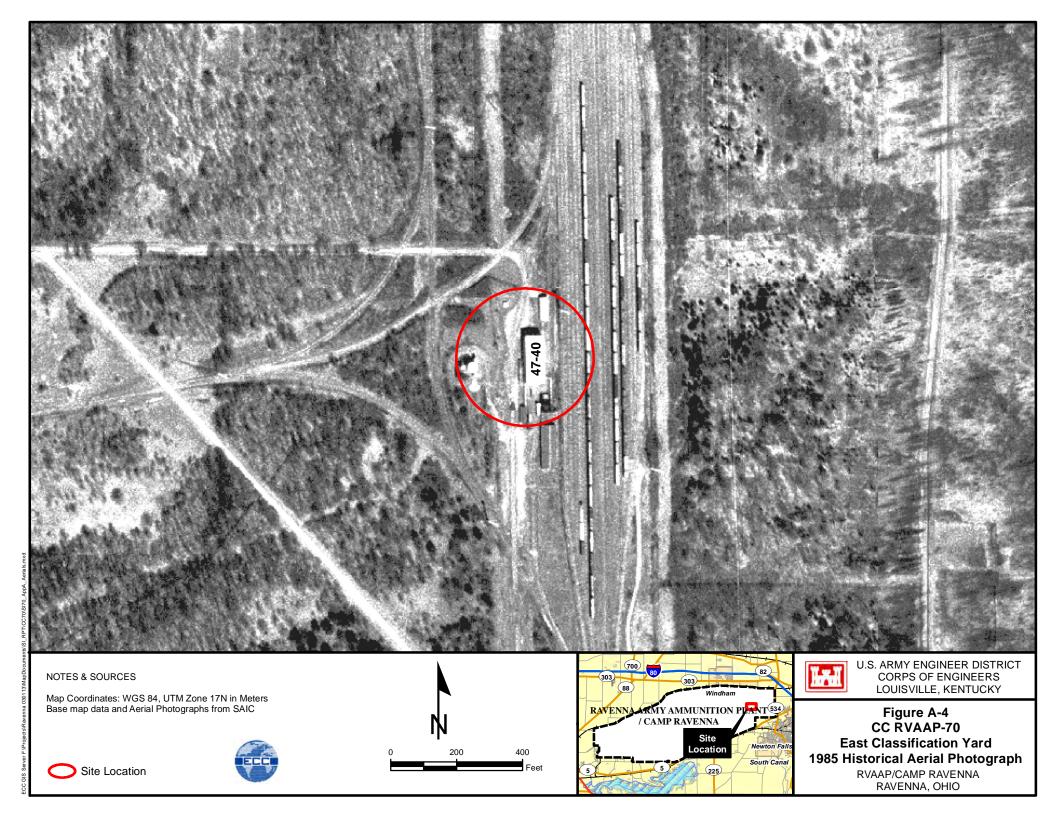


Figure A-1 CC RVAAP-70 **East Classification Yard** 1940 Historical Aerial Photograph RVAAP/CAMP RAVENNA RAVENNA, OHIO

Site Location





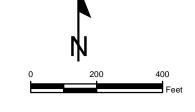




#### NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters Base map data and Aerial Photographs from SAIC





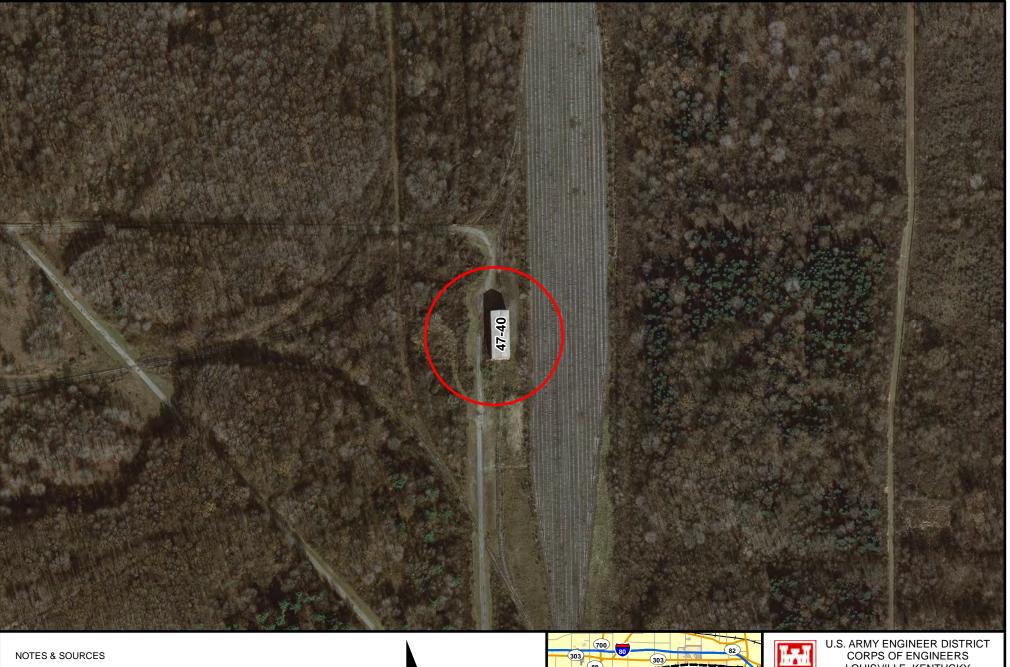




I.A.

Figure A-5 CC RVAAP-70 East Classification Yard 1997 Historical Aerial Photograph RVAAP/CAMP RAVENNA RAVENNA, OHIO

Site Location



Map Coordinates: WGS 84, UTM Zone 17N in Meters Base map data and Aerial Photographs from SAIC

Site Location



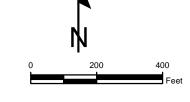






Figure A-6 CC RVAAP-70 **East Classification Yard** 2009 Historical Aerial Photograph RVAAP/CAMP RAVENNA RAVENNA, OHIO

# **APPENDIX B**

Field Activity Forms

# **APPENDIX B.1**

Surface Soil Sampling Summary Forms



# SURFACE SOIL ISM SAMPLING

# 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>F. CLASS FARD</u>
Decision Unit: <u>NUO</u> <u>Building No.</u> FORMAR FURL ANEA
Sample Date: <u>11-5-12</u> Time: <u>1600</u> Weather: <u>1747 clavor -40'</u>
Sample ID:
Duplicate Sample ID:
Field Sampler:
Depth of Sample: <u>O-/F7</u>
Material:
Remarks:
Laboratory Analysis:
Ø VOC □ TAL METALS Ø SVOCs □ EXPLOSIVES Ø TPH GRO/DRO □ PCBs □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: Aff Donn DATE: 11-5-12



# SURFACE SOIL ISM SAMPLING

# 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>E. CLASS</u> FO
Decision Unit: <u>DU 02</u> Building No. <u>DAAINAUR DIYCH NEXT TO</u> FORMR FURL ARM
Sample Date: 11-J-12 Time: Weather: CLOUDE -40'S 11-7-12 TPH/GAU RESAMPLIN DUE TO LAB BASARING WOR UPON RECEINS
Sample ID: 07055-0002m-0001-50
Duplicate Sample ID:
Field Sampler:
Depth of Sample: 0-1 FT
Material:
Remarks:
Laboratory Analysis: MTOC VOC TAL METALS DISVOCS DIEXPLOSIVES DITPH GRO/DRO PCBS DIPROPELLANTS
デージス ロ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: 1/1 / mm DATE: 11-5-12 (Signature) 11-7-12



# SURFACE SOIL ISM SAMPLING

#### **2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES**

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>F, CLASS, KD</u>
Decision Unit: DU03 Building No. 47-40 (Anound BLO)
Sample Date: <u>//-5-12</u> Time: <u>/5/5</u> Weather: <u>CLOUDE - 40'5</u>
Sample ID: <u>07055-0003m-000  -50</u>
Duplicate Sample ID:
Field Sampler:
Depth of Sample:
Material:
Remarks:
Laboratory Analysis:
□ VOC 🖉 TAL METALS 🖾 SVOCS □ EXPLOSIVES □ TPH GRO/DRO 🏚 PCBS □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected

RECORDED BY: \_\_\_\_\_\_ Deff\_ M mon\_\_\_\_\_ DATE: \_\_/\_-5-12\_\_\_\_\_



# SURFACE SOIL ISM SAMPLING

# 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES USACE Contract No. W91QR-04-D-0039

# Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP-</u> O CR Site Name: <u>F. CLASS</u> , FD
Decision Unit: <u>DV04</u> Building No. <u>47-40 MAINTENANCE PI</u>
Sample Date: <u>12-7-12</u> Time: <u>1022</u> Weather: <u>pTUK, CLOUDE 405</u>
Sample ID:
Duplicate Sample ID:
Field Sampler:
Depth of Sample:
Material:
Remarks:
Laboratory Analysis:
□ VOC 🖾 TAL METALS 🛱 SVOCS □ EXPLOSIVES □ TPH GRO/DRO Æ PCBS □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected

DATE: 12-7-12 



#### SURFACE SOIL ISM SAMPLING

# 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES USACE Contract No. W91QR-04-D-0039

#### Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>E, CLass</u> , HD
Decision Unit: Building No Building No
Sample Date: 11-5-12 Time: 1200 Weather: 1764, CLAMPY - 40'5
Sample ID: 07055-0004m-0001-50
Duplicate Sample ID:
Field Sampler:
Depth of Sample:
Material:
Remarks:
Laboratory Analysis:
□ VOC □ TAL METALS SVOCs □ EXPLOSIVES □ TPH GRO/DRO □ PCBs □ PROPELLANTS
لي الممكن المراجع FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected

RECORDED BY: \_\_\_\_\_\_\_ (Signature) DATE: \_\_\_\_\_\_ DATE: \_\_\_\_\_\_



#### SURFACE SOIL ISM SAMPLING

# **2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES** USACE Contract No. W91QR-04-D-0039

#### Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>F, CLASS, FANO</u>
Decision Unit: <u>PUO6</u> Building No. <u>WASH RACK ARFA</u>
Sample Date: <u>//-5-12</u> Time: <u>/430</u> Weather: <u>P147</u> , CLOVOF -46'S
Sample ID:
Duplicate Sample ID:
Field Sampler: <u>The AM</u>
Depth of Sample: 0-1 FT
Material:
Remarks:
Laboratory Analysis:
□ VOC □ TAL METALS Ø SVOCS Ø EXPLOSIVES □ TPH GRO/DRO Ø PCBS □ PROPELLANTS
□ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected

RECORDED BY: <u>Jeff Dom</u> DATE: <u>11-3-12</u> (Signature)



### SURFACE SOIL ISM SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>E, CLADS, FAAD</u>
Decision Unit: <u>PUO7</u> Building No. <u>Common DAAIMAGE DITCH</u>
Sample Date: 15-12 Time: 1330 Weather: 1744, CLOVIT - 40'5
Sample ID: 07055-0006M-0001-50
Duplicate Sample ID:         0         70         7000         M-000         I-So
Field Sampler:
Depth of Sample:
Material:
Remarks:
Laboratory Analysis:
Ø VOC □ TAL METALS Ø SVOCS Ø EXPLOSIVES □ TPH GRO/DRO Ø PCBS □ PROPELLANTS
ロード (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected Olars-0006m-0002-50 ms/mso
RECORDED BY: Monom DATE: 11-5-12 (Signature)

This page intentionally left blank.

## **APPENDIX B.2**

Subsurface Soil Sampling Summary Forms

This page intentionally left blank.



### SUBSURFACE SOIL SAMPLING

# 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES USACE Contract No. W91QR-04-D-0039

CR Site No. CC-RVAAP- 70 CR Site Name: CC7c En	ST CLASS YARD
Decision Unit: $\phi$   Building No. FFA Vertical G	eoprobe No. <u>SB-1</u>
Subsurface Sample Type: 💋 Horizontal ISM 🕂 Vertical ISN	1 🗆 Discrete 🖾 Composite
Sample Date: 14 NOV 12 Time: 11:00 Weather: 305	25
Subsurface Sample ID:	с
Duplicate Sample ID:	
Tube A Time <u>11.00 m</u> Interval Drilled (ft bgs) : <u>1-4</u>	$\frac{6765B - \infty 11m - \cos 1 - 50}{\text{Recovery (ft/in): } \frac{36'}{2}$
Tube B Time <u>11:00 M</u> Interval Drilled (ft bgs) : $4-7^{1}$	
Tube C       Time       Interval Drilled (ft bgs) :	Recovery (ft/in):
Field Samplers: FR, AM, TH, DC	
Subcontractor (Name/Company): Protent	
Remarks: <u>5'000</u> .	
Remarks: <u>5'00c</u>	
Laboratory Analysis:	O/DRO 🗆 PCBs 🗆 PROPELLANTS
Laboratory Analysis: 成 か 7 6 位 VOC ロ TAL METALS 以 SVOCs ロ EXPLOSIVES	O/DRO 🗆 PCBs 🗆 PROPELLANTS



## SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: ('C-10 EAST	CLASS YARD
Decision Unit: $\phi$   Building No. Former FA Vertical G	eoprobe No. <u>ちょこ</u>
Subsurface Sample Type: 🖓 Horizontal ISM 💋 Vertical ISN	1 🔲 Discrete 🔲 Composite
Sample Date: <u>14 NOV 12</u> Time: <u>9:35 m</u> Weather: <u>30</u>	s PC
Subsurface Sample ID:	0
Duplicate Sample ID:	
Tube A Time $4.35_{\text{res}}$ Interval Drilled (ft bgs) : $1-4^{1}$	Recovery (ft/in):
Tube B Time $\underline{4:35}$ ~ Interval Drilled (ft bgs) : $\underline{4-7}$	Recovery (ft/in): <u> </u>
Tube C       Time       Interval Drilled (ft bgs) :	Recovery (ft/in):
Field Samplers: FR, AM, TIH, DC	
Subcontractor (Name/Company): <u>PFUDENT</u>	
Remarks: 5 OPONL. STEOND	
Laboratory Analysis:	
	O/DRO 🗆 PCBs 🗀 PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellant	
MS/MSD Sample Collected	
RECORDED BY: DATE: (Signature)	14 NEV 12



#### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>CC 70</u> EAST CLASS YARD
Decision Unit: $\frac{1}{2}$ Building No. FFA Vertical Geoprobe No. SB-3
Subsurface Sample Type: 🛛 Horizontal ISM 🖓 Vertical ISM 🛛 Discrete 🖾 Composite
Sample Date: 14 Nov 12 Time: 13:00 m Weather: 30's PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time $\frac{13.66}{6}$ Interval Drilled (ft bgs) : $1-4^{1}$ Recovery (ft/in): $36^{11}$
Tube B Time <u>(3 <sup>cc</sup></u> Interval Drilled (ft bgs) : <u>4-7</u> Recovery (ft/in): <u>4</u> ''
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FE, AM, TH, DC
Subcontractor (Name/Company):
Remarks: ODUR AT 6.5
Laboratory Analysis:
□ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE: DATE:



#### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>CC 70 EA ST LLASS YARM</u>
Decision Unit: <u>J</u> Building No. <u>FFA</u> Vertical Geoprobe No. <u>SB-4</u>
Subsurface Sample Type: 📮 Horizontal ISM 🔤 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 19 Nov 12 Time: 11:50 m Weather: 30's PC
Subsurface Sample ID: <u>GD&amp;SB-00/6M-0001-50</u>
Duplicate Sample ID:
Tube A Time 11.50 Am Interval Drilled (ft bgs) : 1-4 Recovery (ft/in): 40"
Tube B Time <u>11.50ゃ</u> Interval Drilled (ft bgs) : <u>4-</u> 7 <sup>1</sup> Recovery (ft/in): <u>1</u> 0 <sup>11</sup>
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FK, AM, TH, DC
Subcontractor (Name/Company): Provini
Remarks:
Laboratory Analysis:
VOC I TAL METALS SVOCs EXPLOSIVES THE GRO/DRO PCBS PROPELLANTS
□ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE: /4 NOV 12



#### SUBSURFACE SOIL SAMPLING

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YNC D
Decision Unit: $\phi$   Building No. FFA Vertical Geoprobe No. SB-5
Subsurface Sample Type: 🛱 Horizontal ISM 🛱 Vertical ISM 🗆 Discrete 🖾 Composite
Sample Date: 14 101/12 Time: 12:10 p Weather: 30 5 7C
Subsurface Sample ID: 07059-0017M-0001-50
Duplicate Sample ID:
Tube A Time 12, 10 P Interval Drilled (ft bgs) : 1-4' Recovery (ft/in): 48''
Tube B Time <u>12, 10 p</u> Interval Drilled (ft bgs) : <u>4-7</u> Recovery (ft/in): <u>48</u> "
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FR, AM, TH, DC
Subcontractor (Name/Company): <u>{kuvent</u>
Remarks: NO OPOR
Laboratory Analysis:
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



## SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>E. CLASS. FARO</u>
Decision Unit: <u>DUO</u> Building No Vertical Geoprobe No
Subsurface Sample Type: 🛛 Horizontal ISM 💆 Vertical ISM 🖓 Discrete 🏳 Composite
Sample Date: <u>12-7-12</u> _Time: <u>1145</u> Weather: <u>p714 CLovar -467</u>
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>// 30</u> Interval Drilled (ft bgs) : <u>\$=6</u> Recovery (ft/in): <u>}2</u>
Tube B Time <u>//35</u> Interval Drilled (ft bgs) : <u>6 7</u> Recovery (ft/in): <u>47 /2</u>
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: <u>AM, 1H, RW</u>
Subcontractor (Name/Company): FRMTZ GRO FACTION OF OOYLM COLL. ON 12-12-12 DUE TO
GRO FACTION OF OG42M COLLION 12-12-12 DUE TO
FRO FAITURI MEMOR OF DOG2 M-DOD COLL, OR 12-12-12
Remarks: <u>MISSAD COLL, ON 12-7-12</u> GRD FACTION MS/MOD OF OOG2M-0002 COLL, OR 12-12-12 Laboratory Analysis: DVE TO MISSAD COLL. ON 12-7-12
BTEX MISS
A FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
$\square$ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) $\square$ MS/MSD Sample Collected $O7OSB - OO92 - SO MS/MSOSS SITE COCS ONLY$
RECORDED BY: Man DATE: 12-7-12
RECORDED BY: UN Rom DATE: 12-7-12 (Signature) USE BORING COF FOR DUOI SBOZ FOR SOIL DISCRIPTION - BORING LOG NIT COMPLETED SBOZ APPROX IOFT FROM SBOG.



## SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>CO 70 EAST CLASS</u> VARIS
Decision Unit: $\cancel{0.5}$ Building No. $\cancel{1.4}$ Vertical Geoprobe No. $\cancel{5.6 \cdot 0}$
Subsurface Sample Type: 🛛 Horizontal ISM 🔍 Vertical ISM 🛛 Discrete 🗍 Composite
Sample Date: 13 NOV 12 Time: 9.15 AM Weather: 30's PC
Subsurface Sample ID: <u>0705B-0021M-0101-50</u>
Duplicate Sample ID:
Tube A Time $\frac{9:15}{A4}$ Interval Drilled (ft bgs): $\frac{1-4}{2}$ Recovery (ft/in): $\frac{40}{2001-50}$
Tube B Time $\frac{9.13 \text{ Ary}}{1.13 \text{ Ary}}$ Interval Drilled (ft bgs) : $\frac{1-1}{1.13 \text{ Constraints}}$ Recovery (ft/in): $\frac{43}{1.13}$
Tube C Time $\frac{9:23_{\text{Arry}}}{23_{\text{Arry}}}$ Interval Drilled (ft bgs) : $\frac{7-13'}{12}$ Recovery (ft/in): $\frac{4'}{12}$
Field Samplers: FRAM, TH, DC
Subcontractor (Name/Company): _ <u>PROFENT</u>
Remarks:
Laboratory Analysis:
🗆 VOC 💢 TAL METALS 💢 SVOCs 🗆 EXPLOSIVES 🗆 TPH GRO/DRO 🛱 PCBs 🗆 PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE: DATE:



## SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-76</u> CR Site Name: <u>CC-76 EAST LLASS VARD</u>
Decision Unit: $\cancel{0}3$ Building No. $\cancel{47-40}$ Vertical Geoprobe No. $\cancel{5B-\phi}2$
Subsurface Sample Type: 🛛 Horizontal ISM 🖵 /Vertical ISM 🗆 Discrete 🗔 Composite
Sample Date: 13 No 12 Time: 9:35 AM Weather: 30's PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>9.40</u> Interval Drilled (ft bgs) : <u>1-4</u> Recovery (ft/in): <u>30</u>
Tube B Time $\frac{c_1.40 \text{ AM}}{c_1.40 \text{ AM}}$ Interval Drilled (ft bgs) : $\frac{4-7'}{c_1}$ Recovery (ft/in): $\frac{3e^{it}}{c_1}$
Tube C Time <u>4.50am</u> Interval Drilled (ft bgs) : <u>7'-13'</u> Recovery (ft/in): <u>16''</u>
Field Samplers: FR, AM, TH, DC
Subcontractor (Name/Company): <u>PRODENT</u>
Remarks:
Laboratory Analysis:
UVOC 🛱 TAL METALS 🛱 SVOCS 🗆 EXPLOSIVES 🗆 TPH GRO/DRO 🛱 PCBS 🗆 PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



## SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>CC 76 FAST (LASS VIARIS</u>
Decision Unit: $43$ Building No. $47-40$ Vertical Geoprobe No. $5B-43$
Subsurface Sample Type: 🗹 Horizontal ISM 🛛 🖉 ertical ISM 🗆 Discrete 🔲 Composite
Sample Date: 13NOU12 Time: 9:58** Weather: 30's PC
Subsurface Sample ID: 07058-6023m-0001-50
Duplicate Sample ID:
Tube A Time <u>10:54</u> Interval Drilled (ft bgs) : <u>1-4</u> Recovery (ft/in): <u></u>
Tube B Time $\frac{10.5\%}{10.5\%}$ $\frac{10.5\%}{10.5\%}$ $\frac{10.5\%}{10.5\%}$ $\frac{10.5\%}{10.5\%}$ $\frac{10.5\%}{10.5\%}$ $\frac{10.5\%}{10.5\%}$
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FR, AM, TH, DC
Subcontractor (Name/Company): 2400ENT
Remarks:
Laboratory Analysis:
□ VOC 🛱 TAL METALS 🖾 SVOCS □ EXPLOSIVES □ TPH GRO/DRO 🛱 PCBS □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
□ MS/MSD Sample Collected 7
RECORDED BY: DATE: DATE:



#### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 79</u> CR Site Name: <u>CC 76 EAST CLASS VALO</u>
Decision Unit: <u>Ø</u> 3 Building No. <u>47.40</u> Vertical Geoprobe No. <u>SB-p4</u>
Subsurface Sample Type: 🗹 Horizontal ISM 🗹 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13 NOV 12 Time: 11:22 Weather: 30's PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>It 22am</u> Interval Drilled (ft bgs) : <u>1-4</u> Recovery (ft/in): <u>30</u>
Tube B Time <u>11.226</u> Interval Drilled (ft bgs) : <u>4-7</u> Recovery (ft/in): <u>28</u> "
Tube C       Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FRIAM, 74, DC
Subcontractor (Name/Company): PRUDENT
Remarks:
Laboratory Analysis:
□ VOC 🛱 TAL METALS 🕱 SVOCs □ EXPLOSIVES □ TPH GRO/DRO 💆 PCBs □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: J NOV 12



## SUBSURFACE SOIL SAMPLING

CR Site No. CC-RVAAP- 76 CR Site Name: CC. 74 EAST LLASS YALD
Decision Unit: $\underline{93}$ Building No. $\underline{4740}$ Vertical Geoprobe No. $\underline{58-\overline{95}}$
Subsurface Sample Type: 🛛 Horizontal ISM 🖓 Vertical ISM 🗆 Discrete 🗀 Composite
Sample Date: 13 Nov 12_ Time: 12.28 2 Weather: 30's PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time Interval Drilled (ft bgs) : 1-4 Recovery (ft/in): 36 "
Tube B Time 17 Interval Drilled (ft bgs) : 1-7 Recovery (ft/in): 42'
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FF, AM, 7H, DC
Subcontractor (Name/Company): PLNENT
Remarks:
Laboratory Analysis:
UVOC 🕅 TAL METALS 🖾 SVOCS 🗆 EXPLOSIVES 🗆 TPH GRO/DRO 🛱 PCBS 🗆 PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE: J 3 NOV 12



## SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>E. CLASS FARD</u>
Decision Unit: <u>DV03</u> Building No. <u>47-96</u> Vertical Geoprobe No. <u>5806</u>
Subsurface Sample Type: 🛛 Horizontal ISM 🖾 Vertical ISM 🖾 Discrete 🖾 Composite
Sample Date: 12-7+12 Time: 1050 Weather: PTHE CLOUDE - 40'S
Subsurface Sample ID: 0705B-0046M-0001-50
Duplicate Sample ID: 07058-0047M-0001-50 (SITTL COC'S ONCH)
Tube A Time <u>/ ステ</u> Interval Drilled (ft bgs) : <u>/ – ん ′</u> Recovery (ft/in): <u> </u>
Tube B Time 1040 Interval Drilled (ft bgs) : 6-7 Recovery (ft/in): 47/2
Tube C       Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: <u>TH, M, RW</u>
Subcontractor (Name/Company):
Remarks: USE BORNE LUC FOR DUO3 SBOZ FOR SOIL DESCRIPTION BURING LOG FOR SBOG NOT COMPLETED, SBOZ APPROX, 15 FT Laboratory Analysis: EAST OF SBOG
□ VOC □ TAL METALS □ SVOCs □ EXPLOSIVES □ TPH GRO/DRO □ PCBs □ PROPELLANTS
K FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



## SUBSURFACE SOIL SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>E. CLASS.</u> FALO
MINTENANCE PIT Decision Unit: <u>DUOF</u> Building No. <u>47-40</u> Vertical Geoprobe No. <u>SBO1</u>
Subsurface Sample Type: Interview ISM ISM ISM Isometry in the second se
Sample Date: 12-7-12 Time: 102-32 Weather:
Subsurface Sample ID:
Duplicate Sample ID:
0705B-0049-0001-50
Tube A Time 1022       Interval Drilled (ft bgs) : 0-1       Recovery (ft/in): 12
Tube B       Time       Interval Drilled (ft bgs) :       Recovery (ft/in):
Tube C       Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: R W
Subcontractor (Name/Company):
Remarks: KRENSAL AT 12" BELOW CONC. FLOOR
Laboratory Analysis:
□ VOC 🛱 TAL METALS 🛱 SVOCs □ EXPLOSIVES □ TPH GRO/DRO 🛱 PCBs □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



### SUBSURFACE SOIL SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>E, CLA, S, FARD</u>
MAINTENARCE PIT Decision Unit: <u>DUOY</u> Building No. <u>47-4</u> Vertical Geoprobe No. <u>SBO2</u>
Subsurface Sample Type: 🛛 Horizontal ISM 🖄 Vertical ISM 🗍 Discrete 🖓 Composite
Sample Date: <u>12-7-12</u> Time: <u>0945</u> Weather: <u>PTFF-CLOV0F-405</u>
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time Interval Drilled (ft bgs) : <u>6~15</u> Recovery (ft/in):'
Tube B Time Interval Drilled (ft bgs) : Recovery (ft/in):
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers:
Subcontractor (Name/Company):
Remarks: REFUSAL AT 15" BELOW GOVE, FLOOR
Laboratory Analysis:
UVOC DATAL METALS SVOCS EXPLOSIVES THE GRO/DRO PCBS PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: D DATE: DATE:



## SUBSURFACE SOIL SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>E, CLASS, FARD</u>
MAINTENANCE PIT
Decision Unit: $DOY$ Building No. $47-40$ Vertical Geoprobe No. $SBO3$
Subsurface Sample Type: 🛛 Horizontal ISM 团Vertical ISM 🗍 Discrete 🗍 Composite
Sample Date: 12-7-12 Time: 1000 Weather: PTLY. 1 Lovor - 405
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>/ 000</u> Interval Drilled (ft bgs) <u>D-4/FT</u> Recovery (ft/in): <u>4/FT</u>
Tube B       Time       Interval Drilled (ft bgs) :       Recovery (ft/in):
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers:
Subcontractor (Name/Company):
Remarks: REAUSAL AT & FT BALON LOAVE. FLOOR
Laboratory Analysis:
UVOC DATAL METALS ASVOCS DEXPLOSIVES DTPH GRO/DRO A PCBS DE PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: <u>A Monom</u> DATE: <u>12-7-12</u> (Signature)



## SUBSURFACE SOIL SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>E. CLASS, FAAD</u>
MAINTENANCE PIT
Decision Unit: $DUOY$ Building No. 47-40 Vertical Geoprobe No. $SBOY$
Subsurface Sample Type: 🛛 Horizontal ISM 🖉 Vertical ISM 🗍 Discrete 🗍 Composite
Sample Date: <u>/2-7-12</u> Time: <u>/018</u> Weather: <u>PTHY.</u> CLINNE - 405
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>/0/ 8</u> Interval Drilled (ft bgs) : <u>0-46</u> Recovery (ft/in): <u>46</u>
Tube B Time Interval Drilled (ft bgs) : Recovery (ft/in):
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers:
Subcontractor (Name/Company):
Remarks: REFUSAL AT 46 BALOW CONC. FLOOD
Laboratory Analysis:
UVOC 🛱 TAL METALS 🖾 SVOCs 🗆 EXPLOSIVES 🗆 TPH GRO/DRO 🖾 PCBs 🗆 PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



#### SUBSURFACE SOIL SAMPLING

### 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP-</u> CR Site Name: <u>E. CLASS</u> , <u>FAND</u>
Decision Unit: <u>NOY</u> Building No. <u>47-40</u> Vertical Geoprobe No. <u>SBO5</u>
Subsurface Sample Type: 🛛 Horizontal ISM 🖾 Vertical ISM 🗍 Discrete 🗍 Composite
Sample Date: 12-7-12 Time: 1025 Weather: 17hr. CLADE - 40's
Subsurface Sample ID: 07050-6054m-0001-50
Duplicate Sample ID:
Tube A Time $1025$ Interval Drilled (ft bgs) : $0.34''$ Recovery (ft/in): $34''$
Tube B       Time Interval Drilled (ft bgs) : Recovery (ft/in):
Tube C       Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: <u>AM, RW</u>
Subcontractor (Name/Company):
Remarks: <u>REEVSAL AT 34''</u>
Laboratory Analysis:
UVOC 🕅 TAL METALS 🖾 SVOCS 🗆 EXPLOSIVES 🗆 TPH GRO/DRO 🗹 PCBS 🗆 PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>CC 70 EAST CLASS VARD</u>		
Decision Unit: 45 Building No. Former Hara Vertical Geoprobe No. 58 - 1		
Subsurface Sample Type: 🛛 Horizontal ISM 🖓 Vertical ISM 🗆 Discrete 🗆 Composite		
Sample Date: 13NOVIZ Time: 17:42 pm Weather: 305 PC		
Subsurface Sample ID:		
Duplicate Sample ID:		
Tube A Time 17:42, Interval Drilled (ft bgs) : 1-41 Recovery (ft/in): 32"		
Tube B Time $742$ Interval Drilled (ft bgs): $4-71$ Recovery (ft/in): $1000 - 500$		
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):		
Field Samplers: Any, FR, DC, TH		
Subcontractor (Name/Company): <u> </u>		
Remarks:		
Laboratory Analysis:		
UVOC I TAL METALS SVOCS EXPLOSIVES TPH GRO/DRO PCBS PROPELLANTS		
□ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)		
MS/MSD Sample Collected		
RECORDED BY: DATE: DATE: DATE: IS		



#### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>CC 70</u> GAST LLASS YALD
Decision Unit: Building No. Framer Herg Vertical Geoprobe No
Subsurface Sample Type: 🛛 Horizontal ISM 🖾 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13Nov 12 Time: 17:22 Weather: 30'S PL
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>17:22</u> Interval Drilled (ft bgs) : <u>1-4</u> Recovery (ft/in): <u>4</u> 4"
Tube B Time 17:22 Interval Drilled (ft bgs) : 4-7 Recovery (ft/in): 12!
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: AM, FC, DC, 7H
Subcontractor (Name/Company): <u>Perven7</u>
Remarks: 755Appn PID AIR TEMP 2320F
Laboratory Analysis:
UVOC I TAL METALS SVOCS EXPLOSIVES THE GRO/DRO PCBS PROPELLANTS
□ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE: / 3_ NOV 12



### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-74</u> CR Site Name: <u>CC-74</u> TAS	ot class ymen	
Decision Unit: 15 Building No. Exerce K HERB Vertical Ge	eoprobe No. <u>SB</u>	93
Subsurface Sample Type: 🗹 Horizontal ISM 🗹 Vertical ISM	I 🗌 Discrete 🔲 Co	omposite
Sample Date: 3 NW 12 Time: 17.04pm Weather: 30'5	PL	
Subsurface Sample ID:	Sv	
Duplicate Sample ID:		
Tube A Time 17:04 printerval Drilled (ft bgs) : 1-4'	Recovery (ft/in):	37"
Tube B Time $17.04_{e^{-1}}$ Interval Drilled (ft bgs) : $4-7^{1}$	Recovery (ft/in):	38 "
Tube C Time Interval Drilled (ft bgs) :	Recovery (ft/in):	
Field Samplers: IMIFRIDC, TH		
Subcontractor (Name/Company): PLUENT		
Remarks:	n 	
Laboratory Analysis:		
🗆 VOC 🛛 TAL METALS 🖾 SVOCs 🖾 EXPLOSIVES 🗆 TPH GRO		
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants	, PCBs, Pesticides) , PCBs, Pesticides)	HARBIC IDES
MS/MSD Sample Collected		
RECORDED BY: DATE:	13 NOV12	



#### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-76</u> CR Site Name: <u>CC-70</u> EAST CLASS YAKD
Decision Unit: 05 Building No. Former Acce Vertical Geoprobe No. SB - 09
Subsurface Sample Type: 🛛 Horizontal ISM 🖉 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13 Nov 12 Time: 16:25 PM Weather: 30'5 PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time Interval Drilled (ft bgs) : Recovery (ft/in):38''
Tube B Time $\frac{16.25}{1}$ Interval Drilled (ft bgs) : $\frac{4-7'}{1}$ Recovery (ft/in): $\frac{3''}{1}$
Tube C       Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: AM, FR, DC, TH
Subcontractor (Name/Company): PEUDENT
Remarks:
Laboratory Analysis:
日 FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collecter
RECORDED BY: DATE: DATE: /3 NTV /2



#### SUBSURFACE SOIL SAMPLING

CR Site No. CC-RVAAP- 74 CR Site Name: CC-74 EAST CLASS VARD
Decision Unit: <u>\$5</u> Building No. Hers Sturate Vertical Geoprobe No. <u>SB-85</u>
Subsurface Sample Type: 🖉 Horizontal ISM 🖆 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13 Nov 12 Time: 16 00 Weather: 305PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time $16.15_{2-1}$ Interval Drilled (ft bgs) : $1-4^1$ Recovery (ft/in): $38^{11}$
Tube B Time 10:15.1 Interval Drilled (ft bgs) : 4-7' Recovery (ft/in): 32'
Tube C       Time       Interval Drilled (ft bgs) :       Recovery (ft/in):
Field Samplers: AM, FR, DC, TH
Subcontractor (Name/Company): Protect
Remarks:
Laboratory Analysis:
□ VOC □ TAL METALS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: <u>13 NOU 12</u>



## SUBSURFACE SOIL SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES USACE Contract No. W91QR-04-D-0039

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>F, CLASS, FARO</u>
HEAB SHED Decision Unit: <u>DUOS</u> Building No Vertical Geoprobe No. <u>SBOG</u>
Subsurface Sample Type: 🛛 Horizontal ISM 🖄 Vertical ISM 🖓 Discrete 🎧 Composite
Sample Date: 12-7-12 Time: 1115 Weather: <u>PThr. Clavor 40's</u>
Subsurface Sample ID: 0705B-0044m-0001-50
Duplicate Sample ID: OTO SB- 0045M-0001-50 (SITT COC'S ONLY)
Tube A Time <u>//@J</u> Interval Drilled (ft bgs) : <u>/-6</u> Recovery (ft/in): <u>5/</u>
Tube B Time 11/0 Interval Drilled (ft bgs) : 6-7 Recovery (ft/in): 12"
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers:
Subcontractor (Name/Company):
Remarks: USE BORNE LUC FOR DUOS SAOI FOR SOIL DESCRIPTION BORNE LOF FOR SAL WAS NOT COMPLETED. SBOG IS APPROX, Laboratory Analysis: 15FT DUE WAST OF SBOI.
VOC TAL METALS SVOCS EXPLOSIVES TPH GRO/DRO PCBS PROPELLANTS
(A FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected 0705B-0044M-0002-SO (SITE COE'S ONLY)
RECORDED BY: Am DATE: DATE:



## SUBSURFACE SOIL SAMPLING

## 2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES USACE Contract No. W91QR-04-D-0039 Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>CC 74 EAST LLASS VACO</u>
Decision Unit: $\cancel{\phi 6}$ Building No. Wist Riack Vertical Geoprobe No. $\underline{5B} - \frac{\phi}{4}$
Subsurface Sample Type: 🖉 Horizontal ISM 🖾 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13 NET Time: 2.20 pm Weather: 365 PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time $2:20_{\text{fm}}$ Interval Drilled (ft bgs) : $1-4^{-4}$ Recovery (ft/in): $38''$
Tube B Time $2.20$ Interval Drilled (ft bgs): $4-7'$ Recovery (ft/in): $32''$
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FK, AM, TH, DC
Subcontractor (Name/Company):
Remarks: STEENG ODOR 4-7 @ SSEAM PID 11. Spom Lthen Iniveran
Laboratory Analysis:
Laboratory Analysis:
□ VOC □ TAL METALS 🕵 SVOCS 🛱 EXPLOSIVES □ TPH GRO/DRO 🖾 PCBS □ PROPELLANTS

1



#### SUBSURFACE SOIL SAMPLING

CR Site No. CC-RVAAP- 7¢ CR Site Name: CC-74 EAST CLASS YARD
Decision Unit: $\frac{\phi}{6}$ Building No. WASH RACK Vertical Geoprobe No. $\frac{SB}{\phi}$
Subsurface Sample Type: 🗹 Horizontal ISM 🛛 Vertical ISM 🗔 Discrete 🗆 Composite
Sample Date: 13 Nov 12 Time: 3 10 pm Weather: 30'S PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>3.10pm</u> Interval Drilled (ft bgs) : <u>1-4'</u> Recovery (ft/in): <u>19</u> "
Tube B Time <u>3. 10 pr</u> Interval Drilled (ft bgs) : <u>4-7</u> Recovery (ft/in): <u>34</u>
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FR, AM, TH, DC
Subcontractor (Name/Company): パアンロモルT
Remarks: LAST L' LTODUR - CLAY
Laboratory Analysis:
□ VOC □ TAL METALS \$
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE: /3/2



### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP- 70</u> CR Site Name: <u>CC 7 &amp; EAST CLASS VALO</u>
Decision Unit: $\phi_b$ Building No. WASH LACK Vertical Geoprobe No. $SB - \phi 3$
Subsurface Sample Type: 🗹 Horizontal ISM 🗹 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13 Nov 12 Time: 2: 43 p.m. Weather: 30: PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>2:43</u> Interval Drilled (ft bgs) : <u>1-4</u> Recovery (ft/in): <u>38</u>
Tube B Time <u>2:43 pm</u> Interval Drilled (ft bgs) : <u>4-7</u> Recovery (ft/in): <u>35</u>
Tube C       Time       Interval Drilled (ft bgs) :       Recovery (ft/in):
Field Samplers: FR.AM, 74, DC
Subcontractor (Name/Company):
Remarks:
Laboratory Analysis:
UVOC I TAL METALS SVOCS EXPLOSIVES I TPH GRO/DRO
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



### SUBSURFACE SOIL SAMPLING

CR Site No. CC-RVAAP-76 CR Site Name: CC 74 EAST CLASS YNNED
Decision Unit: <u>\$6</u> Building No. <u>Wash lack</u> Vertical Geoprobe No. <u>58-69</u>
Subsurface Sample Type: 🛛 Horizontal ISM 🖾 Vertical ISM 🗔 Discrete 🗔 Composite
Sample Date: 13 NOV 12 Time: 3:43 m Weather: 305 Pc
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>3:43 pm</u> Interval Drilled (ft bgs) : <u>1-4</u> Recovery (ft/in): <u>30</u>
Tube B Time <u>3:43, 1</u> Interval Drilled (ft bgs) : <u>4-7</u> Recovery (ft/in): <u>27</u>
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FR , Am , 74 , DC
Subcontractor (Name/Company): PRUDENT
Remarks:
Laboratory Analysis:
□ VOC □ TAL METALS 🕵 SVOCS 🏚 EXPLOSIVES □ TPH GRO/DRO 🛱 PCBS □ PROPELLANTS
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: DATE:



#### SUBSURFACE SOIL SAMPLING

CR Site No. <u>CC-RVAAP-70</u> CR Site Name: <u>CC 76 EAST CLASS YALD</u>
WASH FACK Decision Unit: Building No Vertical Geoprobe NoSB - \$\varphi 5
Subsurface Sample Type: 🛱 Horizontal ISM 🗹 Vertical ISM 🗆 Discrete 🗆 Composite
Sample Date: 13/11/2Time: 2.00kmWeather: 30's PC
Subsurface Sample ID:
Duplicate Sample ID:
Tube A Time <u>2: and Interval Drilled (ft bgs)</u> : <u>1-4</u> Recovery (ft/in): <u>32</u> "
Tube B Time 2: 00 Interval Drilled (ft bgs) : 4-7 Recovery (ft/in): 30 "
Tube C Time Interval Drilled (ft bgs) : Recovery (ft/in):
Field Samplers: FK_AM_TH_DC
Subcontractor (Name/Company): Platent
Remarks: STRONG ODER 4-7 @55EAM PID 40ppm & then I MIN OPEN
Laboratory Analysis:
UVOC I TAL METALS SVOCS EXEXPLOSIVES I TPH GRO/DRO
FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
MS/MSD Sample Collected
RECORDED BY: DATE: /3/2

## **APPENDIX B.3**

Daily Health and Safety Forms

This page intentionally left blank.

	Vision Integrity Results	ECC		SAFETY MEETING
Date: Company: 1. AWARENES:	-	Image: Marcing state in the second	Briefing:	TEFF DONOVAN
TICHS WIXAN H	TANDS 4 F EFE PNOTO D PDG	ALLS Thon BU. Ecnor IN 131456	ShES ANOS S	
2. OTHER ISSU	JES (HASP chan	ges, new AHAs, attendee com	nents, etc.):	
BECHN LEWL	15 SUN PPE-U	SE CARR WARN	ISI-L M	OCLETE'S
BLAG 1026	L (60.1445.	KOPUL IN CLOS CAR) WILL BE AT G	PACK TRAGE Rog.	In 144 5 Turoznat front, To

#### 4. ATTENDEES (Print Name):

1. JEFF DONOVAN 3. AL EASTERDAY	2.
3. AL EASTELDAN	4.
5. Fred Roche	6.
7. Amanda Miller	8.
9. Jacker Willer	10.
11. Tomas themanos? Jr.	12.
13. Igvid Compen	14.
15. Ian Tenchin Rolling	<u>6</u> .
17. Nathan Majer No	18.
19. Tetor to the fit	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.

ECC—Never Compromising Safety

	sion Integrity Results	ECC	DAILY SAFETY MEETING SIGN-IN SHEET
Date: Company:	LIT ECO	<b>7</b> 10- <b>6</b> -12 Project Name/Loc Person Conducting	ation: Ravenna AAP, Ravenna, OH g Briefing: JEFF Donoran
- Level D - Dress wa	m		tion, recent incidents, etc.):
- check for - watch your	ticks footing on	unpuch surfaces	
- Re CLARP	of enclos	new AHAs, attendee com rehicle traffic o	ments, etc.): n base due to Training expresse
	DAILY ACTIV		ETY MEASURES TO BE USED:
4. ATTENDEES (Pr			
1. JEFF PO 3. In The	NOVAN	2. ALF	XANDIA EASTERING
		4. <del>J</del>	
7. David Come	the Mover	8.	
9. Fred Roche		10.	
11. Amanda N	yiller	12.	۲۰۰۰ - ۲۰۰۰ -
13. Jacky Kil		14.	······································
15. Tomas He	turnes f	16.	
17.		18.	
19.		20.	
21.		22.	
23. 25.		24.	·
23.		26.	
29.		<u> </u>	

ECC—Never Compromising Safety

DAILY SAFETY MEETING Vision Integrity Results ECC SIGN-IN SHEET Ravenna AAP. Ravenna, OH //- 13-/2Project Name/Location:ECCPerson Conducting Briefing: Date: JEFF DONOVAN Company: 1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.): Warm date 2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.): - Hearing Protection Around Geoprobe what work AWARE Vour Surroundings and of performed being rround 5 3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED: CONT. IS SUBSURFACK SOIL SAMPLINE 4. ATTENDEES (Print Name):

1. JEFF PONSVAN	2. Fred Roche
3. Joe, Jeter	4. David Gomean
1. JEFF DONOVAN 3. Joe JEter 5. Tomas Foranavors Tet	4. David Gmean 6. Amonda Hiller
7.	8.
9.	10.
11.	12.
13.	14.
15.	16.
17.	18.
19.	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.

ECC—Never Compromising Safety

Visid In	on itegrity Results	ECC	DAI	LY SAFETY MEET SIGN-IN SHEET	ING
Date: Company:		<b>4</b> -12 Project Name/L Person Conduct			
-Level	<u>D</u>	oncerns, pollution prev			
-Dress	warm The Drive	ng			
-watch	1/005 600	Fing			
2. OTHER ISSUES	(HASP changes,	new AHAs, attendee co	mments, etc.)	·	
2. OTHER ISSUES	(HASP changes, with Your	new AHAs, attendee co	mments, etc.) 1 Back.	Ask for help	
2. OTHER ISSUES – Lift	(HASP changes, with Your	new AHAs, attendee co	omments, etc.) 1 Bick.	Ask for help	
2. OTHER ISSUES – Lift	(HASP changes, with Your	new AHAs, attendee co	mments, etc.) 1 Back	Ask for help	
2. OTHER ISSUES - Lift	(HASP changes, with Your	new AHAs, attendee co	mments, etc.) 1 Back	Ask for help	
- Lift 3. DISCUSSION OF	DAILY ACTIV	ILSS, NOT YOU	<u>м</u> <b>Васк.</b>	SURES TO BE USED:	
- Lift 3. DISCUSSION OF	DAILY ACTIV	legs, Not You	<u>м</u> <b>Васк.</b>	SURES TO BE USED:	
- Lift 3. DISCUSSION OF	DAILY ACTIV	ILSS, NOT YOU	<u>м</u> <b>Васк.</b>	SURES TO BE USED:	
- Lift 3. DISCUSSION OF	DAILY ACTIV	ILSS, NOT YOU	<u>м</u> <b>Васк.</b>	SURES TO BE USED:	
- Lift 3. DISCUSSION OF	DAILY ACTIV	ILSS, NOT YOU	<u>м</u> <b>Васк.</b>	SURES TO BE USED:	
- Lift 3. DISCUSSION OF Com7, 4. ATTENDEES (PI	with Your DAILY ACTIV WITH LS rint Name):	ILSS, NOT YOU TTIES/TASKS AND S. SUBJURIAN	AFETY MEA	NSK FOR help	
- Lift 3. DISCUSSION OF <u>Com7</u> , 4. ATTENDEES (PI 1. JEFF D	With Your DAILY ACTIV	Ilgs, Not You TTIES/TASKS AND SA SUBSCREAM	AFETY MEA Soil So	ASK FOT help SURES TO BE USED: OMPLINE	
- Lift 3. DISCUSSION OF CONT, 4. ATTENDEES (PI 1. TOFF DO 3. Joy Ter	with Your DAILY ACTIV WITH IS rint Name): proven	Ilgs, Not You TTIES/TASKS AND SA SUBSCREAM	Devict, C	ASK FOR help SURES TO BE USED: SOMPLINE Sompline Some and Amount & The	
- Lift 3. DISCUSSION OF Com7, 4. ATTENDEES (PI	with Your DAILY ACTIV WITH IS rint Name): proven	<u>legs, Not You</u> TTIES/TASKS AND S/ <u>SUBJURMM</u> 2. 4. 7	Devict, C	ASK FOT help SURES TO BE USED: OMPLINE	

16.

18.

20.

22.

24.

26.

28.

30.

15.

17.

19.

21.

23.

25.

27.

29.

DAILY SAFETY MEETING Vision Integrity Results ECC SIGN-IN SHEET Ravenna AAP. Ravenna, OH 

 Image: Project Name/Location:
 Ravenna AAP. Ravenna, OH

 ECC
 Person Conducting Briefing:

 TEFF
 Donovan

 Date: Company: 1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.): VIELICLE AUSARNASP Thips - KALLS MAINT CONDITIONS 2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.) RGIN TODEY = 5/19pery model conditions. Wearing Protection in Bld with Geoprobe 3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED: SITTI 4. ATTENDEES (Print Name): 2. 1. TEFF PONOVAN Jos Teter 4. AMANDA MILLER ictie shanks 3. Tomusticanourle. 6. David Contas 5. 8. 7. Koyann Williams 10. 9. 12. 11. 14. 13. 16. 15. 18. 17. 20. 19. 22. 21. 24. 23. 26. 25.

28.

30.

ECC-Never Compromising Safety

27.

29.

This page intentionally left blank.

# **APPENDIX B.4**

**Field Notes** 

This page intentionally left blank.

11-5-12 Daranna 11-5-17 8 RAVENA 1630 AMISARD SAMPLINE 0720 FUL (J. DoNorse, F. Roching, PRUDENT (A. MILLEN + ALL OUS IN ART CLASS, KAND FUR 15 SUNFALL SOIL SAMPLES TIDERMONZ) AT AND 2 DAAMAGE DUTCHES BIO 1036 1720 VECC AT BLU 1036 OBO 17+5 MERTAL TO XE-con SAUMENT Equip, BIL DECON WILL BK 0903 TEST AMANTOR DEL, Compar XED OF THE FOLLOWAG; SAMPLE CONTAMPES WASH/SCLUB EQUIP, by Alcarox + POTABOR MATCH - RINSE -0953 AY B. CLASS LAND -CC70 SPRAK NJ XSOPR and (PEST. KINSE W DI FROM CAS) 1200 COLL HERB SHED AT E. CLASS, MARD SPAR W/ 10 /2 MITHIC ACID FOR SUPERAL HERBICDES plass infoI, and in DU 77.5 The Folk 1330 COLL. DRAMALE DITCH DU # 7 - COLL, DUP, MS, MSD 1800 ALL OKA/ITA - \$20 1036 TEVEL SWITE + GOV, QA SAMMEN LOUKED. North Contraction of the second secon

3/1-5-12				Rorma	11-6-12
JEA.	ST CLADY,	60 JAMPLES		Y	
101	NTIFICS 1	N TRA FOLLOWAR	100	26 Dux TO OHANNE	fronka,
1	AMNER!			UE CANT CONT	Samplin 4
				IN DRIPOT ANIA.	mill
07055-0	001m-0001.	- SU = DUOI Formen FLEL AO	227.	MOVE TO FLAC.	50957971021
	2:02m -	~ = DUOZ DRAMABE DITE	J\$ <del>7</del>		
	1503m -	= \$10 47-40	103	5/ AT RUNC FORT	TATION
-00	204m	= DUOS HARD SLAD	-		
-06	USM	= DUDG WASH RACK			
-00	706m	= 10007 Contron VITCH	· · · ·	1	
	1				
		KACT		×	
SAMPLY CO	IL SUMAAN	CC-RVAAN JO CLASS.	Sng	NOTA EAST. CLAS	Vany
	th TIMA	AMALLSIS + Rh HAD		QA/QC SAMALE)	
-000/m- 11-3		VOL MOTA STOL DAD			
~ 0002m-	1510	* + ·		JUPLICATE COLL	
+0007m-	1515	SHOC, TPL METALS, PLB	-	DRAM. DITER WILL A	
2 JANS 0004M	1200	+ HARDICIDA	SAR	07055-0007-0	
2 J/n 5 005m		SVOL PUB PHALOSINS	NOFE	* 0 1057-000 000 0	
- 0005m	1330	VOL, SHOC, hENB, MERTALS.		/	
	1	PCB, EXPLOSIVES PROMOLIA	11-7.	12 07055-00010 -000	n 10 - YAAR BUR
		PESTICINES			
		i eniev.		• • •	

(2)11-2-12 Adriana 11-7-12 SAMPLAS COLL AT CC - NUADA > C \* NOTA FOR PG 3+4 BAST CLUSS. FAND, DIN NOT COLL. TPh URO/610 SAMPLES A DUOD COMMON ORAINATA VITCH (FULL SUITA LULATION, COLL TODAY, KIEPT SAME SAMPLIE 10, BUT W/ TODALS DATE + TIME OF COLL. 0850 COLL 07055-0006m-000/-50 OBservation on staking out sand Creek 11=7-12 @ 0916 12012 9Ph Coal Tipple One side has a 25' decline The other side is the creek. LAB BHOK METHANOL /VIL CUNTAINEN There is an access point from the FOR R. CLASSI FO SAMILR 07055-0002m-0001-50, road corner would need to clear Trees for geoprobe. & Ask Geoprose RII-SAMPLIE PORT, KEPT operator to tell is how he she would SAME SAMPER ID. AUT W/ EUr access). \_\_\_\_\_ Drick Company. TODAYS DATE + T/MX 0910 OULL VE FOR TPH/FRD 1600 AL PACTUROAV X JACKS M KIKIL (RCC) LU. FOR ARPORT THE ASMED FOR THIS SAMPLE. WILL BE LAQUED 1630 TEST AMERICA AT BED 1035 07055-0006m-0002-30 (ms/aso) TO PICK UP SAIMPLES

ABINT - YO'S D 0730 Pec + PAUDENS + PAILLENI AT BLO 1036 1775 MEKTINZ CAL PID- ral of WILL STANT IN BLD 47-40 MANT. DIT -LAST ISM SAMPLING TO DO, 0930 WENT BY ANTELA'S (VISTA) OFFICE TO CLECK IN, NO ONE TOFRE BUD 1037 OARK PROBABLY OFF FRIDAY, 0 137 AT GEO, THEAT PLANT TO CHICK ON BACKFICE / SITE RESTORATION AT PEPE. 2900 AT BUD VI- 40 Bisin DRILLING IN PIT FRAM MATTRIAL LIKE PAINT COMING UP From BUNMHOLE, POSSIBLY FROM ORILING MTO THE CONC.

D12-7-12 12-7-12 MXED N/SLAG WHEN AT 003, DUI, OU3, + DUS 1300 BAGN PP BORNEY AT CC 72 RV 88 POURKO D. COMPAU AT BLO U-6 OLASAND BRUSH FOR UST SAMPLING 1410 AT CC72 72-08 70 COMPUT Non SAMPLING 0915 AT BLD 47.40 11004, GRETTING PLERVERL ATT- OF PJ 1515 pmish at 72-08, WITCHN CALLS FOR 1-47 4-7 INTENVAL, WILL COLL. 0-1 PIRRCER BILOW FLOOR AS SUNFAUN SOL SAMPLE WILL LOUL 0-4' (REAVERL) AS VERT, 15m AT FAC 1-1 BORING NED TO USA 0-1 PT MATRAIAL IN I-4 MT SAMPLES Juk TO LAUK DO SAMPUN MATRINIAL O-1 PT WILL COURD ANT PROISIDUAL DATA FAP IN TELS INTENURL 1100 WILL COLL JBOB BOANTS

Date 13 Nov 12 PC LLESS THAN (360F) 7726 ton LEFT AT 6:20pm II HKS DRIHUME VERY SLUD - CORING-NO GO - MAY HANDHIT UST AT CC 70 NEAR FORMER HERB STOKEN AT 53-4-DUJ - HAD ODDES AT 55 KUNY INFOLTACE, MAY BE SOME ISSUES, HERB 57-2 CallERGD DUS 4-7 VOL VERY HOT 1-7' VOC HUT BRIVES DUG wask SB-L

Date 13 NOV 2012 QC 70 DU-3 Bidy 1740 STACTED 8.56 AM 40 " 43" 4" 5B-2 Q9:40 AM STALTED @ 9:35AM 0-4' BUK LLAY 18" 30" 4-7' TRANS DK LLAY INTOR BEDDED SS/CLAY 550 6-8' 38" 3011 @ 9:50 AM LIESS 16" SS 7-131 -33-3 STAL 439 @ 9:58 AM BL CLAY 40" TEANS TO DE COMY 32" 0-4'

Date 13 NOV 2012 5B-49 STALTON 11. 15AM U-4' CILIZAM DE BON SITTY CLAY TRANS TO BEN SILTY LLAS 4-7' W GARNEL & SJ' - SS R7' SB-5 STALTON 12:10 1-41 C 12:28 pm 36. 4'-7' BIK CLAY TRANS TO BEN SILTY 42" unt LUNCH - DELLER 12:16 m QU 6 MASI RACK STALTED @ 1:90 pm 5B-5 Q. 2:00pm BAN CLAY - SULTY CLAY 32" 1-41 301 4-71 LAST 19" GAMS PD STRONG ORDER 40 ppuy 2 linin open At HOT A Contected voo

Date 13 NOU 2012 WASH KACK @ 2:20 pm SB-41 384 1-4' SAME AS \$5 4-71 32" PLD 11.5 ppm Washt Rack ( 2:43 pm SB- 43 ) 200 TO -38 " 1-4' SAME AS \$5 4-71 35 Canalan ELODIR C SANDSENT -----WASH RACK @ 3. 10 pm 53-42 19" LT OKG-SILTY (LAN) END"/GRAVEL 39" BLK CLAY TEANS TAN/LT BEN LAST 6" LT ODOR (CLAY) 1-41 4-7' WASH LACK @ 3:43pm SB-04 -1- 1' 30" GRAVEL CLANT TRANS BEN CLAST BEN CUNT TERMS DK-LT BENY CUNT 4-21 27' 17 6000 - 55 P 10"

Date 13 NOV 2012 FORMER HERGLIDE STURAGE SHED DV 45 56-5 STALTED 16.00 @ 4:15m 1-4' 35 ' DK GRAY CLAY THANG LT BAN 4-7' 32" 11 TO \$5 24" 55 5B-\$4 C 4.25 m 38" DK GRAY CLAY MAY AAVE #74 GRAVELIGLAG TANK ?? 1-4' 4-7' 3" 1992 58-43 12.1000 e sidam 1-4' 37" GRAY BRISHLTY CLAY A-7' 39" TRAVS LIBEN THE LAST 18" 55 4-7' 38" SB-\$2 Q 5:12 pm SAME AS Ø3 1-41 5:22 pm 44" ALL TEMP 32 4-71 COLLETED VOC SAMPLE SB-BI G-SAZP LT BKN SILTY CUTY 4-7 32" 10" -10-7# AL

Date 14. NOU 2012
- SREM MECTING
ECY DU-1 SB-2 Strong petroleum smell ~ 2' from bottom (VOC + TPH taken) ECY DU-1 SB-1
strong petroleum smell ~ 2' Prom end (11P)+ sample +hore)
ECY DU-1 SB-4 NO DOWR ECY_DU-1 SB-5
ECY DUI - SB-3
<b>3</b> 6" 40"

Date FOR 12 STALTED 7)35m CC 70 Ensi CLuss Vinco & B:40m 10 10 Building 47-40 (Kand House) Du-9 5B-1@ 9:06 AM 0-4' 21' REVISION SS While Buff The 4-7' SURFACE SOILS PIO 3.5 ppm 7-13 5B-2 9:23 m 0-4' 26 15" Reserven 55 white Buff Tan -----5B-3@ 945AM 0- 36" DEBENSINKLAY -0-4' 2 48" KEFUSHL SS 36-18" BUH TAN 55 5B-9 @ 10:00m 0-30" u 6.4 0- 4' 2 46" KEPISH S 30 46" ... - L<sup>L</sup> 5B-5 @ 10-20m 0-91 × 36" REFUSER SS 20-36 0-34 DECUM (170 EAST CLASS YD BUIDIN- 47.40 DJ-3 SB-06

AZ Date FDECIL -----EADT CLASSYD Former Fuel Spill --------DU-1 53-06 9-5' string obse PID- 14 pm ------Horbicide Shed E DU-5 SB 06 Some - AS OTHENS 661 ŧ anix = Rounio House SAME - AS OTHERS 00-3 53-6 unit 6672-08 RV89 UST SITE (EE 63-10 3:00 1-4' BRN'SILTY OUNY (FILL ------ SAMPLEDCE 6 4 C' L 11 4-7' 58-2 @ 1313 1-4 BIEN ELINY SINVO EK CONT (FILL) TELANSTIC DEVICE 4-7' LT BEN SILTY CLINY WI PEN GRAVER INELD @7 53-30 13.22 1-9' BEN CITY SAND / BIKCL (FILL) TICHARS D OF BENCL 4-7' LE BEN SILLY LAY M DEN GENEL MIDE @7

Project No: 6	640030.0005.110051	Day:1	Date: January 29, 2018	_
W912QR-12-I	<b>D-0002, TO 0003</b>		Report No:	
Project Title	Additional Sampling a	t CC-60 CC-70 and CC-74 Comp Payon		

Work Area	Shift	Hours	Worked:	Weather:Cloudy	
	DAY	From:7:30 AM	To: 4:00 PM	Temp 30s F	
				Rain/Snow;	

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8.5			1
Cheryl Huey		4.5			
Paul Zahrte		4.5			
Contractors					
Underground Detective	7.5			1	7.5
·····					
Visitors					
<u>.                                    </u>					
				<b> </b>	

**HEALTH AND SAFETY TASKS PERFORMED/PPE:** Kevin Sedlack conducted a brief safety meeting at 9:00 AM. He discussed 1) Roll of Range Control, 2) what to do in the event of an emergency, 3) driving on the base.

EQUIPMENT ON SITE: Utility location equipment provided by the Underground Detective.

## QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

## SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

- 1. Cleared Area 69 (Former Firehouse) and Area 74 (Maintenance) of underground utilities.
- 2. Filled borings in the concrete trench of Area 72 (Railroad Maintenance) with bentonite. Hydrated the bentonite.

#### **PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:**

1. Underground Detective discovered an anomaly using the GPR east of the Automotive Maintenance building. The anomaly has the shape of a tank pit. A metal detector was used, and no metal was detected. Plan to move 74-1034-WP2 closer to the building to avoid the anomaly and the sewer line.

## NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

#### **PROPOSED SCOPE OF WORK FOR TOMORROW:**

- 1. Clean debris in Area 72 (Railroad Maintenance Building)
- 2. Cut brush in Area 72

	_
Joseph D. Peterlin	
Date: 29 January 2018	

CONTENTS					
PAGE	REFERENCE				
			DATE		
······					
	(1				
			ž.		
		30			
			х.		
3°.					

Location Camp Revening Date 1-29-2018 3 Project / Client

Paul Pol-to (Porspus) 307 / cloudy The rel Huey (Perspars) The Peter/M (Persons Annived at 7:30 Aur To conduc Sofety meeting with kovin sol and to have underground Clear propered boring location. - Security did not have persons is to for electrice Keyld Sollace Sent into to security - 8:45 Am Cleared security Nott Piter baugh with Underground Detective arrives and clears Sacurity Sphety meeting with Kevia Sedkick Building 1836 - NEED to Check in Daily with Constral. 614-336-6041. AT.

Location Comp Pavering Date 1-29-2018 Project / Client

Location Comp Ravenue Date 1-29-2018 5 Project / Client

- Mobilized to Area 69 (Former Fire station) a layed out Proposed bosings. Underground Detective started Clearing area with GPR

- Poul, Kevin, and Jac mobilized to Area 74 ( Automotive maintenonce. Marked proposed bonings.

- Paul, Kevini, and Joe Mabilized Jo Fred 70 (Roilroad Maintenanic). Filled in former berings with bentaite. Hydroted bentonite with distilled Woter.

- Bentenit, is Holeplug & 3/g " Coarse grade satures benton te from Wyoning Baroid Industrial Drilling Products Po. 180× 1675, Houston, TX 77251 877-379-7912

JDI

12:00 NOON: Paul and Cherry leave site. interground Detective leaves site to get gaseline. 1310 pm: Underground Detective Returns. 2:30 pm Cleated Area 69 and marked ut. I. tops Moved to Area 74 Found an average behind building that is the shupe of a lest pit. there is a samer like botween anomaly and be lang Took photographs of utility Markings 4.00 pm Leave Site -29-2019

Project No: 640030.0005.110051	Day:2	Date: January 30, 2018
W912QR-12-D-0002, TO 0003		Report No:

Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH

Work Area	Shift	Hours	Worked:	Weather:Cloudy	
	DAY	From:7:30 AM	To: 4:15 PM	Temp 10s F	
				Snow	

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8.75			
Contractors					
American Waste	_			1	7.5
- Steve Kilper		8.75			
- Todd		8.75			
Sunbelt Rental (drop off equipment				_	
Roll-off delivery driver					
Visitors					

**HEALTH AND SAFETY TASKS PERFORMED/PPE:** Kevin Sedlack conducted a brief safety meeting at 7:45 AM. He discussed 1) Roll of Range Control, 2) what to do in the event of an emergency, 3) driving on the base.

American Waste conducted safety briefs before cleanup of waste and again before brush hogging. American Waste topics covered in included with the Tailgate Safety Meeting Log.

EQUIPMENT ON SITE: Mini-excavator, Bobcat with brush hog attachment, and roll-off box.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

#### SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

- 1. Brush hogged area around Area 70 (Railroad Maintenance).
- 2. Moved debris, and started to clean the area above the trench.

#### **PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:**

- 1. Oily residue is present in the old drum rack. Steve is checking with the facility waste management people to determine what to do about the oily residue.
- 2. The east tracks inside the building are covered with wood. We can not determine if they contain oily sludges. Steve said this side was not used to work on the train engines, and therefore, should not contain the same amount of oily materials that the pit contains. We will take no action to remove wood or sample the materials below the wood.

## NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

## **PROPOSED SCOPE OF WORK FOR TOMORROW:**

- 1. Clean debris in Area 70 (Railroad Maintenance Building)
- 2. Characterize waste in roll-off.

## Joseph D. Peterlin

Date: 30 January 2018

Location Com) Barening Date 1-302018 Project / Client

Location Comp Ravenniq

Project / Client \_

- Arrived at 7:35 Am. Heave SNOW! Temperatures in 20%F - STeve Kilper with Anerican Lowoffil Monagenzent already ansite. -Todd with American Landfill management arrived al 7:45 Am - 9 50 Am : Conducted Safety Tailorte with Kerin Sedleck - 8:00 in: Checkes in at Range control Drace To Rail and Maintenionice Building - 8:30 Am : Reviewed Poulroad Mantonerice building scope of work with Kevin steve, GAN TOOO "900 mm: Conducted Safety prief with Steve and Toda TOP

Date <u>1-30-2018</u> 9:50 Aus Sundelt Rentel Arrives our base. I quided the anver to our Work location 11:00 Am: Conducted Sofety brief and brush 1202. Used Aren and Weste's JA then wolked area to be cleared 11. 20 Am storted prysh hagging 12:30 pm. Left Railroad Maintenence area to meet rolloff driver at gote Kerner annihes ons to 1:05 pm : Back owsite With rolloff driver. Brush is depiced 1. 20 Jui Discussed the covered tracks ON the cast side of building with Kevin- We don't know what's before the boods KeVIN said that work ON TRINS accurred on the west Fracks with P.T. Kevin de wot want to take

8 Location Comi Ravenda Date 1-30-2018 Location \_\_\_ Date \_\_\_\_\_ Project / Client \_\_\_\_ Project / Client \_\_\_\_\_ boords off to observe conditions around Tracks we will not conduct on prestigeton for by in Pailroad Maintenbuce Building. 4:15 pm: Check out with Range Control. Jeanse Bess. 13Ditter 1-30-2018

Project No: 640030.0005.110051	Day: 3	Date: January 31, 2018
W912QR-12-D-0002, TO 0003		Report No:
During This Additional Same Provide COL		100000000

Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH

Work Area	Shift	Hours	Worked:	Weather: Cloudy
	DAY	From:7:30 AM	To: 2:45 PM	Temp 10s F to 30s F

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	7:15	7.15			
Contractors					
American Waste					+
- Steve Kilper		4			
- Todd		7:15			
- Kevin		7:15			
Visitors					<u> </u>
Burt (Environmental)					

## HEALTH AND SAFETY TASKS PERFORMED/PPE:

American Waste conducted safety brief before cleanup of waste. American Waste topics covered in included with the Tailgate Safety Meeting Log.

EQUIPMENT ON SITE: Mini-excavator, Bobcat with brush hog attachment, and roll-off box.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

## SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

- 1. Scrapped oily debris from trench and drum storage area.
- 2. Placed debris in roll-off box.

## PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN: None

## NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

## **PROPOSED SCOPE OF WORK FOR TOMORROW:**

- 1. Collect waste characterization sample from roll-off
- 2. Collect the Area 69 (Former Firehose) groundwater grab samples
- 3. Collect the Area 74 (Automotive Maintenance) groundwater grab samples if time permits

#### Joseph D. Peterlin Date: 31 January 2018

Location Camp Rainna Date 1-31-2013 Project / Client \_\_\_\_

Location Comp Ravenne Date 1-31-2018

- Arried at 7:15 Am to contrive Work and Railroad Maintenimice building, stere already on site in Dutside parking lat. Todal and Karin/ with knowcoul waste arrived of 7:3000

-7:35 Am; Checked in with Bange Cattol,

-8.00 km & Conducted Daily safety brief, steve, Toold and Key N with Amorican Waster Keyin Sedlock, and the Paterlin, Topics compred are included on the American Waster tollaster form, which will be printed and Secluded with Daily Tailgote form,

HISOD KM: Calibrated the PID: To 100 pp

11:30 Aurs State leaves site,

JOP

Project / Client

12 5 THE KENN RAPPORES CLEEN UP. Reven and I discuss the location of proposed for 145. - alo check's observed in the nich. Source 4 Doriby ? Provelle. - Oil down rack hed cil starting bobs. place are attille here. - There are creats south of oil drugs reck No standing, Place once bring through wood Near creck. - Outside cathe basial Near rocal Where water would how . We found another eater basiki neor Dividing that concrets to Know N coter bashy. Place filiel bor ing int This are where surface water will flow This is highere of the Southern Most boring. 1: 30pm: Discussed progress with Ed Harre Heyse. JDP

Location ( Comp Ranang Date 131-2018 13 Location Date Project / Client Project / Client 1045pai Burt from Emporcasmentel STOPPEd by the site Walked South side of building. Locatien of proposed battings for this area do not change from proposed borlog lacations. 2:20 pm: American infoste (Foodland Fernin) leave she 2:15 pm: check out of Base with Bonge Control. 1-31-2018

Project No: 640	030.0005.110051	Day: 5	Date: February 2, 2018	
W912QR-12-D-0	0002, TO 0003		Report No:	
Project Title:	Additional Sampling at C	C-69, CC-70 and CC-74, Camp Raven	na OH	

Work Area	Shift	Hours	Worked:	Weather: Cloudy	
	DAY	From:7:30 AM	To: 3:45 PM	Temp 10s F	

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8:15			
Contractors					
EnviroCore					<u> </u>
- Tony Creamer		4:15			+
- Keith		4:15			
<u> </u>					
Visitors					<u> </u>
					<del>†</del>

## HEALTH AND SAFETY TASKS PERFORMED/PPE:

Conducted safety brief with Kevin Sedlack and Tony Creamer (EnviroCore) and Keith (EnviroCore). Discussed Parsons AHAs and working in cold.

EQUIPMENT ON SITE: Geoprobe with supporting equipment.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

## SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

- 1. Collected SB101 and SB102 at Area 72.
- 2. Completed borings to collect groundwater grab samples from 074-1034-WP1.

## PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN: None

## NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

## **PROPOSED SCOPE OF WORK FOR TOMORROW:**

- 1. Collect groundwater grab samples from the four borings at Building 1034.
- 2. Complete borings at Area 72 (Railroad Maintenance).
- 3. Mobilize and start at Area 69 (Former Firehouse) if time permits.

## Joseph D. Peterlin

Date: 2 February 2018

Date 2-2-2018 Location Bungersala Location Long Bouenna Date 2-2-2-19 Project / Client \_ Project / Client \_\_\_\_ 10325 Anne Started Spier Arrived at 7:20 pm to complete grab Semples at Area 71, and Collect Soil - Sinchos a- Concreto samples at Area 73, 10 inclus of yroval - -- (tony and Keith) Prave at 7:30 km. BOJA, MUIST Plastic con sil white there where Conducted Safety brief with Kewin Sedlerk et 1:45 pm Jample Volute Was A 8:15 Ans Sompled the decar woter SJEFTICK TO COULT 3 40= 105 A VX 4 Torres 8: 15 pr: Mohilized To Building 103%. Collecter 5: -174 1915, 0.-0 MS D. No ENGLIC Sound for 9:15 py: institut pro well at 2004 TAP2 - TATZ 2012 50 OVER DUTTES have an use for and, while CALL with the of scient 0 1 percent matter and you (Ruil-sed Munitorprice Building SELDAWLOS Marcor TO Around Store are a will do auplicates on themes Dering benduse at patter that The - Spanstand. JOP -352

Location Camp Royledke Date 2-2-2018 20

Location CompRoversion Date 2-2-2018 21

recking

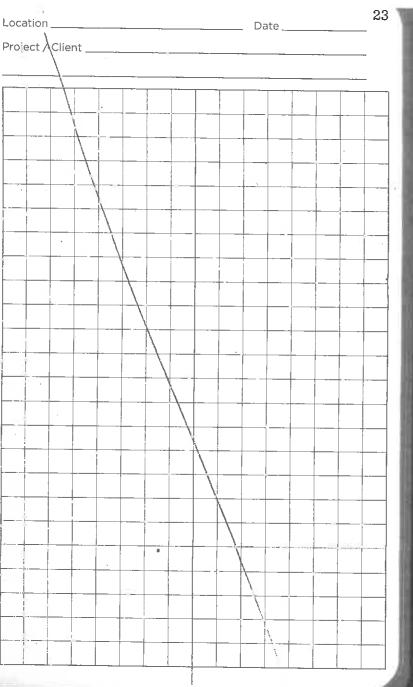
. TOF

Project / Client \_\_\_

Project / Client

House plantic city, sitt shrit with 17-61-513101 STATEN OF 1131 p East Track Near Trace possel. D-1Ft wed - 13 mary 6-8 HI Some - Collecter dutitete for 4-545 Hinches of mixed rike Grave! - Colificated PID to 100 per Sebytelene -in Dr. - Collocation good moist, plastic clausert c. p with Troce crouldgroding into a brown hand clay sil 1-1 A 0.2 pm 4-1 A 0.1 pm 6-8 1 21 pm Source of bottom Bestack of 8 Ft. Huder Refuser 2 At Raio ipiy could be due to gravel avourt Tracks. 15 concrete Under Tracks JOP

22 Location Comp Revenuero Date 2-2-2018 Location Project / Client \_\_\_\_\_ 4-7+ 1 And Miscar ilon 2/1-Back of a it Ratoril at 744 - Measured depth of Treach at 3Ft Swy. This is less then depth that will require fell protection! - 11: 45 Ami Drillers leave site. -12:20 pm: Faush at 12:20 Area TO. - Complete COC and Package Somples. - 3-45: Leave site to Take Somples to FORX 2-2-2018



Project No: 0	540030.0005.110051	Day: 6	Date: February 5, 2018
W912QR-12-I	D-0002, TO 0003		Report No:
Project Title:	Additional Sampling at CC-69, 0	CC-70 and CC-74. Camp	Ravenna OH

Work Area	Shift	Hours	Worked:	Weather: Cloudy	
		From:7:30	To: 4:30 PM	Temp 10s F	
	DAY	AM			

8	<u>9</u> 9			Hours
-				
8	9			
			1	
	7:30			
	7:30			
				-
				<u> </u>
		·		† <del></del> -

## HEALTH AND SAFETY TASKS PERFORMED/PPE:

Conducted safety brief with Kevin Sedlack, Cheryl Huey (Parsons), Tony Creamer (EnviroCore) and Brandon Creamer (EnviroCore). Discussed Parsons AHAs and working in cold.

EQUIPMENT ON SITE: Geoprobe with supporting equipment.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): PID (see field notes)

## SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

- 1. Collected groundwater grab samples from Area 74.
- 2. Collected soil samples from Area 70 (Railroad Maintenance) SB104, SB105, SB106, and SB107.

## PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:

The geoprobe concrete bit and concrete core have a 4 foot extension. The concrete bit was used to drill approximately 6 inches through concrete at SB103. After that depth, the geoprobe was used in an attempt to punch through the remaining concrete. However, the concrete is at least 20 inches thick in this area. After approximately 2 hours of work, the drillers decided that they need a concrete core machine to complete this boring.

## **NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL:**

- 1. The monitoring wells are required to be installed by a 6.25-inch inside diameter hollow stem auger unless we can demonstrate that there is a continuous 2 inches of sand pack surrounding the well screen. This doesn't seem possible so the scope of work will be changed to install wells using 6.25 inch augers.
- 2. SB103 will be moved to a location that Kevin Selleck will mark tomorrow morning.

## **PROPOSED SCOPE OF WORK FOR TOMORROW:**

- 1. Collect SB103 from Area 70 (Railroad Maintenance).
- 2. Collect roll-off characterization samples.
- 3. Mobilize and start at Area 69 (Former Firehouse).

Joseph D. Peterlin Date: 5 February 2018

Location Com Renention Date 2-5-2018 Location Canp Rovenna Date 2-5-2018 Project / Client \_\_ Project / Client . -Arrived at 7:20 And to contribue (South pro of theks drillingo 5 in clas of concrete - Chery Hury (Persons), Kould - 5 wiches of grave Brandan Creamer (Envirolore) Bedrock (Refusal) ONSITE. - 7:45 Am: So fety brief conducted APA OXNELL 18Inch. with Cherton Hucy, Tony Brandon, and Kesial Satisfy meeting is documented in BOUN Silt, Send With trace deily tailacte form and daily dividing ravel. tap inch sono 12 To in in ches the checklist form. Do Hour - 8:15 Au: Che: 11 starts spanpling at Building 10:34 11:15 pm: Celibrated PhD to 100 pm is a butylesse in all residention - 8.45 Jul: Start geoprole of Reilroud standora Menest Calcalle Building Drilers were suche to use Extract seponate fram concrete AT les 4 graches at concrete TOP ADT

Location Comp Raiporal Date 2-5-2018 Project / Client .

Location (cm) Revenues Date 2-5-2018 Project / Client \_

11 JO Am; Michk Leeper, Katie, at Ed D'AMGED, Kevin Sedlack the Reilroset Maintenewce building Walkert Ed through work couplete and black proposed. 12:00 NOON : STart STO SBIDT by cotch besin wear road Top 4 inches: organic sediment Approxinctely & inches of gravely -SCNU - mettled brown and pray, mpist slighty plestic clay, silt save with Trock group! JDP ...

Sis a nould Silt, Soud with Boit or 18", 5 a Wecklehper and store SBIOG (Cotch besen by RR Tracks) TOD 4 inches tup squi Remuning Sample: Brach mass Gently NEOSTIC CLAY, Silt 50 Fider gra 2 Bft top 14 ichos : Browny, Marstswithtesta clay Silt song W. K. Hace gravel. Botton 14 wohes: Wastlored will the solidatione oner boown SONTACTONIO STOP

28 Location Comp Revenden Date 2-5-2018 Project / Client \_

8-10 IT: weathered Soudstate - Refused at 10 AT 2:00 pm: Mark Leeper, Crang and Kound Sedleck adsite we discussed 1. Auger diameter - All agree that 4 25 wich auger is OK TOUS To install 2-inch monitoring wells. 2 A CONCIETA CORE Machine 15 - required to dill the ough consiste in French 2:05pm started 53105 0-1 pt; Top soil 2 Jinches Brown moist slightly plastic ing int and some with Trace 2 inclosed of cut laye at the energy below prede. TOP

Location Comp Revening Date 2-5-201829 Project / Client H'S Brown, noist slige the TICET Grovel To s

Bottom 141 " interthored smith Refused at 7 PTD Roodings SR1.24 12-4 O.O ppm 53107 (0+1)00 DA ppm PDIA porn DPm 9-1 DDM 53106 0ppm 0 ppm 14-6 ppn DO (3-8) 00 Ppin 8-10 010 Ppm

30 Location Comp Pollpanna Date 1-5-2013 Project / Client .

SR/185 (0-2 O.C. Ppor 58105 55105 2.7. 0 2 pm 4-6) 0.0 50m 0.0 SB195 (6-7)

- Discussed concrete corres in trench with Driller. they have both a concrete bit and a concrete core for the geop-dog the Droblem is both atto on a Rod that con not be extended forsile the trench, they contrise the concrete bit only a feel withos with concrete bit only a feel withos with concrete they are going to get a concrete they machine for thet we contract the Rod Martine for thet we contract the Rod Martine for the top contract 130 pm: Drillers leave to get concrete in C

3:00pm: Met dillers at Buildine 1036 To discuss concrete courses and 3.75 inch augers. The

Location Carp Bureauce Date 2-5-2015 31 Project / Client

NUTE ON PIDS SHADE IV Times and Fill some edition wing - PTD, SE Protos. Then istig the place 2/12/2/ 100-18 serel scraiged Sciend Tring. 315 pm sparte with MR. Klape. We she sough to show SB 103 Outside of the with I called divillers to incel lo a marchate 3 25 one GPOX- with Mark, Kein and Kati 1. Stage of Work to Tomme. ca - igunplots Anda 72 MO. 2 15 Area 124 7. Down Lobeling = WUMBUS during Use Formas RYAAP, 8151 SR 5, 2 were off 44266 5.19 N: Area 69 72 74 STIRT

32 Location An Rale Date 1.5. Locs 33 Location. Date \_\_\_\_ Project / Client Project / Client \_\_\_\_\_ - Clarked out it Kuns Cartal 1-17 : E # 4:30 Qu \$-5-2018 ÷

#### DAILY ACTIVITY REPORT

	640030.0005.110051	Day: 7	Date: February 6, 2018	
	D-0002, TO 0003		Report No:	
Project Title:	Additional Sampling	at CC-69, CC-70 and CC-74, Camp Raven	na OH	

Work Area	Shift	Hours	Worked:	Weather: Cloudy	 
		From:7:30	To: 4:00 PM	Temp 20s F	 
	DAY	AM			

Number on Site	Total Hours
	+
<u> </u>	+
	<u> </u>
	+
	+
_	

### HEALTH AND SAFETY TASKS PERFORMED/PPE:

Conducted safety brief with Kevin Sedlack, Cheryl Huey (Parsons), Tony Creamer (EnviroCore) and Brandon Creamer (EnviroCore). Discussed Parsons AHAs, working in cold, and drilling safety checklist.

**EQUIPMENT ON SITE:** Geoprobe with supporting equipment.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): PID (see field notes)

## SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

- 1. Collected Area 70 (Railroad Maintenance building) samples SB103 and catch basin sediment sample. The catch basin sediment sample appears to be outside of the scope of work listed in the work plan, but I understand it was requested by the Ohio EPA.
- 2. Collected roll-off box waste characterization sample.
- 3. Collected soil samples from Area 69 (Former Firehouse) SB110, SB111, SB112, and SB113.

#### PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN: None

#### NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None.

#### **PROPOSED SCOPE OF WORK FOR TOMORROW:**

1. Collect seven groundwater grab samples at Area 69.

### Joseph D. Peterlin

Date: 6 February 2018

Location Camp Parlenale Date 2-6-2018 Location Camp Pavenne Date 2-6-2018 Project / Client Project / Client -Arrived at 7:30 Aug To complete Browny, minist To wet, spridy cley and silt trace grevel Work of Anec TO (Roll roud Mainterior) and stort borings at Area 59 PID Reading 1. 4 pour of top (Firehouse) 7:35 Ace: Safety Tailate Meeting with = Cheryl Hvey Colibrated Tony, Bindon, Cheryl, Kerin ct 7:35 Ann 250kg Sapsint signed Form in Sorety Plani 4-7 ft & 21 with seconery \$:30 pm : Mork Leepert, Creig Coombs - Wet grovely Bondy clay condition Silt Grey Possible Fill Material From Sump discharge Kevin Sedlack at Area To. Found Sump under North Stairs, Manea boring To sump discharge 1. 110 Sampled From wetgrovely / Soudy SBICS located west of white trench Simp 2010 15 Nov 0-4 41: Cetch besin by \$B107 + ilsept hand arear to collect - 8 which concrete So ment semple. This so my D'e appears to be outside scope - 8 inches gravel 930 An Sompled Rolloff 18 169

Location Date Pover Date Date Location Carp Revender Date 2. 1. 18 Project / Client Project / Client PTO Readiles \$-12 PT : PTD + 12 53103 2-1 - 0.5 Wet Brown Silt Souch will SB103 (4-7) - 0,0 Elay Catch pasial - 0.0 Carle tod 10 -15 ft Sounde 10: 00 Am: Mared to Area 69 11/13/2 / 12-16 Ft: RIDINSTOOLAG TO GRAY SIGHT DEST-C Clay, Silt, Send With the SBIID 1.44: Brown moist sliphed - Plastic, Clay, Silt, Sond Trace Grovel. - inet sondy D- 0.2 p.m 15.4015 PIDppn 6-8 At BROWN, MOIST, Shephile, Plastic clay, silt, sound Frack 16-20 St: Groy Wet clay c. 1+ Sond, Soney layer is shallo fravel birt Zinch Genery loyer at 5 ft. 10 mes 12 inches 15 a weathand PTD + 0.0 pm Sandstane -Sample (15 2014) ( liceboi charle spices pay 丁语月 PI 1 - 0.1 ppm STAR.

Location Revenue Date 2 6-2019 Location Comp California Date 2-6-2018 Project / Client \_\_\_\_ Project / Client 20-24 Et: 11.5 Am is plated PM and Project Status. Annal maded To 33/11 Top 12 inches: Goay with clay silt Sene SBIN Bottom 18 , Neles Drawn weathered D-4 DT. JSPSON & Huches Bismon Meist, Slightly Plastic Clay, silt, Soud Mare gravel. -Sinkstone, collected sample from top of Dicens we the real sond starte at PTD - O.OSAM 1254 4-8At: Brown wet clay, 5.1t, Send Trace grevel PID-0.0,pm Refused of 28 Ft PID - 0.2 12000 24-28ft. BOWN, Wet Weathered R-12: Groy Mast Clay SI Sandstane PTD-0.000m. PED- O. Oppon . -T17?-NR.

Location Comments Rate MASS Date 2-6- 245 Location Comp Router Date - C- Jord Project / Client Project / Client 12-10 FT: Stay, Clay, Sitt sand SBILZ Wet Supple GAL 0-4 At 722 Suil 135 4 25 2.0 pp Middle 12, de : Bion / Mast. 10 Da Ft: Gene wet cley sill Soud PLD - 2.0 pm clap, SHT Sond Tiscs .... Botton 12 inches inst surel Bottom 4"15 & gozy weatherd sandstanic Sample diso te soudstance. ground silt ris PID-0.0,10 Brefusal at 23FF 4-3AT: Brown inorst, 20. 23 Ft: Brown net scallstore Service collected from bottom. PED-120 por PTD-0.0 700 12 10 5 por 1 left site to wat bottories ALT of dillors Everthe 1:45 per legiter book auste THE DF

Location \_\_\_\_\_ Pour any Date 2-6-2015 Location LI of Prischard Date 2-6-701843 Project / Client Project / Client \_ 8-12 PT: BOUNWE 1.1 SB/13 SITT Shad will To are grovel 0-4At: 4 well Top Soil PID-00 ppin BIDUN, Moist, Slightly Plestic - Refused at 14 ST Clay, silt, Sond Trace Gravel - collected 10 to 15 At somply PID-0.0ppeu From 12-12 At intervel. 4-8 FT: Brown Moist Slight. Plastic day Silt sand trace 12-14Ft; Brown wet clay silt Sand Trace gravel on Top. grovel. Stiff prown noist eley, scald Silt phith Trace group Non Wotton PTO-D.J PRIM 8-12 FT: Brown, maist, 5/5 5-5 - No observable bedrock. Drillers plastic city silt sead Trace Sinal. Wit loyer at 11 Ft - top I ded stop of geopeobe. They - between the one on reck. - Sompled io - 11 At above more imprin able loyer. PID-00ppa The RT7

Location Cours Rauseran Date 2.6.2015 Location Count Parene Date 2.6 101845 Project / Client Project / Client 12-16 ft: 107 12 makes brown moist clay site sand trace 20-24 At Batton & is a DIMUN Westhered Sudstar gravel 1 TPA is a firey cley, solt sine Botto 36 wither wit brown With Trace prover St. FF Sand With chap and solt. concred sonoie From store PID-00 pm Sandstone 12-16 ft : Groy Moist clad, sitt Sand Slightly plastic 2 20 pm ; Drillers leave site. - Checked Cois . ti 12707 - Sample collected from 17-18 St In Sugar NTE Vol - in it with at 3:43 pour to go to the Old - Ole - 1 hs Taking some for faller -PID DOPAN 16-20 Fr : Gray moist clay silt Sand, Slightly Blost, c · PIN-0.0 pom e-1-24/5 -312

### DAILY ACTIVITY REPORT

Project No:	640030.0005.110051	Day: Monday	Date:	3-5-2018
W912QR-12-	D-0002, TO 0003		Report No:	
Project Title:	Additional Sampling at CC-69, CC-7	0 and CC-74, Camp Rave	nna OH	

Work Area	Shift	Hours	Worked:	Weather:	Sunny
		From:	To:	Temp 29-	-37
	DAY	10:00	16:30	Rain/Snow	v; none

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS	1				
Cheryl Huey		7			
Contractors					
Visitors					
				_	

SAFETY: Cold stress in a.m., Slips-trips-falls, muscle strains, pinch points

SITE WORK COMPETED: Sampled 4 wells at 069 (MW001, 002, 003, 004). Sampled roll-off at 070 for TCLP Vocs.

**PROPOSED SCOPE OF WORK FOR TOMORROW:** Sample one well at 069 and 3 wells at 074. Also sample IDW water and complete waste inspection.

Cheryl Huey	
Date: 3-5-2018	

106 Location Contract & Trumenus Constituines Date 3/5/18
Project / Client OAMP PANEMUA 070, 063
O. HUGY LUCL SAMPLING
CASS ONSITE, SWNNY DAGE
FORECAST SUNNY HIGH 303
1000 TAILGATE BRIEFING . CHECK W RANGE CONTROL.
1005 CALIBRATE EQUIPMENT
451 556 ? COND - (11B) 1,423 1.413
PN 4.0- 3.72 4.01
PH 10.01 10.11 10.01
pt 7.0 7.36 7.01
082 (240,00) - 238,2 240,0
DU2 (32 MIR SAT) - 92, 7%/ 100, 2%
Turbidimener HI98703
60.1NU B- 0.19 A- 0.10
15 NTM 15-14-15.0
100 mm B-104 A-107 - 750 mm B-756 A-751
1020 DRING TO ACC 070 TO COLLECT FRLP VOC
SAMPLE FROM ROLL-UFF
1830 COLLECT 0705 (~ 0002-UN)
1043 BACKTO ADC 069
1058 BACKE 069. CHECKED IN WITH RANGE CONTROL
1100 SET UP C D69MW-003
1139 STAT PURCING MW003
1240 SAMPLED DIAME - 203-0001-GW 1255 START PURCING 069 MW 001

Location FORTINGE + TELIMBULL CONVITED ate 3/5/18 107
Project / Client CMNP RAVERINA 069
C. HUEY WELL SAMSLING
14:01 SAMPLES 069 MW-001-0001-6W MEDUNI 14:07 SAMPLES 069 MW-001-0001-6W MEDUNI
14'20 Start Duging a grue and N Dut.
14'20 STANT PURCTING 069MW-002 NOW. DTW 28 73
15'06 SAMPLED 069MW-002-0001-GW
15:21 START PWRGING 069MW-004 DTWR 8,97
16 15 5 AMPLES 069 MW 004 - 0001 - GW
16'20 CLEANED VE.
16'25 CHEAKED OUT @ RANKE CONTROL
16.26 WENT OUTSIDE THE GATE TO PACK
THE COLER.
1206 LEFT THE SITE FOR FOR FORX
25/8

106 Location Contract & Trumenus Constituines Date 3/5/18
Project / Client OAMP PANEMUA 070, 063
O. HUGY LUCL SAMPLING
CASS ONSITE, SWNNY DAGE
FORECAST SUNNY HIGH 303
1000 TAILGATE BRIEFING . CHECK W RANGE CONTROL.
1005 CALIBRATE EQUIPMENT
451 556 ? COND - (11B) 1,423 1.413
PN 4.0- 3.72 4.01
PH 10.01 10.11 10.01
pt 7.0 7.36 7.01
082 (240,00) - 238,2 240,0
DU2 (32 MIR SAT) - 92, 7%/ 100, 2%
Turbidimener HI98703
60.1NU B- 0.19 A- 0.10
15 NTM 15-14-15.0
100 mm B-104 A-107 - 750 mm B-756 A-751
1020 DRING TO ACC 070 TO COLLECT FRLP VOC
SAMPLE FROM ROLL-UFF
1830 COLLECT 0705 (~ 0002-1)
1043 BACKTO ADC 069
1058 BACKE 069. CHECKED IN WITH RANGE CONTROL
1100 SET UP C D69MW-003
1139 STAT PURCING MW003
1240 SAMPLED DIAME - 203-0001-GW 1255 START PURCING 069 MW 001

Location FORTINGE + TELIMBULL CONVITED ate 3/5/18 107
Project / Client CMNP RAVERINA 069
C. HUEY WELL SAMSLING
14:01 SAMPLES 069 MW-001-0001-6W MEDUNI 14:07 SAMPLES 069 MW-001-0001-6W MEDUNI
14'20 Start Duging a grue and N Dut.
14'20 STANT PURCTING 069MW-002 NOW. DTW 28 73
15'06 SAMPLED 069MW-002-0001-GW
15:21 START PWRGING 069MW-004 DTWR 8,97
16 15 5 AMPLES 069 MW 004 - 0001 - GW
16'20 CLEANED VE.
16'25 CHEAKED OUT @ RANKE CONTROL
16.26 WENT OUTSIDE THE GATE TO PACK
THE COLER.
1206 LEFT THE SITE FOR FOR FORX
25/8

# **APPENDIX B.5**

## **Photoionization Detector Calibration Forms**

This page intentionally left blank.

INSTRUMENT CALIBRATION LOG

Project/Site Name KAVENNA , 01710

Calibrated By V. Donovan

Instrument/Serial Number	Pre-calibration Reading	Post-calibration Reading	Calibration Gas/Concentration	Date
MiniRae 3000 PID ノッチイフ	0,0/1142	6.0/99,7	Isobutylene / 100ppm	11-12-12
MiniRae 3000 PID / of Y7	0.0/111.3	0,0/103,2	Isobutylene / 100ppm	11-13-12
MiniRae 3000 PID ノー ジーゲン	0.0/99,8	C'En/10'0	Isobutylene / 100ppm	11-14-12
MiniRae 3000 PID / 0 『アク	0,0/99.1	0,0/99,6	Isobutylene / 100ppm	11-12-12
MiniRae 3000 PID	0.0/101.2	0,0/102.4	Isohutylene / 100ppm	11-16-12
MiniRac 3000 PID		*	Isobutylene / 100ppm	
MiniRae 3000 PID			Isobutylene / 100ppm	3
MiniRae 3000 PID			Isobutylene / 100ppm	
MiniRae 3000 PID		2	Isobutylene / 100ppm	
MiniRae 3000 PID			Isobutylene / 100ppm	
MiniRac 3000 PID			Isobutylene / 100ppm	
MiniRae 3000 PID			Isobutylene / 100ppm	

INSTRUMENT CALIBRATION LOG

V

Project/Site Name Ravena 0M10

Calibrated By David Camper

Date	13-3-12	12-3-12	12-4-61	E1.4.21	12-5-12	21212	211-121	21/01/61	-el/an/el	2/11/2	13/11/12	12/12/12
Calibration Gas/Concentration	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm	Isobutylene / 100ppm
Post-calibration Reading	0.0 110.20	0.0 102	0.0/103	0.0/101	0.0/107	0.0/101	0.0/101	0.0/99.3	20/102	9.9910.0	0.0/101	0.0199.7
Pre-calibration Reading	2.1014.0	201100	0.0 / 100	0.0/100	0.01 100	00199.4	L.PP10.0	0.01/0.0	00/100	0.0 / 100	oai / 00	0.0 / 100
Instrument/Serial Number	MiniRae 3000 PID 11806	MiniRac 3000 PID	MiniRae 3000 PID 11 FUS	MiniRae 3000 PID 1 0 6 9 9	MiniRae 3000 PID $1 + 8p \leq$	MiniRae 3000 PID 116 05	MiniRae 3000 PID 11805	MiniRae 3000 PID $11805$	MiniRae 3000 PID 1 089 9	MiniRae 3000 PID 11 名 5	MiniRae 3000 PID 10 PG 9	MiniRae 3000 PID 11 805

# **APPENDIX B.6**

**Tailgate Safety Meetings Logs** 

This page intentionally left blank.

	PROJECT	Г NAME:		ECT NO:		
BATE: 1- 21 201	W ThF Sa Su	TIME: 7	3. Wer And St 1	BLUN SAN	ULK # 8.5	GAARA GA
WEATHER: flef-	ICI SHELLI JA	08			JUCH'S VOCE	TICAN
WORKING COND	TIONS: Sho	t,J				
PPE: 1 ovid / Ti	\$					
ITEMS DISCUSSE	D:					
the sky sent uil	K Ketall:	BY. acc	Rom Frish .	TY TIVE No	L. Crowner	w Make A
NO ( HUD F				J		
	142 materia	il.				1
Direvsked w.	IR Streve y:	A TE elf:	Ava 1554	A (51-0	AMacula	9
	DIJALS ATTRINDED T			ETING (SIGNAT	1(8ES)	
THE FOLLOWING INDIVI	DUALS ATTENDED T	THE DAILY TAILS	and safety me	ETING (SIGNAT	URES)	
THE FOLLOWING INDIVI	DUALS ATTENDED T	THE DAILY TAILQ	and safety me	ETING (SIGNAT	URES)	
THE FOLLOWING INDIVI	DUALS ATTENDED T	THE DAILY TAILQ	AND SAFETY ME	ETING (SIGNAT	URES)	
THE FOLLOWING INDIVI	DUALS ATTENDED T	THE DAILY TAILQ	AND SAFETY ME	ETING (SIGNAT	URES)	
THE FOLLOWING INDIVI	DUALS ATTENDED T	THE DAILY TAILS	AND SAFETY ME	ETING (SIGNAT	URES)	
THE FOLLOWING INDIVI	DUALS ATTRONDED T	THE DAILY TAILS	AND SAFETY ME	ETING (SIGNAT	URES)	
THE FOLLOWING INDIVI	DUALS ATTENDED T	THE DAILY TAILS	AND SAFETY ME	ETING (SIGNAT	URES)	

Jae Reterin SITE SAFETY AND HEALTH OFFICER

Project/Task: Date: List Personnel:

Pre-Work Hazard Evaluation LIGAN BIDG TO

List Personnel: DEC/TODD/Ar DVE. Pre-Work Checklist (complete for all tasks before beginning)

1. Read and understand procedures/instructions/SDS/JHA for task?

- 2. Proper equipment and tools available and servicable and safe?
- 3. Required permits (GWP, Not work, confined space, etc.) completed?
- 4. Proper PPE for project/task discussed and available to at h
- 5. Energy isolation discussed and identified by all personnel?
- 6. Have all personnel participated in Show Me of the work area?
- 7. Have all other work areas and personnel been notified of the work?
- 8. Have hazards associated with the project/task been identified [below]?
- 9. HAVE YOU TALKED THROUGH HOW TASK WILL BE PERFORMED?

10. HAVE YOU TALKED THROUGH WHAT TO DO IN AN EMERGENCY?

Known or Potential Hazards

Hazardous atmosphere Stored energy - electrical Stored energy - liquid/gas Stored energy - mechanical Chemical hazarda Hot/Cold hazards Fall hazards (working at ≥ 47) Pinch point hazards Excavation hazards Slig/Trip/Fall hazards Line of Fire hazards

E	no
yes.	X
Par.	na
100	2
R	no
R	10
yes	X
yes	200
18	no hu
100	No.

Mot work. Confined space Other work in vicinity Jacking/cribbing Traffic/barricadirys Overhead hazards Visibility/Noise issues Utting/Ergishomilica Weather factors Other: 31946/7

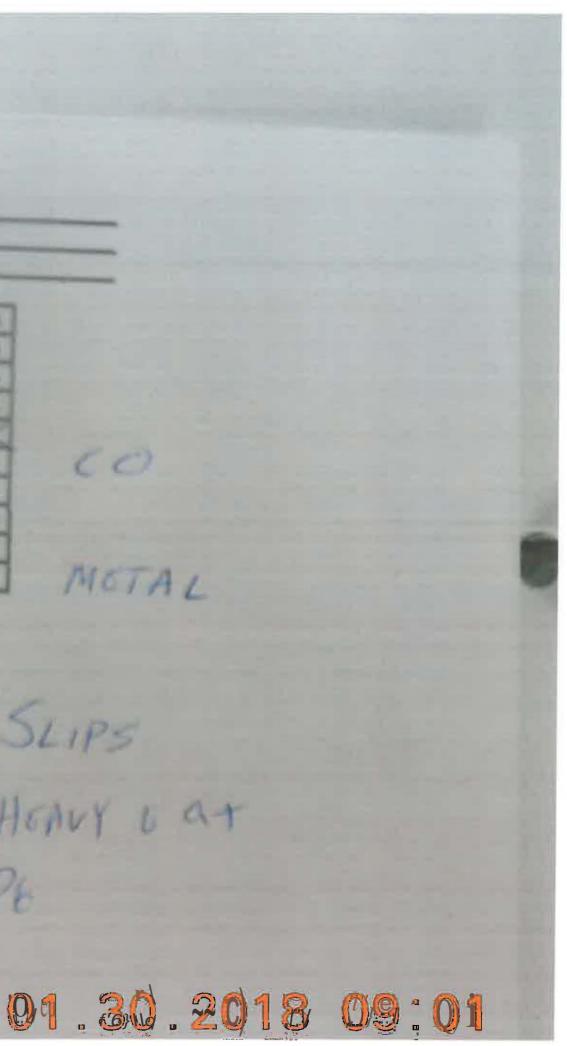
13K	100	will	
Par -		will	th/ch
mes-	140	10.12	14/2
YER	105	will.	N/A
	1980		Insa.
1th	100	will	N/A
YAC	ho	will	N/A
YES .	Pic.	will .	N/A
YEL	100	- Illine	NZA
yes.	ma	will	NIA

MOTAL

VPR A YES. yets. 20 800 no yes. Nor my 亥 196 125 THE. VER 792

SLIPS HEAVY 0 at

Note any special hazard controls, special PPE, notifications to other steas, and other considerations on reverse side of this card.



		or oreve with	er: 33	0-61	8-02	59	-
List Personnel:	00 TO	-1001					
1. Read and understand p 2. Proper equipment and understand p 3. Proper equipment and understand p	Foceduresi/instru Foceduresi/instru Fools available a	ks before beginning) uctions/SDS/JHA for ta~k? md servicable and safe? Ined space, etc.) completedi' available to all? a by all personnel?		Ino	will	N/A	1
3. Required permits (GWP)	hot work, cont	ined space, etc.) completed?	Xes-	no	will	N/A	
4. Pr-Oper PPE for project/t	ask discussed a	ne available to all?	yes	no	will	DYA	-
5. Energy isolation discusse 6. Have all personnel parts	a and identifie	By all personnel?	Contraction of the local division of the loc	no	witt	N/A	
6. Halle all personnel partic	upated m show	Me of the work area?	yes	no	Will	NXA	
7. Have all other work afeas	and personnel	Me of the work area? Me of the work area? been notified of the Worf </td <td>yes</td> <td>no</td> <td>with</td> <td>N/A</td> <td></td>	yes	no	with	N/A	
8. Have halards associated	with the projec	t/Lisk peen identified lbelow)/	Ver	no	will	N/A	
			Ves	по	Will	N/A	
10: HAVE VOU TALKED THR	JUGH WHAT T	O DO IN AN EMERGENCY?	57	no	whill	N/A	
KROWR or Potential Hazards			Yes	по	wan	N/A	
Hazardous atmosphere	Luce First	7				0	-
Stored energy - electrical			yes	ne	1	S	>LI
Stored energy - liquid/gas		- Comment of the	The second	ne		-	
Stored energy - mechanical	yes ne	Other work in vicinity	yes	he	-	0	TA
Chemical hazards	yes no	Jacking/cribbing	yes	no		9	J/A
Hot/Cold hazards	yes no	Traffic/barricading		no	-	-	H
Fall hazards (working at 2 4')	yes ma	Overhead hazards	10000	NO		C	-
Pinch point hazards	yes box	Visibility/Noise issues	-	no		-	-
	yes ne	Lifting/Enganomics	1	x			-
Excavation hazards	yes no	Weather factors					(1
SUp/Trip/Fall hazanids	no no	Other: VISILINI	12	10		1	-

YPS no

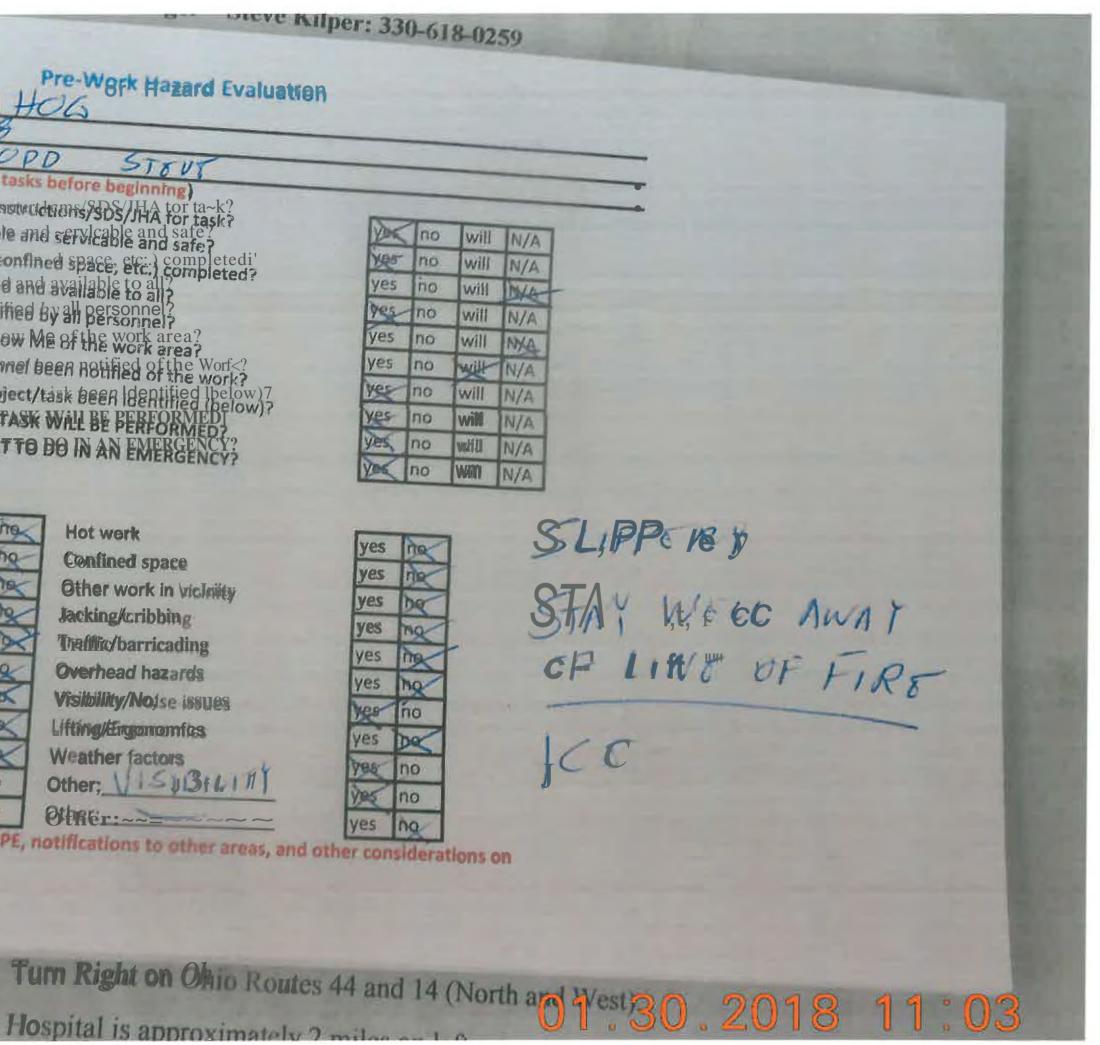
Hospital is approximately 2 miles on 1 of

Line of Fire hazards Note any special hazard controls, special PPE, notifications to other areas, and other considerations on

reverse side of this card.

Other; Yes no 

.



	TAILGATE SAFETY PROJECT NAME:	MEETING LOG PROJECT NO:
DATE: MTu	W Th F Sa Su TIME: Q.	on An
WEATHER:	<u></u> 0:	
WORKING CONDITIO	DNS: Cold / SIL	10W (17°F)
PPE: Level	D with Dust mi	25KS when sweeping
TEMS DISCUSSED:	See Attached	
Andre Bergen		
		Sealed - La Sele - S
E FOLLOWING INDIVIDUAL	S ATTENDED THE DAILY TAILGAT	E SAFETY MEETING (SIGNATURES)
histor		
11AF		
The log AV.		
S. A.	2	
9 Chan-	-	

SITE SAFETY AND HEALTH OFFICER

### Emergency - 911

Camp Ravenna Ranac Combrol (Innergency): 814-336-6041

Selely Manager - Steve KUper: B304618-0259

Project/frask;

Pre-Work Hazard Evaluation Key Key N. TODD OF STRY-

We was and where the projective of the second second part of the second part of

世に

Ven.

ves	no	will	IN/A
105	no	wilf	MA
Vec	ne	Will	INJA
VOS	no	will	INYA
yes	no	will	HALA
her	no	ikw	N/A
ne	no	will	N/A
pes	no	will	N/A
me	no	will	N/A
105	no	will	NA

CRY WASIL

01.31 2018 08.18

Haza Couls-atmbsphere	
Stored Elbelgy gelectrical	
Scored energy - liat/tb//gas	
Stored energy-mechanical	
Chefhic II hazards	
Host/Cold nazadds	
Fall Mazands (working at 2 C)	
Pinch point hazards	
A Station Hazards	
lip/Trip/Fall hazards	
ine of Fire hazards	

Kinown or Potentißaf Hauled.

Dilte

List Personnel:

<	Hjot work
K	Confined spatch
2	Other work in vienway
2	Jadiwherichibidihi
	Tratfic/transcoling
	Olienhead haranti
14	Visibility/Noise same
	Liftung/ErHonon+
2	Weather factor
	Other
	Other:

res	no
/es	100
B	See 1
es	THE
×	00
65	340
25	no .
e -	no
ę.	no
₽> `	no
-	

ves no

54105

Note any special hazard controls, special PPE, notifications to other areas, and other considerations on neverse side of this card.

- Furn Right on Unio Routes 44 and 14 (North and West).
- Hospital is approximately 2 miles on left
- Follow signs to Emergency Entrance.

PROJECT NAME:	ETY MEETING LOG PROJECT NO:	
DATE: 2.2.28/8TH WHEFSA Su TIME:	8:00 fu	
WEATHER: SHE SNOW		
WORKING CONDITIONS: SHOW OF	d cold	
PPE: Bevel D		
TEMS DISCUSSED: Worst-e Monor	ement	
Prepeek welk R.		
Att As in Safety Think		
HE FOLLOWING INDIVIDUALS ATTENDED THE DAILY T	ATT CATTE CARPTER ACCORDEC (CLONA T	TD C@)
m Contraction of the second se	ALOATE SAFET I MEETING (SIONAT)	JKESj
Dart 7-		
TATA .		·
Petry PY		
	÷	

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG PROJECT NAME: **PROJECT NO:** 1 - Mata Mille & Sassu FIME: 7:30 Am 2-5-2018. DATE: WEATHER: Fleet qr/= WORKING CONDITIONS: 5 MOLL PPE: Level D MARK Revainsed MARK Revainsed Doily Childley Thespecticon /16dk/is T THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

ATE: MY	White Bassu "	TIME: 7:35	PER-	R-6-2018
	19 % E. SNOL	A design of the second se		
ORKING CONDI	TIONS: Andre	SAVEW _	I B-	
		- JNOW -1		
B: Lettel	Th	n		1. 100 - 10
Lever		•		
ems discussei	D: AAA B			·····
	B: AAA Ase s. tailts	KIT III AR		
tips, Fraik	s palls	•		
	<u> </u>			
				H
FOLLOWING INDIVI	DUALS ADENDED THE	DAILY TAILGATE SA	FEIMMEENO	(G (SIGNATURES)
1100			· · · · · · · · · · · · · · · · · · ·	
all -	7			
1				
lig				
12. 070.			+	
Dugl De	<u>~</u>			

SITE SAFETY AND HEALTH OFFICER

DATE 3KIN G	Fu W Th F Sa Su	ATE SAFETE I NAME: CAME NAME: CAME	n - moste		141.0p, 0.300C
the second se					
WEATHER: SU	ADAGH HIGH 2005	TO HIGH 3	65		
WORKING CONI	DITTONS: GREWND	SCRT , Same	F(2)(0)	S'flatts M	WD
	USIG ASIP HACT				
PPE: LE VEL .!					
TEMS DISCUSS	ED: Qicd stress	C 1.1 A #14	~		-
6 D.C		and the second sec			
SUL PS-14	HP.S.F.F.F.HLS, MU	iscle Stan	ins, finc	A Parmars	10
					_
		~ ~			
					4
		117-2010			
HE FOLLOWING INDT	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEETI	NG (SIGNATUR	
HE FOLLOWING INDF	VIDUALS ATTENDED TH	E DAJLY TAILGATE	SAFETY MEETI	NG (SIONATUI	(ES)
	VIDUALS ATTIENDED TH	E DAJLY TAILGATE	SAFETY MEETI	NG (SIONATUI	UES)
	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEETI	NG (SIGNATUR	RES)
HE FOLLOWING INDT	VIDUALS ATTIENDED TH	E DAJLY TAILGATE	SAFETY MEETI	NG (SIONATUI	les)
	VIDUALS ATTIENDED TH	E DAILY TAILGATE	SAFETY MEETI	NG (SIGNATUR	les)
	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEET	NG (SIGNATU	RES)
	VIDUALS ATTENDED TH	E DAJLY TAILGATE	SAFETY MEETI	NG (SIONATUI	(ES)
	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEETI	NG (SIONATUI	les)
	VIDUALS ATTIENDED TH	E DAJLY TAILGATE	SAFETY MEETI	NG (SIGNATUI	les
	VIDUALS ATTIENDED TH	E DAJLY TAILGATE	SAFETY MEETI	NG (SIONATUI	les)
	VIDUALS ATTIENDED TH	E DAJLŸ TAILGATE	SAFETY MEETI	NG (SIGNATUI	les)
	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEETI	NG (SIGNATUR	(ES)
	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEET	NG (SIGNATU	RES)
	VIDUALS ATTENDED TH	E DAILY TAILGATE	SAFETY MEETI	NG (SIGNATUR	les

Hun STE EASTATY AND HEALTH OFFICER

- )

This page intentionally left blank.

## **APPENDIX B.7**

**Daily Safety Inspections** 

This page intentionally left blank.

			DAILY SAFETY INSPECTION
PI	RO.	JECT:	DAILY SAFETY INSPECTION Ravenna 1-30-2018 Page 1 of 2
N	Ŷ	' NA	Item
	L	T	Daily safety briefing conducted
-	-	F	Emergency numbers and route to hospital posted
	-	F	FWSHP and project-specific Addenda on-site, available to employees, and complete
			Required exposure monitoring conducted and documented
		C	Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	/	F	First aid kit available and inspected weekly
	i	F	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		2	Personnel using buddy system (maintain visual or verbal contact and able to render aid)
		-	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
1	/		If temperature <40°F: cold stress training conducted, controls in SSHP implemented
1		/	Personnel using appropriate biological hazard controls (See SSHP)
1			Drill rig operating manual on-site
╡			Drill rigs inspected weekly and documented
1		~	Personnel near drill rig or other overhead hazards wearing hardhats
1		/	Each of two drill rig emergency shutdown devices tested daily
╡		~	Employees excluded from under lifted loads
┝	オ		Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
Ť	1	7	Radius of exclusion zone around drill rig at least equal to mast height
T			Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
╈	1		Containers of flammable liquids closed and labeled properly
Ţ	7	- 1	Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected nonthly
1	オ		Personnel exiting potentially contaminated areas washing hands before eating
Ť	1		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit
_	_		

8

			DAILY SAFETY INSPECTION
PF	ROJ	ECT	Page 2 of 2
N	Y	NA	Item
		-	Portable electrical equipment plugged to a GFCI
_		-	Electrical wiring covered by insulation or enclosure
-			Three wire, UL approved, extension cords used
			Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, wor
	$\leq$		areas clear of objects that might fall on employees)
	-		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
			Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		-	Moving (rotating) machinery guarded to prevent employee contact
Τ		~	Fall protection provided for work at elevations greater than 4 ft
		~	All containers of hazardous material labeled to indicate contents and hazards
	7	-	MSDSs for hazardous materials on-site
ļ	7	/	All vehicles equipped with two-way radios and cellular phones
T	1	7	15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
T		-	Potable and non-potable water labeled
Ť	T	7	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
1.	才		Visitor access controlled
†.	╞	-	Site hazards and controls consistent with SSHP
卞	7	- 1	Site hazard controls appropriate and sufficient
			to correct or control any "N" responses
Jame	<u>,</u>	Pe	terlin de 1-30-2018 Signature Date

.

134

3

2

Γ			DAILY SAFETY INSPECTION
P	RC	JECT	Page 1 of 2 Page 1 of 2
N		Y NA	Item
	ľ	1	Daily safety briefing conducted
	ŀ	1	Emergency numbers and route to hospital posted IN Sofety Man
	•	P	FWSHP and project-specific Addenda on-site, available to employees, and complete
	Γ	-	Required exposure monitoring conducted and documented
	Γ		Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	-	1	First aid kit available and inspected weekly
	-	1	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		~	Personnel using buddy system (maintain visual or verbal contact and able to render aid)
	Γ	-	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel
			wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
		1	If temperature <40°F: cold stress training conducted, controls in SSHP implemented
		-	Personnel using appropriate biological hazard controls (See SSHP)
		/	Drill rig operating manual on-site
		-	Drill rigs inspected weekly and documented
Ι		~	Personnel near drill rig or other overhead hazards wearing hardhats
Τ		~	Each of two drill rig emergency shutdown devices tested daily
T		/	Employees excluded from under lifted loads
T		~	Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
1		~	Radius of exclusion zone around drill rig at least equal to mast height
T		~	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
T	_	~	Containers of flammable liquids closed and labeled properly
~	7		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
Ť	2		Personnel exiting potentially contaminated areas washing hands before eating
Ť			Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit
- <b>- -</b>			

r

## DAILY SAFETY INSPECTION

Ν	ΙY	NA	Item
	1	-	Portable electrical equipment plugged to a GFCI
			Electrical wiring covered by insulation or enclosure
		-	Three wire, UL approved, extension cords used
	7		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazar areas clear of objects that might fall on employees)
	7		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
			Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with
	-		Moving (rotating) machinery guarded to prevent employee contact
1		7	Fall protection provided for work at elevations greater than 4 ft
1	1	~	All containers of hazardous material labeled to indicate contents and hazards
Ţ	オ		MSDSs for hazardous materials on-site
Ţ	7		All vehicles equipped with two-way radios and cellular phones
1	╡		15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservat poured
t	╈		Potable and non-potable water labeled
╋	1	7	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective c
1-	オ		Visitor access controlled
Ţ	オ	5	Site hazards and controls consistent with SSHP
T-	1	5	Site hazard controls appropriate and sufficient
tic	ons t	aken t	o correct or control any "N" responses
		5	Erlin ATA 1-31-2018 .

1

	_		DAILY SAFETY INSPECTION
P	RO.	JECT:	Comp Power 2-2-2018 Page 1 of 2
Ν	Y	NA	Item
	1-	1	Daily safety briefing conducted
	-	F	Emergency numbers and route to hospital posted
	-		FWSHP and project-specific Addenda on-site, available to employees, and complete
		~	Required exposure monitoring conducted and documented
	1	1	Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	た	-	First aid kit available and inspected weekly
		F	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		-	Personnel using buddy system (maintain visual or verbal contact and able to render aid)
		-	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
·	-		If temperature <40°F: cold stress training conducted, controls in SSHP implemented
			Personnel using appropriate biological hazard controls (See SSHP)
	~	ł	Drill rig operating manual on-site
	/		Drill rigs inspected weekly and documented
	~		Personnel near drill rig or other overhead hazards wearing hardhats
	-	1	Each of two drill rig emergency shutdown devices tested daily
_		-	Employees excluded from under lifted loads
	~	-	Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
4	~	ſ	Radius of exclusion zone around drill rig at least equal to mast height
	_	-	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
			Containers of flammable liquids closed and labeled properly
	, ,		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
	7	_	Personnel exiting potentially contaminated areas washing hands before eating
	J		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit
_			

100

PROJECT:       Page 2 of 2         N       Y       NA       Item         Item       Portable electrical equipment plugged to a GFCI       Item
Dortable electrical equipment plugged to a CECI
I ortable creculture equipment plugged to a GFC1
Electrical wiring covered by insulation or enclosure
Three wire, UL approved, extension cords used
Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
Moving (rotating) machinery guarded to prevent employee contact
Fall protection provided for work at elevations greater than 4 ft
All containers of hazardous material labeled to indicate contents and hazards
MSDSs for hazardous materials on-site
All vehicles equipped with two-way radios and cellular phones
15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
Potable and non-potable water labeled
Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
Visitor access controlled
Site hazards and controls consistent with SSHP
Site hazard controls appropriate and sufficient
Actions taken to correct or control any "N" responses
Joe Reterlist ODE 2-2-2018
Vame Signature Date

J

5

			DAILY SAFETY INSPECTION
	-		DAILY SAFETY INSPECTION Camp Prover 10 2-5-2018 Page 1 of 2
N	Ŷ	NA	
	c	1_	Daily safety briefing conducted
	3	F	Emergency numbers and route to hospital posted
	ſ	+	FWSHP and project-specific Addenda on-site, available to employees, and complete
	c	F	Required exposure monitoring conducted and documented
		F	Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	Ļ	ł	First aid kit available and inspected weekly
	-	F	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
			Personnel using buddy system (maintain visual or verbal contact and able to render aid)
			If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel
$\downarrow$			wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
	<u>ــــــــــــــــــــــــــــــــــــ</u>		If temperature <40°F: cold stress training conducted, controls in SSHP implemented
			Personnel using appropriate biological hazard controls (See SSHP)
	-	-	Drill rig operating manual on-site
	ζ	-	Drill rigs inspected weekly and documented
Τ	S	-	Personnel near drill rig or other overhead hazards wearing hardhats
Τ	7	-	Each of two drill rig emergency shutdown devices tested daily
Τ	4	-	Employees excluded from under lifted loads
1.	_	-	Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
T	7	-	Radius of exclusion zone around drill rig at least equal to mast height
	_	-	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
╈	1	~	Containers of flammable liquids closed and labeled properly
-	7		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
T	7	-	Personnel exiting potentially contaminated areas washing hands before eating
-	7		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit

r

DAILY	' SAFETV	INSPECTION	
	WARDIN I	THOI DOLLON	

			DAILY SAFETY INSPECTION
PRC	)JEC	T:	Page 2 of
1 Y	ΓŇ.	A	Item
T	Τ.	_	Portable electrical equipment plugged to a GFCI
╈			Electrical wiring covered by insulation or enclosure
$\uparrow$	-	-	Three wire, UL approved, extension cords used
╈	1-	-	Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, wo
6	+		areas clear of objects that might fall on employees)
-	+		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		-	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSH
		7	Moving (rotating) machinery guarded to prevent employee contact
$\top$	1-	オ	Fall protection provided for work at elevations greater than 4 ft
┢	†	7	All containers of hazardous material labeled to indicate contents and hazards
┢			MSDSs for hazardous materials on-site
t			All vehicles equipped with two-way radios and cellular phones
	-		5-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are boured
	-	1	Potable and non-potable water labeled
	-	才	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
0	$\vdash$		/isitor access controlled
J		S	ite hazards and controls consistent with SSHP
		s	ite hazard controls appropriate and sufficient
lions			o correct or control any "N" responses

÷

)

			DAILY SAFETY INSPECTION
PI	RO	JECT	Camp RovenNa 2-6-2018 Page 1 of 2
Ν	Y	/ NA	Item
	^	F	Daily safety briefing conducted
	L	F	Emergency numbers and route to hospital posted
-			FWSHP and project-specific Addenda on-site, available to employees, and complete
		17	Required exposure monitoring conducted and documented
		F	Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
		1	First aid kit available and inspected weekly
	0	ł	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		-	Personnel using buddy system (maintain visual or verbal contact and able to render aid)
			If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
1	/	ł	If temperature <40°F: cold stress training conducted, controls in SSHP implemented
Ť		-	Personnel using appropriate biological hazard controls (See SSHP)
T	~	ł	Drill rig operating manual on-site
┦	<u> </u>	-	Drill rigs inspected weekly and documented
1	~	7	Personnel near drill rig or other overhead hazards wearing hardhats
Ť	7	-	Each of two drill rig emergency shutdown devices tested daily
T		/	Employees excluded from under lifted loads
T	4	/	Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
T	7		Radius of exclusion zone around drill rig at least equal to mast height
	7	/	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
T	1	~	Containers of flammable liquids closed and labeled properly
c	7	-	Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
•	7	-	Personnel exiting potentially contaminated areas washing hands before eating
Ţ	7		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit
	_		

			DAILY SAFETY INSPECTION									
PI	ROJ	ECT:	Page 2 of 2									
Ν	Y	NA										
	Γ	-	Portable electrical equipment plugged to a GFCI									
	1-	-	Electrical wiring covered by insulation or enclosure									
		-	Three wire, UL approved, extension cords used									
	-		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, wor areas clear of objects that might fall on employees)									
	-	-	Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)									
			Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP									
	~		Moving (rotating) machinery guarded to prevent employee contact									
		-	Fall protection provided for work at elevations greater than 4 ft									
		-	All containers of hazardous material labeled to indicate contents and hazards									
	-+	~	MSDSs for hazardous materials on-site									
	7		All vehicles equipped with two-way radios and cellular phones									
			15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured									
	1	~	Potable and non-potable water labeled									
+	1	5	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps									
,	オ		Visitor access controlled									
+	オ		Site hazards and controls consistent with SSHP									
	╞		Site hazard controls appropriate and sufficient									
Actic	ons 1	taken	to correct or control any "N" responses									
<u>Id</u>	2	Peter	rlin MART 2-6-2018									
Jame	e	_	Signature Date									

			DAILY SAFETY INSPECTION							
PF	ROJ.		CAMP PAVENNA 3/5/2018 Page 1 of 2							
N	Y	NA	Item							
	J		Daily safety briefing conducted							
	$\checkmark$		Emergency numbers and route to hospital posted							
	$\overline{\checkmark}$		FWSHP and project-specific Addenda on-site, available to employees, and complete							
		J	Required exposure monitoring conducted and documented							
	ノ		Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented							
	V		First aid kit available and inspected weekly							
	$\checkmark$		Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)							
		Personnel using buddy system (maintain visual or verbal contact and able to render aid)								
		$\checkmark$	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed							
	$\overline{\mathbf{V}}$		If temperature <40°F: cold stress training conducted, controls in SSHP implemented							
		1	Personnel using appropriate biological hazard controls (See SSHP)							
		J	Drill rig operating manual on-site							
-		J	Drill rigs inspected weekly and documented							
		J	Personnel near drill rig or other overhead hazards wearing hardhats							
		J	Each of two drill rig emergency shutdown devices tested daily							
		1	Employees excluded from under lifted loads							
		J	Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment							
		J	Radius of exclusion zone around drill rig at least equal to mast height							
		J	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment							
		$\checkmark$	Containers of flammable liquids closed and labeled properly							
			Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly							
1	オ		Personnel exiting potentially contaminated areas washing hands before eating							
		J	Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit							

PF	<b>XO</b> J	ECT:	DAILY SAFETY INSPECTION Page 2 of 2
N		NA	
			Portable electrical equipment plugged to a GFCI
	-		Electrical wiring covered by insulation or enclosure
	-	17	Three wire, UL approved, extension cords used
-	1		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, wor
	V		areas clear of objects that might fall on employees)
	1		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		J	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		J	Moving (rotating) machinery guarded to prevent employee contact
		1	Fall protection provided for work at elevations greater than 4 ft
		1	All containers of hazardous material labeled to indicate contents and hazards
		1	MSDSs for hazardous materials on-site
	$\checkmark$		All vehicles equipped with two-way radios and cellular phones
	$\checkmark$		15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		1	Potable and non-potable water labeled
-		1	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
-	$\checkmark$		Visitor access controlled
	$\checkmark$		Site hazards and controls consistent with SSHP
	1		Site hazard controls appropriate and sufficient
<u> </u>	ions	taken	to correct or control any "N" responses
UN Van		L Hug	Signature Date

## **APPENDIX C**

**Boring Logs** 

This page intentionally left blank.

## **APPENDIX C.1**

**Typed Boring Logs** 

This page intentionally left blank.

	Environmental Chemical									Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU01
	7			Corpora	ation					Drilling Method: Direct-Push Boring No. SB01 Geoprobe 6620DT						
	Coordin		LOG OF	<b>SOIL BORING</b> X = 499331.064	Y = 45	62319.4	11			Sampling M	lethod:	2" diamete MacroCore	er-5 ft SS s	ampler	Sheet 1 of	1
	Surface	Elevatio		952.101283	ft msl			_		Motor					Di	rilling
	Referer	Below S nce Eleva	ation:					_		Water Lev. Time	NA				Start 14-Nov-12	Finish 14-Nov-12
		nce Desc								Date Reference	NA NA				-	
Digital Picture	Sample Type	ln. Drvr / In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per	Depth (feet)		USCS Log	Surface Co	nditions:	Soil				
#	JT -	Recvrd	5			6 in.			- 3							
		60/36			0.0	NA	0	H								
							1									
									CL	Brown silty	clay					
	ISM			1-4 ft			2	H	CL	Transition t						
	13101			1-4 11			3	H	UL	Transition t	o gry sity c	lay				
							4									
							5	$\left  \right $	CL	Interbeddeo	d silty clay					
		24/22			0.0	NA			CL	Same as al		odor at 5'				
	ISM			4-7 ft			6	$\Box$								
	ISM			1-7 ft			7			End of bori	ag at 7 ft by					
	10101			1-7 IL			/				ng at 7 it by	<b>J</b> S				
							8									
							9	$\left  \right $								
							10									
								$\Box$								
							11	$\left  \right $								
							12	┝┥								
							13	H								
							14	$\left  \right $								
							15									
							16	H								
							10									
							17									
							10	$\left  \right $								
							18	$\left  \right $								
							19									
								Ц								
							20	H								
							21	∐								
							22	H								
							23	H								
								$\Box$								
							24	Н								
Logged	l by:			ndez P.G Prude	ent Tech	۱	<u> </u>			Date:	14-Nov-12	<u> </u>	Notes:		Applicable	
Drilling	Contract SPECIFI		Frontz Dri	illing Well not installe						Driller:	Joe Teter		-		ole Summary	Sheets for
Diam. c	of casing:	2"		Screen Interva	al:					Sandpack:			_	ISM = Inc	remental San	npling
BOH:		7 ft bgs		Riser Interval:						Bentonite:	0-7 ft bgs		_	Method		

	Environmental Chemical								Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU01
ECC					oration	əai			Drilling Met	hod:	Direct-Pus	h			SB02
	20 I			F SOIL BORING					Sampling M	lethod:	Geoprobe 2" diamete	r-5 ft SS sa	ampler		
	Coordin Surface			X = 499341.403		0.026					MacroCore	e liner	•	Sheet 1 of	
	Casing	Below S	Surface:	955.909004					Water Lev.					Start	illing Finish
	Referer Referer	ice Elev	ation:							NA NA				14-Nov-12	14-Nov-12
Disital						Diama	Denth		Reference	NA	Qall				
Picture	Sample Type	/ In.	Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	Log	Surface Co	nditions:	Soil				
#		Recvrd							Data a lite						
		60/34			0.0	NA	0	CL	Brown silty	clay					
							1								
								CL	Transition to	o gry silty c	lay				
							2								
	ISM			1-4 ft											
						<b>—</b>	3								
							4								
								ł							
							5		Strong odo	r at 5'					
		24/20			0.0	NA		CL	Interbeddeo	d silty clay					
	ISM			4-7 ft			6								
	ISM			1-7 ft			7		End of borir	og at 7 ft by	16				
	10101			1-7 R			1			ng at r it bi	<b>J</b> 3				
							8								
							9								
						<b>—</b>	10								
							11								
							12								
							. –								
							13								
						<u> </u>	14								
							15								
							16								
						<u> </u>	17								
							17								
							18	1							
								ļ							
						<b> </b>	19	ļ							
							20								
						<b> </b>	21								
							22	ļ							
						<b> </b>	╏││								
							23								
							24								
						<b> </b>									
Logged				andez P.G Pru	udent Tech.	<u>e</u>	•	•	Date:	14-Nov-12		Notes:		Applicable	
	Contract SPECIFI		Frontz IS:	Drilling Well not installed	1		-		Driller:	Joe Teter		-		le Summary information	Sheets for
Diam. c	of casing:	2"		Screen Interval					Sandpack:			-	ISM = Inc	remental Sam	pling
BOH:		7 ft bgs	6	Riser Interval:				Bentonite:	0-7 ft bgs		-	Method			

Environmental Chemical							Job. No.	5461.004	Client	Client ACOE-Louisville		Location CC-70	RVAAP DU01		
Corporation							Drilling Met	Drilling Method: Direct-Push Boring No. SB Geoprobe 6620DT							
	Coordinates: $X = 499337.254 Y = 4562298.838$								Sampling N	lethod:	2" diamete	er-5 ft SS s	ampler		
	Surface	Elevatio	on:	953.010065	ft msl		38	_			MacroCor	e liner		Sheet 1 of Di	1 rilling
	Casing Referer	Below S	urface:					_	Water Lev. Time	NA NA				Start 14-Nov-12	Finish
	Referer							_	Date	NA				14-1100-12	14-1100-12
Digital	Sample n. Drvr Dpth. Sample PID Blows							USC	Reference CS Surface Co		Soil				
Picture #	Type	/ In. Recvrd	Ċsg.	Depth	(ppm)	per 6 in.	(feet)	Lo							
π		60/36			0.0	NA	0	CL	Brn Silty cla	av					
							1	_							
									- Transition t	to gry silty c	lay				
	ISM			1-4 ft			2	-							
	10101			1-410			3	-							
							4	_							
							_	-							
		24/19			0.0	NA	5								
	ISM	24/10		4-7 ft	0.0	11/1	6	-	Odor at 6.5	5					
								CL	- Transition	to brown silt	ty clay, san	dstone at	7' bgs		
	ISM			1-7 ft			7	_	End of bori	ng at 7 ft bộ	<u>js</u>				
								-							
							8	-							
							9								
							10	4							
							11	-							
								-							
							12								
								_							
							13	-							
							14	-							
							15								
								_							
							16	-							
							17	-							
								1							
							18								
							╏╴╎	4							
							19	-							
							20	┥							
							_~								
							21								
							╏╴┝	-							
							22	-							
							23	-							
							20	1							
							24								
	b. "		Τ 114	ander D.O. D	nu clara ( 7	ach			Deter	4 A N 4 C	<u>,</u>	Netce		Applicate	
Logged Drilling	l by: Contract		T. Herr Frontz	nandez P.G P Drilling	ruuent I	ecn.	-		Date: Driller:	14-Nov-12 Joe Teter		Notes:		Applicable	Sheets for
WELL	SPECIFI	CATION		Well not installe			-		0.000			_	analytical	information	
Diam. c BOH:	of casing:	2" 7 ft bgs		Screen Interval: Riser Interval:					Sandpack Bentonite:	: 0- 7 ft bgs		_	ISM = Inc Method	cremental Sar	nping

				Environmer	ntal Cho	mical				Job. No.	5461.004	Client	ACOE-Lo	ouisville	Location CC-70	RVAAP DU01
ECO					oration	mudi				Drilling Met	hod:	Direct-Pus	h			
			LOG O		١G					Sampling M	lethod:	Geoprobe 2" diamete	er-5 ft SS s	ampler		
	Coordin	ates:		X 499330.844	Y 4562	302.465	5					MacroCore	e liner	•	Sheet 1 of	
	Surface Casing	Below S	Surface:	953.213474	n msi					Water Lev.					Start	illing Finish
	Relefen	ice Elev	ation.							Time	NA				14-Nov-12	14-Nov-12
										Date Reference	NA NA					
Digital Picture	Sample Type	ln. Drvr / In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows	Depth (feet)		USCS Log	Surface Co	nditions:	Soil				
#	туре	7 m. Recvrd	Csy.	Deptil	(ppiii)	per 6 in.	(leet)		LUg							
		60/40			0.0	NA	C	$\square$	CL	Brown silty	clay					
								Ц								
							1	Н								
								Н	CL	Transition t	o gry silty c	lay				
	ISM			1-4 ft			2	Ή								
	121/1			1-4 It			3	ĮΗ								
							0	Ή								
							4	ιH								
								Н								
							5	;								
		24/18			0.0	NA			CL	Inter bedde	d gray silty	clay				
	ISM			4-7 ft			6	şЦ								
	ISM			1-7 ft			7			End of borin	ng at 7 ft bộ	gs				
								Н								
							8	Ή								
							g	ΥH								
								Ή								
							10	$\neg$								
								П								
							11									
								Ц								
							12	2								
								Н								
							13	$^{3}$ H								
								Н								
							14	Ή								
							15	H								
								Ή								
							16	sП								
							17	'Ц								
								Ц								
							18	ЪЦ								
								Н								
							19	Ή								
							20	Ή								
							20	Ή								
							21	Η								
								Н	1							
							22	2								
							23	۶Ц								
								Ц								
							24	١H								
Logged	hv:		T Here	nandez P.G I	Prudent	Tech		Ш		Date:	14-Nov-12	>	Notes:		Applicable	
	Contract		Frontz	Drilling			-			Dale. Driller:	Joe Teter				ple Summary	Sheets for
WELL	SPECIFI	CATION		Well not instal			-						_	analytical	information	
Diam. c BOH:	of casing:	2" 7 ft bgs		Screen Inter Riser Interva						Sandpack: Bentonite:			-	ISM = Inc Method	remental San	npling
DON.		1 11 11 198			41.						<u>o i it bys</u>		-	INCLINU		-

				Environmen		mical				Job. No.	5461.004		ACOE-Lo	uisville	Location CC-70	RVAAP DU01
	y			-	oration					Drilling Met		Direct-Pus Geoprobe	6620DT		Boring No.	SB05
	Coordin			F SOIL BORIN X 499319.18		307.983	3			Sampling N	lethod:	2" diamete MacroCore	er-5 ft SS sa e liner	ampler	Sheet 1 of	1
	Surface Casing	Elevation Selow S	on: Surface:	953.721998	ft msl					Water Lev.	ΙΝΔ			1	Dr Start	illing Finish
	Referen	ice Eleva	ation:							Time	NA				14-Nov-12	
	Referen									Date Reference						
Digital Picture	Sample Type	/ In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per	Depth (feet)		USCS Log	Surface Co	onditions:	Soil				
#		Recvrd 60/48			0.0	Ġ in. NA	0		CL	Prown cilty	alay					
		00/40			0.0	INA	0		ΟL	Brown silty	Clay					
							1									
							2									
CC70	ISM			1-4ft			2									
#3							3									
							4	_								
							4	_								
							5									
0.070		24/20		. – .	0.0	NA			CL	Transition t	to It brn clay	/, firm, mois	st. No odor	S		
CC70 #3	ISM			4-7 ft			6	_								
	ISM			1-7 ft			7			End of bori	ng at 7 ft bç	<u>js</u>				
							8									
							9									
							10									
							11									
							12									
							13									
							14	_								
							15									
							16									
							17									
							18	_								
							19									
							20	_								
							21									
								$\square$								
							22	Н								
						ļ	23	Н								
							24	Ц								
Logged	by:			andez P.G	Prudent	Tech.	<u> </u>	Ц		Date:	14-Nov-12		Notes:		t Applicable	
	Contract SPECIFI		Frontz    S:	Drilling Well not instal	led					Driller:	Joe Teter		-		ple Summary	Sheets for
Diam. c	of casing:	2"		Screen Inter	val:					Sandpack			_	ISM = Inc	cremental San	npling
BOH:		7 ft bgs		Riser Interva	al:					Bentonite:	0-7 ft bgs		_	Method		_

				Environmen	ital Cha	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU03
ECC	7				bration	iiiGal				Drilling Met	hod:	Direct-Pus Geoprobe			Boring No.	SB01
	<b>0</b> "		LOG O		IG					Sampling M	lethod:	2" diamete	r-5 ft SS sa	mpler		
	Coordin Surface			X 499377.945 950.493691		319.59						MacroCore	eliner		Sheet 1 of	1 rilling
	Casing	Below S	Surface:					_		Water Lev.					Start	Finish
	Referen Referen									Time Date	NA NA				13-Nov-12	13-Nov-12
Digital	Sample			Sample	PID		Depth		USCS	Reterence Surface Co		Soil				
Picture	Туре	/ In.	Csg.	Depth	(ppm)	per	(feet)		Log			001				
#		Recvrd			0.0	Ġ in.	0									
		60/40			0.0	NA	0	Η	CL	Dark brown	silty clay					
							1	Η	OL	Dark brown	i Sirty Oldy					
							2									
	ISM			1-4 ft				Ц								
							3	Η	CL	Transition to	o brown cla	ıy silt				
							4	Н								
							-	Η								
							5									
		60/43			0.0	NA			CL	Brown clay	silt					
	ISM			4-7 ft			6	Ц								
				. – .				Н		Sandstone	at 6' 8" bgs	, 4 inch laye	er			
	ISM			1-7 ft			7	Η								
							8	Η								
							0	Η	CL	Brown clay	silt					
							9									
							10	Ц								
		36/4			0.0	NA	1.1	Η								
							11	Η								
							12	Η								
	Comp.			7-13 ft			13			End of bori	ng at 13 ft b	ogs				
								Н								
							14	Н								
							15	Η								
								Π								
							16									
								Ц								
							17	Н								
							18	Н								
							10	Η								
							19	П								
								Д								
							20	Ц								
								Н								
							21	Η								
							22	Η								
								Π								
							23	П								
								Ц								
							24	Η								
Logged	by:		T. Hern	andez P.G F	Prudent	Tech.				Date:	14-Nov-12	2	Notes:	NA = Not	Applicable	
Drilling	Contract		Frontz	Drilling						Driller:	Joe Teter		-	See Sam	ple Summary	Sheets for
	SPECIFIC		S:	Well not install Screen Interv						Sandpack:					information remental Sam	npling
BOH:	. saony.	2 13 ft bg	IS	Riser Interva						Bentonite:		<u> </u>	_	Method		
													_	Comp. =	Composite Sa	ample

				Environmer	ntal Cha	mical				Job. No.	5461.004	Client	ACOE-Lo	ouisville	Location CC-70	RVAAP DU03
ECC					oration	anneal				Drilling Me	thod:	Direct-Pus	h		Boring No.	
			LOG O	F SOIL BORI	NG					Sampling N	Method:	Geoprobe 2" diamete		ampler	+	
	Coordin	ates:		X 499391.598	3 Y 4562	343.52				<u> </u>		MacroCore	e liner		Sheet 1 of	
	Casing	Elevation Below S	urface:	949.926113	it msi			_		Water Lev	. NA				Start	illing Finish
	Releter		alion.							Time Date	NA NA				13-Nov-12	13-Nov-12
								_		Reference	NA				_	
Picture	Sample Type	/ In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per	Depth (feet)		Log	Surface Co	onditions:	Soil				
#		Recvrd			0.0	Ġ in.										
		60/30			0.0	NA	0		CL	Black clay						
						`	1		OL	Diack ciay						
							2									
	ISM			1-4 ft			0	_		Tropolition						
							3		CL	I ransition	to dark clay					
							4									
		60/38					5	Ц	CL	Inter bedde	ed sand stor	ne/clay				
	ISM	36/27		4-7 ft	0.0	NA	c									
	121/1			4-7 IL			6			Sand stone	e at 6.8 ft bo	ıs				
							7					<b>,</b>				
	ISM			1-7 ft												
							8			End of bori	ing at 8 ft bo	gs				
							9									
							5									
							10									
							11									
							12									
							12									
							13									
							14	_								
							15									
							10									
							16									
							17	Ц								
							18	Н								
							10	Η								
							19									
							20									
							21	Н								
							21	Η								
							22									
								Ц								
							23	Ц								
							24	Н								
							24	Η								
Logged				andez P.G	Prudent	Tech.		. 1		Date:	14-Nov-12	2	Notes:		Applicable	
	Contract SPECIFI		Frontz S:	Drilling Well not insta	lled					Driller:	Joe Teter		-		<u>p</u> le Summary information	Sneets for
Diam. c	of casing:	2"		Screen Inter	rval:					Sandpack			_	ISM = Inc	cremental San	npling
BOH:		8 ft bgs		Riser Interv	ai:					Bentonite:	0-8 ft bgs		-	Method		_

				Environmen	tal Cha	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU03
ECC					ration	mcal				Drilling Met	hod:	Direct-Pus	sh		Boring No.	
			LOG O		IG					Sampling N	lethod.	Geoprobe 2" diamete		ampler		
	Coordin	ates:		X 499403.104	Y 4562	326.744	ļ			oumphing w		MacroCore	e liner		Sheet 1 of	
	Surface Casing	Elevation Below S	on: Surface:	950.326370	ft msl					Water Lev.	INA				Dr Start	illing Finish
	Relefe		alion.							Time	NA				13-Nov-12	13-Nov-12
	Referen	ice Desc	cription:							Date Reference	NA NA				_	
Digital	Sample	ln. Drvr	Dpth.	Sample	PID	Blows	Depth	П		Surface Co		Soil				
Picture #	Туре	/ In. Recvrd	Csg.	Depth	(ppm)	per 6 in.	(feet)		Log							
		60/40			0.0	NA	0									
								Π	CL	Dark brown	n clay					
							1									
								Ц								
							2	ЕЦ								
	ISM			1-4 ft				Н								
							3	Ч	CL	Transition t	o brown cla	ау				
								Н								
							4	Ή								
							5	Η								
		24/15			0.0	NA		╈	CL	Brown clay						
	ISM	∠- <del>1</del> /1J		4-7 ft	0.0	11/7	6	H		Sandstone						
								Η		2011000010						
	ISM			1-7 ft			7	·Γ		End of bori	ng at 7 ft bo	gs				
								Π								
							8	ЗЦ								
								Ц								
							9	Ч								
								Н								
							10									
								Н								
							11	Н								
							12	,H								
							12	Ή								
							13	Н								
								Η								
							14	Π								
								Π								
							15	şП								
								Ц								
							16	ïЦ								
						ļ		Ц								
							17	Ή								
								Η								
							18	Ή								
							40	Η								
							19	Ή								
							20	H								
							20	Η								
							21	Н								
								П								
							22	гЦ								
								$\square$								
							23	Щ								
								Ц								
							24	Ч								
	l bur		Т Ц	andez P.G F	Drudovst	Took		Ц		Dete:	14-Nov-12	)	Notor		Applicable	
Logged Drilling	i by: Contract		Frontz		ruuent	rech.				Date: Driller:	Joe Teter	<u> </u>	Notes:		Applicable ole Summary	Sheets for
WELL	SPECIFI	CATION		Well not install			•						-	sampling	information	
	of casing:			Screen Inter						Sandpack:			_		remental Sam	pling
BOH:		7 ft bgs		Riser Interva	I:					Bentonite:	U-1 tt bgs		_	Method		-

ECC				Environmer	ntal Che oration	emical				Job. No. Drilling Me	5461.004	Client Direct-Pus	ACOE-Lo	uisville	Location CC-70 Boring No.	RVAAP DU03 SB04
	7											Geoprobe	6620DT	moler		
	Coordin	ates:		X 499403.345	5 Y 4562	306.532	2			Sampling N	vietnod:	MacroCor	er-5 ft SS sa e liner	ampier	Sheet 1 of	
		Elevation Below S		950.175454						Water Lev.	. NA		1	1	Dr Start	illing Finish
	Referer	nce Eleva nce Desc	ation:							Time Date	NA NA				13-Nov-12	
Dividual					DID		Deeth			Reference	NA					
Picture	Sample Type	/ In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per	Depth (feet)		USCS Log	Surface Co	onditions:	Soil				
#		Recvrd	NIA		0.0	Ġ in.	0									
		60/30	NA		0.0	NA	0	H	CL	Dark brown	n silty clay					
							1		01	Dantorom						
								Ц								
							2	Н								
	ISM			1-4 ft			3	Η								
							5	Η								
							4									
		04/40			0.0		5			<b>T</b>	(	(		<b>5</b> (1)		
	ISM	24/12		4-7 ft	0.0	NA	6	Η	CL	I ransition	to drown sil	ty clay with	gravel at 5	.5 ft bgs		
							Ū									
	ISM			1-7 ft			7			Sand stone	e at 7 ft bgs	. End of bo	ring at 7 ft b	ogs		
								μ								
							8	Η								
							9	H								
							10									
							11	Н								
							11	Η								
							12									
							13	Η								
							14	Η								
							14	Η								
							15									
								μ								
							16	Η								
							17	H								
							18									
							10	Η								
							19	Η								
							20									
								Д								
							21	Н								
							22	Н								
							22	Η								
							23									
								Ц								
							24	Н								
Logged	by:		T. <u>H</u> err	nandez P.G	Pruden	t <u>Tec</u> h.		Ц	<u> </u>	Date:	14-Nov-12	2	Notes:	NA = Not	Applicable	
Drilling	Contract SPECIFI		Frontz	Drilling Well not insta						Driller:	Joe Teter		_	See Sam	ple Summary	Sheets for
	of casing:			Screen Inte						Sandpack			_		remental San	npling
BOH:	5	7 ft bgs		Riser Interv							0-7 ft bgs		_ _	Method		

				Environmer	ntal Chr	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU03
<b>ECC</b>	7				oration	anncal				Drilling Met	thod:	Direct-Pus	sh		Boring No.	SB05
	29 I		LOG O	F SOIL BORI	NG					Sampling N	/lethod:	Geoprobe 2" diamete	er-5 ft SS sa	ampler		
	Coordin Surface	ates: Elevatio		X 499391.536 949.516013		290.735	5					MacroCore	e liner	-	Sheet 1 of	1 illing
	Casing	Below S	urface:							Water Lev.					Start	Finish
		nce Eleva nce Desc								Time Date	NA NA				13-Nov-12	13-Nov-12
Digital	Sample		-	Samp. #	PID	Blows	Depth	-		Reference Surface Co	NA	Soil				
Picture	Type	/ In.	Csg.	/ Samp.	(ppm)	per	(feet)		Log			3011				
#		Recvrd 60/36	NA	depth	0.0	ό in. NA	0	$\square$								
		00/00	NA.		0.0		0	Ή	CL	Black clay						
							1		-							
								Ц								
	1014						2	Н								
	ISM			1-4 ft			3	Н								
							5	Ή								
							4	H								
								П								
							5				-					
		24/21		A 7 f4	0.0	NA	_	Н	CL	Transition 1	to brown silt	ty clay				
	ISM			4-7 ft			6	Ή								
	ISM			1-7 ft			7	ŀ		End of bori	ng at 7 ft bo	gs				
							8									
								Ц								
							9	Ή								
							10	Н								
							10	Η								
							11									
							12	Н								
							13	Н								
							10	Ή								
							14									
								Ц								
							15	Ц								
							40	Н								
							16	1								
							17	H								
								П								
							18	μ								
							40	Н								
							19	Ή								
							20	Η								
								□								
							21	Ц								
								Н								
							22	Ή								
							23	Η								
							20	Н								
							24	Г								
	b		Τ 114.5		D1	h Tast				Deter	44 N 40	<u>,                                     </u>	Netz		Application	
Logged Drilling	by: Contract		I. Herr Frontz	nandez P.G Drilling	Fruden	LIECN.				Date: Driller:	14-Nov-12 Joe Teter	<u> </u>	Notes:		Applicable	Sheets for
WELLS	SPECIFI	CATION		Well not insta									-	analytica	l information	
Diam. o BOH:	of casing:	2" 7 ft bgs		Screen Inter						Sandpack	: 0-7 ft bgs		-	ISM = Inc Method	cremental San	npiing
										-			-	-		-

				Environ	tal Oha	miaal				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU04
ECC	7			Environmer Corpo	ntal Che oration	inical				Drilling Met	hod:	Direct-Pus			Boring No.	
										Sampling N	lethod:	Geoprobe 2" diamete	r-5 ft SS sa	ampler		
	Coordin Surface	ates:		x 499388.601		330.898	3				-	MacroCore	e liner	•	Sheet 1 of	1 illing
	Casing	Below S	Surface:	947.070703						Water Lev.					Start	Finish
	Referer Referer	nce Eleva								Time Date	NA NA				6-Dec-12	6-Dec-12
										Reference	NA				-	
Digital Picture	Sample Type	ln. Drvr / In.	Dpth. Csg.	Sample Depth	PID (ppm)		Depth (feet)		JSCS Log	Surface Co	nditions:	Soil under Cored thro		oor o facilitate s	ampling	
#		Recvrd	Ű			6 in.	. ,	Ш	Ũ				0			
	ISM	12/12		0-1 ft	3.5	NA	0	Ή		Sand stone	, tan					
	ISIVI			0-111			1	H		Refusal at	1 ft					
							2	2								
								Н								
							3	ЗН								
							1	H								
							4	Ή								
							5	5								
								Ц								
							6	Ъ								
							_	H								
							7	Ή								
							8									
							_									
							9									
								Н								
							10	Ή								
							11	H								
								Ή								
							12	2								
							13	3								
								H								
							14	Ή								
							15	5								
								Η								
							16									
							17	Ή								
							18	ĮΗ								
								Ή								
							19									
								Д								
							20	Щ								
								Η								
							21	Ή								
							22									
							23	зД								
								Ц								
							24	١H								
Logged	bv:		T. Herr	andez P.G	Prudent	Tech	<u> </u>			Date:	6-Dec-12		Notes:	NA = Not	Applicable	
Drilling	Contract	or:	Frontz	Drilling						Driller:	Joe Teter			See Samp	ole Summary	Sheets for
	SPECIFI		IS:	Well not instal Screen Inter						Sandpack:					information remental San	nolina
BOH:	n casiriy.	1 ft belo	ow floor								1 ft to con	c. surface	-	Method		ihii iA

				Environmen	tal Chei	nical			Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU04
ECC	7			Corpo		moai			Drilling Met	hod:	Direct-Pus Geoprobe				SB02
	0		LOG OF		G	000 000			Sampling M	lethod:	2" diamete	er-5 ft SS s	ampler		4
	Coordin Surface			x 499388.601 947.757504	Y 4562 ft msl	JJU.898	>	_			MacroCore	e liner		Sheet 1 of Dr	1 illing
		Below S	Surface:					_	Water Lev. Time	NA NA				Start 7-Dec-12	Finish 7-Dec-12
			cription:					_	Date	NA				1-Dec-12	1-Dec-12
Digital	Sample	ln. Drvr	Dpth.	Sample	PID	Blows	Depth	USCS	Reference Surface Co		Soil under	concrete f	oor		
Picture #		/ In. Recvrd	Csg.	Depth	(ppm)	per 6 in.	(feet)	Log					o facilitate s	sampling	
π		15/15			3.5	NA	0		Sand stone	, tan					
	ISM			0-1 ft	-			]							
							1								
							2		Refusal at ?	1 ft, 3 inche	es				
							2	-							
							3								
							[	4							
							4	4							
							5	-							
							Ĭ	1							
							6								
							_	-							
							7	-							
							8								
							9	-							
							10	-							
								1							
							11	]		_		_	_		
							12	-							
							13	-							
							14	-							
							15	-							
							10	-							
							16	1							
							17	-							
							18	1							
							[	]							
							19	4							
							20	-							
							20	1							
							21	]							
							22	-							
							23	4							
								]							
							24	4							
Logged	by:		T Harns	andez P.G P	rudent T	ech			Date:	7-Dec-12		Notes:		Applicable	
Drilling	Contract	or:	Frontz D	Drilling		5011.			Driller:	Joe Teter			See Sam	ole Summary	Sheets for
	SPECIFI		IS:	Well not install Screen Inter					Sandpack:					information remental San	nolina
	1 ft 3 inc		ow floor	Riser Interva							es to conc.	surface	Method		ۍ

				Environmen	tal Chor	nical			Job. No.	5461.004	Client	ACOE-Lo	ouisville	Location CC-70	RVAAP DU04
ECC				Corpo		mear			Drilling Met	thod:	Direct-Pus			Boring No.	SB03
	5011		LOG OF		G				Sampling N	lethod:	Geoprobe 2" diamete	er-5 ft SS s	ampler		
	Coordir Surface	ates: Elevatio		x 499388.601 947.878894	Y 4562 ft msl	330.898	3				MacroCore	e liner		Sheet 1 of	1 illing
	Casing	Below S	Surface:					_	Water Lev.					Start	Finish
		nce Elev nce Desc	ation: cription:						Time Date	NA NA			+	7-Dec-12	7-Dec-12
Digital	Sample			Samp. #	PID	Blows	Depth	USC	Reference S Surface Co		Soil under	concrete f	loor		
Picture #	Туре	/ In. Recvrd	Csg.	/ Samp. depth	(ppm)	per 6 in.	(feet)	Log					o facilitate	sampling	
#		48/48		uepin	3.5	NA	0								
	ISM			0-1 ft			-								
							1								
							0		Darithur	11					
							2	CL	Dark browr	n silty clay					
	ISM			0-4 ft			3								
									Tan sands						
							4	_	Refusal at	4 ft bgs					
							5	-							
							5	1							
							6								
								_							
							7								
							8	_							
							-								
							9								
							10	_							
							10	_							
							11								
							12	_							
							13	-							
							10								
							14								
								_							
							15								
							16								
							_								
							17	_							
							40	-							
							18	$\neg$							
							19								
							20	_							
							21	-							
							21	1							
							22								
							23								
							24	-							
							<u></u>								
Logged				andez P.G P	rudent T	ech.			Date: Driller:	7-Dec-12 Joe Teter		Notes:		Applicable	Shoota far
WELL	Contract	CATION	Frontz D IS:	Well not install								-	sampling	ple Summary information	
	of casing: 4 ft belo			Screen Interva					Sandpack		nc. surface	-	ISM = Inc Method	remental San	npling
DOUL:					u.				Dentonite:	4 IL LU COI	nc. sullace	_	IVIELIIUU		-

				Environmen	tal Chor	nical			Jo	b. No.	5461.004	Client	ACOE-Lo	ouisville	Location CC-70	RVAAP DU04
ECC				Corpo		mear			Dr	illing Met	hod:	Direct-Pus			Boring No.	SB04
	507 I								Sa	ampling N	lethod:	Geoprobe 2" diamete	er-5 ft SS s	ampler		
1	Coordir Surface	nates: e Elevatio		x 499388.601 947.944510	Y 4562 ft msl	330.898	3					MacroCore	e liner		Sheet 1 of	1 illing
1	Casing	Below S	Surface:					_		ater Lev.					Start	Finish
1		nce Elev nce Deso						_	Da	me ate	NA NA				7-Dec-12	7-Dec-12
Digital	Sample		-	Sample	PID	Blows	Depth	1150	Re	eterence Irface Co	NA	Soil under	concrete f	loor		
Picture		/ In.	Csg.	Depth	(ppm)	per	(feet)	Lo						o facilitate	sampling	
#		Recvrd 48/48			3.5	Ġ in. NA	0									
	ISM	40/40		0-1 ft	0.0		0	_								
							1									
CC 70																
#1							2		L Da	ark brown	silty clay					
	ISM			0-4 ft			3	_								
	10101			0-4 11			5	-	Та	n sandst	one					
							4		-	efusal at 4						
							5	4								
							6	$\neg$								
							0									
							7									
								_								
							8	-	_							
							9	-								
							Ŭ									
							10									
								_								
							11	_								
							12									
							12									
							13									
								_								
							14	_								
							15	_								
							10									
							16									
							17	$\dashv$								
							18	-								
							19									
							_	_								
							20	-	_							
							21									
								1								
							22									
								4								
							23	-								
							24	$\dashv$								
Logged				andez P.G P	rudent T	ech.				ate: illor:	7-Dec-12 Joe Teter		Notes:		Applicable	Shoota far
	Contract SPECIFI		Frontz D	Well not instal	led				DL	iller:	JUE LET		-		ple Summary information	
	of casing			Screen Inter						andpack:		a curt-	_	ISM = Ind	cremental Sa	mpling
ROH:	4 ft belo	w floor		Riser Interva	u:				B	entonite:	4 It to cor	nc. surface	_	Method		_

				Environmen	tal Cho	micəl			Job. No.	5461.004	Client	ACOE-Lo	ouisville		RVAAP DU04
ECC				Corpo		iiicai			Drilling Met	thod:	Direct-Pus			Boring No.	
	557		LOG OF		3				Sampling N	Method:	Geoprobe 2" diamete	er-5 ft SS s	ampler		
	Coordin	ates: Elevatio		x 499388.601 948.013406	Y 4562 ft msl	330.898	3				MacroCor	e liner	· · · · · · · · · · · · · · · · · · ·	Sheet 1 of	1 Iling
	Casing	Below S	Surface:		it mai				Water Lev.					Start	Finish
		nce Elev	ation: cription:						Time Date	NA NA				7-Dec-12	7-Dec-12
<b>D</b> : 1/1								_	Reference	NA					
Picture	Sample Type	/ In.	Csg.	Samp. # / Samp.	PID (ppm)	Blows per 6 in.	Depth (feet)	Log	Surface Co	onditions:		· concrete f ough floor t		sampling	
#		Recvrd		depth		6 in.		_							
	ISM	36/36		0-1 ft	3.5	NA	0	-							
	13101			0-111			1	CL	Dark brown	n silty clay					
									Dankbrown	roncy oray					
	ISM			0-3 ft			2								
									Tan sands						
							3		Refusal at	3 ft bgs					
								_							
							4	-							
							5	-							
							-	]							
							6								
								4							
							7	_							
							8								
							0	-							
							9								
							10	_							
								_							
							11	-							
							12								
							. –	-							
							13								
								_							
							14	_							
							4.5	_							
							15	-							
							16	-							
							_								
							17	_							
								4							
							18								
							19	-							
							19	1	<b> </b>						
							20								
							21	4							
							22	-							
							23	-							
							20	1	<b> </b>						
							24	]							
Logged	l by: Contract		T. Herna Frontz D	andez P.G P Drilling	rudent T	ech.	-		Date: Driller:	7-Dec-12 Joe Teter		Notes:		t Applicable	Sheets for
WELL	SPECIFI	CATION		Well not instal								_	sampling	information	
	of casing			Screen Inter					_ Sandpack	-		_		cremental Sam	pling
DOH:	3 ft belo	w 1100ľ		Riser Interva	u <b>.</b>				_ pentonite:	3 ft to cor	IC. SUITACE	_	Method		

				Environmen	tal Cho	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU05
	/				oration	mudi				Drilling Met	hod:	Direct-Pus			Boring No. Herb. Shed	
			LOG O		IG					Sampling M	lethod:	Geoprobe 2" diamete	r-5 ft SS sa	ampler		
	Coordin Surface			X 499403.104 949.841		326.744	ļ					MacroCore	e liner		Sheet 1 of	1 illing
	Casing	Below S	urface:		it mor					Water Lev.					Start	Finish
	IVEIEIEI		alion.							Time Date	NA NA				13-Nov-12	13-Nov-12
Disting							Darath			Reference	NA	Q a il				
Picture	Sample Type	/ In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)		Log	Surface Co	nditions:	Soil				
#		Recvrd						Ц								
		60/40			0.0	NA	0	Ή		1 2 4 4 4 4 4 4 4						
							1	Н	CL	Light brown	n silty clay					
							I	Η								
							2									
	ISM			1-4 ft												
							3	зЦ								
								Н								
							4	Ч								
							5	H								
		24/15			0.0	NA		Ή	CL	Light brown	n silty clay					
	ISM	2 1, 10		4-7 ft	0.0		6	ŝП	01							
	ISM			1-7 ft			7	'		End of borin	ng at 7 ft bo	<u>js</u>				
								Н								
							8	ЪН								
							9	ΥH								
							5	Ή								
							10	Ъ								
							11	Ц								
								Н								
							12	$^{2}$								
							13	,H								
							15	Ή								
							14	١H								
							15	ъЦ								
								Н								
							16	Ϋ́Η								
							17	,H								
								Н								
							18	зЦ								
							19	Ъ								
								Н								
							20	Ή								
							21	Н								
							21	Η								
							22	<u> </u>								
							23	зД								
								Ц								
							24	ŀμ								
Logged	by:		T. Herr	nandez P.G F	Prudent	Tech		Ц	<u> </u>	Date:	14-Nov-12	)	Notes:	NA = Not	Applicable	
Drilling	Contract	or:	Frontz	Drilling						Driller:	Joe Teter	-		See Samp	ole Summary	Sheets for
	SPECIFI		IS:	Well not install Screen Inter						Sandpack:					information remental Sam	nling
BOH:	n casing.	Z 7 ft bgs		Riser Interva						Bentonite:			-	Method	omentai Sall	ייייקי -

				Environmer	ntal Cho	mical				Job. No.	5461.004	Client	ACOE-Lo	ouisville	Location CC-70	RVAAP DU05
ECC	Environmental Chemical Corporation									Drilling Met	hod:	Direct-Pus	h		Boring No. Herb. Shed	
			LOG O		IG					Sampling M	lethod:	Geoprobe 2" diamete		sampler	Herb. Shed	
	Coordin	ates:		X 499403.104	Y 4562	326.744	1		_			MacroCore	e liner		Sheet 1 of	
	Surface Casing	Below S	Surface:	949.010770					-	Water Lev.					Start	illing Finish
	Referer	nce Elev	ation:						-	Time Date	NA NA				13-Nov-12	13-Nov-12
									-	Reference	NA					
Digital Picture	Sample Type	ln. Drvr / In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per	Depth (feet)	I I	USCS Log	Surface Co	nditions:	Soil				
#	51	Recvrd	5			6 in.	. ,		Ű							
		60/40			0.0	NA	C	$^{\circ}$			- 16 - 1-					
							1		CL	Gray brown	silty clay					
							2		]							
	ISM			1-4 ft												
							3	3	1							
								$\vdash$	1							
							4	╘	1							
							5	5								
		24/15			75.0	NA		T	CL	Gray brown	silty clay					
	ISM			4-7 ft			6	»_	CL	Transition to	-					
				4 7 4			7	Ļ	-	Last 18 incl		-	odor			
	ISM			1-7 ft			/			End of borir	ng at 7 it bộ	ys				
							8		1							
							g									
									-							
							10	)								
							11		1							
							12	2								
									-							
							13	3	-							
							14		-							
								┢	1							
							15	5								
							16	، ا	-							
							17	,–	-							
							17	┢	1							
							18	3	1							
							l									
							19	<b>%</b> _	-							
								$\mathbb{F}$	-							
							20	Ή	1							
							21		1							
								Γ	]							
							22		4							
							_		-							
							23	Ή	1							
							24	₁⊢	1							
								L								
Logged				nandez P.G I	Prudent	Tech.				Date:	14-Nov-12		Notes:		Applicable	Sheata far
	Contract SPECIFI		Frontz IS:	Well not instal	led		-			Driller:	Joe Teter		-		ple Summary	
Diam. c	of casing:	2"		Screen Inter	val:					Sandpack:			-	ISM = Inc	remental San	npling
BOH:		7 ft bgs	1	Riser Interva	<b>a</b> .					Bentonite:	U-1 IT DGS		-	Method		_

				Environmer	ntal Che	mical				Job. No.	5461.004	Client	ACOE-Lo	ouisville	Location CC-70	RVAAP DU05
					bration	mual				Drilling Met	hod:	Direct-Pus Geoprobe	h 6620TT		Boring No. Herb. Shed	
			LOG O		IG					Sampling M	lethod:	2" diamete	er-5 ft SS s	ampler		
	Coordin Surface			X 499403.104 949.191214		326.744	1					MacroCore	liner		Sheet 1 of	1 illing
	Casing	Below S	Surface:	545.151214	it insi					Water Lev.					Start	Finish
	Referen	ICE EIEV	ation:							Time Date	NA NA				13-Nov-12	13-Nov-12
Distal							Danth	_		Reference	NA	Coil				
Picture	Sample Type	/ In.	Csg.	Samp. # / Samp.	PID (ppm)	per 6 in.	Depth (feet)		Log	Surface Co	nditions:	Soil				
#		Recvrd		depth		6 in.		Ц	_							
		60/40			0.0	NA	C	Ϋ́Η		Daula autoria						
							1	Η	CL	Dark gray b	brown slity (	ciay				
								Η								
							2	$2\Box$								
	ISM			1-4 ft				Ц								
							3	Ъ								
								H								
							4	Ή								
							5	sН								
		24/22			0.0	NA		Π	CL	Dark gray b	orown silty o	clay				
	ISM			4-7 ft			6	зП	CL	Transition t						
								Ц		Last 18 incl						
	ISM			1-7 ft			7	7		End of bori	ng at 7 ft bạ	gs				
							8	ĮΗ								
							C	Ή								
							g	эĦ								
							10									
								Н								
							11	Ή								
							12	,H								
								Η								
							13	3								
								Ц								
							14	۴H								
							15	H								
							10	Ή								
							16									
							17	Ύ⊢								
							10	Η								
							18	Ή								
							19	"Н								
								Н								
							20	Ъ								
								Ц								
							21	Ή								
							22	,								
								Ή								
							23	зН								
							24	ŧЦ								
	bu"		T Llag	nandez P.G I		Tooh				Date:	14-Nov-12	)	Notos		Appliachte	
Logged Drilling	Contract		Frontz		rudent		-			Date: Driller:	Joe Teter		Notes:		Applicable ple Summary	Sheets for
WELLS	SPECIFI	CATION		Well not instal			-						-	sampling	information	
Diam. c BOH:	of casing:	2" 7 ft bgs	;	Screen Inter Riser Interva						Sandpack: Bentonite:			-	ISM = Inc Method	remental Sam	ihiind

				Environmen	tal Cho	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU05
ECC					oration	mudi				Drilling Met	hod:	Direct-Pus			Boring No. Herb. Shed	
			LOG O		IG					Sampling M	lethod:	Geoprobe 2" diamete	r-5 ft SS sa	ampler		
	Coordin Surface			X 499403.104 949.529136	Y 4562 ft msl	326.744	ļ					MacroCore	e liner		Sheet 1 of	1 illing
	Casing	Below S	urface:	545.525150						Water Lev.					Start	Finish
	Referen Referen									Time Date	NA NA				13-Nov-12	13-Nov-12
Disting						Diama	Danth			Reference	NA	Qall				
Picture	Sample Type	/ In.	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	(feet)	1	Log	Surface Co	nditions:	Soil				
#		Recvrd	Ū													
		60/40			0.0	NA	C	Ϋ́⊢		Ded						
							1	H	CL	Dark gray o	lay					
								Ή								
							2									
	ISM			1-4 ft												
							3									
							4	╘								
							5	H								
		24/19			0.0	NA		Ή	CL	Dark gray o	lav					
	ISM			4-7 ft			6			Gravel, slag						
	ISM			1-7 ft			7	7		End of bori	ng at 7 ft bo	gs				
							8									
							ç	$\mathbb{H}$								
								Ή								
							10									
							11	ıЦ								
								H								
							12	$^2$								
							13	$\frac{1}{2}$								
								Έ								
							14	ıП								
							15	۶Ļ								
								H								
							16	Ή								
							17	,H								
									1							
							18	зД								
							19	$\mathbb{H}$								
							20	Ή								
							20	Ή								
							21	ιH	1							
								Π								
							22	₂∟								
								Н								
							23									
							24	H								
							24	Ή								
Logged				nandez P.G F	Prudent	Tech.				Date:	14-Nov-12	2	Notes:		Applicable	
	Contract SPECIFI		Frontz	Drilling Well not install	ed					Driller:	Joe Teter		-		ble Summary	Sheets for
Diam. c	of casing:	2"		Screen Interv	val:					Sandpack:			_	ISM = Inci	remental Sam	pling
BOH:	-	7 ft bgs		Riser Interva	l:					Bentonite:			_	Method		

				Environmen	tal Che	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU05
ECC					oration	mual				Drilling Met	hod:	Direct-Pus Geoprobe				SB05
				F SOIL BORIN		ooo				Sampling M	lethod:	2" diamete	er-5 ft SS sa	ampler		
	Coordin Surface	Elevatio	on:	X 499403.104 949.670210	ft msl							MacroCore	e liner		Sheet 1 of Dr	1 illing
	Casing	Below S	Surface:							Water Lev.					Start	Finish
	I CEIEIEI		auon.							Time Date	NA NA				13-Nov-12	13-Nov-12
Digital	Sample			Sample	PID	Blows			USCS	Reference Surface Co		Soil				
Picture	Type	/ In.	Csg.	Depth	(ppm)	per 6 in.	(feet)		Log		nutions.	001				
#		Recvrd 60/40			0.0	6 In. NA		5								
		00/40			0.0			Ή	CL	Clay, drk cl	ay					
							1	ıП								
								Ц								
	1014						2	2H	CL	Transition t	o lt brown o	clay				
	ISM			1-4 ft												
							Ċ	Ή								
							2	4								
								$\square$								
							5	5								
		24/19		<i>,</i>	0.0	NA		Н	CL	Transition t	o light brow	n sandstor	ne			
	ISM			4-7 ft			6	βΗ								
	ISM			1-7 ft			7	7H		End of bori	ng at 7 ft bo	as				
											<u> </u>					
							8	3								
							ç	P								
							10	Ή								
							11	۱Ħ								
							12									
							40	Н								
							13	Ή								
							14	1								
							15	5								
								Н								
							16	Ή								
							17	H								
								Ц								
							18	зД								
						ļ		Ц								
							19	Ъ								
							20	Ч								
							20	Ή								
							21	ıД								
							22	Ľ								
							23	ĴΗ								
							23	Ή								
							24	цĦ								
								П								
Logged	l by: Contract		T. Hern Frontz	nandez P.G I Drilling	Prudent	Tech.	-			Date: Driller:	14-Nov-12 Joe Teter	2	Notes:		Applicable ble Summary	Sheets for
WELL	SPECIFI	CATION		Well not instal			-						-	analytical	information	
	of casing:			Screen Inter						Sandpack:			-		remental Sam	pling
BOH:		7 ft bgs		Riser Interva	น.					Bentonite:	U-7 IL DGS		_	Method		

				Environmen	tal Che	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU06
					oration					Drilling Meth		Direct-Pus Geoprobe	h 6620DT		Boring No. Wash Rack	SB01
	Coordin	ates:	LOG O	F SOIL BORIN X 499403.104	I <b>G</b> Y 4562	326.744	Ļ			Sampling M	lethod:	2" diamete MacroCore	r-5 ft SS sa	ampler	Sheet 1 of	
	Surface	Elevatio	on:	950.017975	ft msl					Mator Lov		ſ				illing Finish
	Releten	Ce Elev	alion.								NA				13-Nov-12	
	Referen	ce Desc	cription:							Date Reference	NA NA					
Digital Picture	Sample Type	ln. Drvr / In.	Dpth. Csg.	Samp. # / Samp.	PID (ppm)	Blows per	Depth (feet)		USCS Log	Surface Cor		Soil				
#	туре	Recvrd	Coy.	depth	(ppiii)	6 in.	(ieet)		LUg							
		60/40	NA		0.0	NA	0	μ	•							
							1	Н	CL	Brown silty	clay					
								Η								
							2									
								Ц								
							3	Η								
							4	Н								
								Π	CL	Tranition to	light browr	n silty clay				
							5									
		24/15			0.0	NA		Н								
					11.5		6	Η		Bott 19 inch strong odor		eam				
					11.5		7	H		End of borir		js				
							8									
							9	Η								
							9	Ή								
							10	Π								
								Ц								
							11	Н								
							12	H								
							12	Η								
							13									
								Н								
							14	Ή								
							15	H								
							16									
							47	Η								
							17	Н								
							18	H								
								П								
							19	μ								
							20	Η								
							20	Н								
							21	П								
							22	Ή								
							23	Η		l						
								Ц								
							24	Ц								
Logged	bv.		T. Hern	andez P.G F	Prudent	Tech		Ц		Date:	14-Nov-12	)	Notes:	NA = Not	Applicable	
Drilling	Contract	or:	Frontz	Drilling						Driller:	Joe Teter	-		See Samp	ele Summary	Sheets for
	SPECIFIC		IS:	Well not install Screen Interv						Sandpack:			Grout:	sampling	information	
BOH:		7 ft bgs		Riser Interva						Bentonite:			Cover:			

				Environmen	tal Che	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU06
					oration					Drilling Meth	nod:	Direct-Pus Geoprobe	h 6620DT		Boring No. Wash Rack	SB02
			LOG O	F SOIL BORIN	IG					Sampling M	lethod:	2" diamete	r-5 ft SS sa	ampler		
	Coordin Surface			X 499403.104 949.634122		326.744	•					MacroCore	eliner		Sheet 1 of Dr	1 illing
	Casing	Below S	Surface:							Water Lev.					Start	Finish
	Referen Referen									Date	NA NA				13-Nov-12	13-Nov-12
Digital	Sample	ln. Drvr	Doth.	Samp. #	PID	Blows	Depth	П	USCS	Reference Surface Cor		Soil			1	
Picture #	Туре	/ In. Recvrd	Csg.	/ Samp. depth	(ppm)		(feet)		Log							
#		60/40	NA	depth	0.0	NA	0									
		00/40	11/2		0.0			Έ	CL	Light orange	e silty clay					
							1			0 0	, , , , , , , , , , , , , , , , , , ,					
							2	2								
							0	Η								
							3	$\mathbf{F}$								
							4									
								Γ								
							5	j I		some grave						
		24/15			0.0	NA		μ	CL	Light gray b	rown to ligl	ht brown sil	ty clay			
							6	ΪH		Odor last 0	inchas					
							7	,H		Odor last 6 End of borir		ıs				
								T			.9	50				
							8									
							9	Ľ								
							10	Η								
							10	1								
							11	Η								
							12									
								μ								
							13	$^{3}$								
							14	H								
								Η								
							15	şΠ								
								L								
							16	Ĭ								
							17	H								
							17	Η								
							18	,H	1							
							19	Ъ								
								Η								
							20	Ή								
							21	H								
								Π	1							
							22	гЦ								
								Ц								
							23	ľ								
							24	H								
							24	Η								
Logged				andez P.G F	Prudent	Tech.		•	•		14-Nov-12	2	Notes:		Applicable	
	Contract SPECIFI		Frontz	Drilling Well not install	ed					Driller:	Joe Teter		-		ple Summary	Sheets for
Diam. c	of casing:	2"		Screen Inter	val:					Sandpack:			Grout:	<u></u>		-
BOH:		7 ft bgs	;	Riser Interva	d:					Bentonite:	0-7 ft bgs		Cover:			-

				Environmen	tal Che	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU06
	7				oration					Drilling Meth	nod:	Direct-Pus Geoprobe	h 6620DT		Boring No. Wash Rack	SB03
	Coordin	ates:	LOG O	F SOIL BORIN X 499403.104	IG Y 4562	326 74/	L			Sampling M	lethod:	2" diamete MacroCore	er-5 ft SS sa	ampler	Sheet 1 of	
	Surface	Elevatio	on:	949,473362	ft msl									•	Dr	illing
	Casing Referen	Below S ce Eleva	ation:							Water Lev. Time	NA NA				Start 13-Nov-12	Finish 13-Nov-12
											NA					
Digital	Sample	ln. Drvr	Dpth.	Samp. #	PID	Blows		Π		Surface Cor		Soil				
Picture #	Туре	/ In. Recvrd	Csg.	/ Samp. depth	(ppm)	per 6 in.	(feet)		Log							
		60/40	NA		0.0	NA	0									
								Н	CL	Brown silty	clay					
							1	Н								
							2	Η								
							3	Ц								
								Н	CL	Transition to	o light brow	n silty clay				
							4	Ή								
							5	T								
		24/22			0.0	NA		Π								
							6	Н								
							7	H		Last 19 inch End of borir		-	odor			
							,	Π				,5				
							8									
								Ц								
							9	Η								
							10	Н								
							10									
							11									
								Ц								
							12	Η								
							13	Η								
							14	Ц								
							4.5	Н								
							15	Ή								
							16									
							17	μ								
							18	Η								
							10	Ή								
							19	Ш								
								Ц								
							20	Ή								
							21	Н								
								Н								
							22	ĽЦ								
							_	Н								
							23	Ή								
							24	H								
								Γ								
Logged	by: Contract		T. Herr Frontz	nandez P.G F	Prudent	Tech.				Date: Driller:	14-Nov-12 Joe Teter	)	Notes:		Applicable ble Summary	Sheets for
WELL	SPECIFI	CATION		Well not install									-		information	
Diam. c BOH:	of casing:	2" 7 ft bgs		Screen Interva						Sandpack: Bentonite:			Grout: Cover:			-
DON.		i it bys								Dentonite.	J-7 IL DYS					-

				Environmen		mical				Job. No.	5461.004		ACOE-Lo	uisville	Location CC-70	RVAAP DU06
	7				oration					Drilling Meth	nod:	Direct-Pus Geoprobe	h 6620DT		Boring No. Wash Rack	SB04
	Coordin			F SOIL BORIN X 499403.104		206 74				Sampling M	ethod:	2" diamete MacroCore	r-5 ft SS sa	ampler	Sheet 1 of	
	Surface	Elevatio	on:	949.594752	ft msl							Macrocore			Dr	illing
	Casing Referen	Below S	Surface:							Water Lev. Time	NA NA				Start 13-Nov-12	Finish
										Date	NA				13-1100-12	13-1100-12
Digital	Sample	ln. Drvr	Dpth.	Samp. #	PID	Blows	Depth		USCS	Reference Surface Cor		Soil				
Picture #	Type	/ In. Recvrd	Csg.	/ Samp. depth	(ppm)	per 6 in.	(feet)		Log							
		60/40	NA		0.0	NA	0	)								
									CL	Gravel/clay						
							1	μ								
								Η								
							2	$\frac{1}{2}$		Transition to	o brown cla	av.				
							3				5 510 W11 010	, y				
							4	ŀμ								
								-								
		24/19			0.0	NA	5	) 	CL	Brown clay	transition to	o dark/light	aray clay			
		27/13			0.0	1 11/74	6	;H			สฉกอเมิบที ไ		gray udy			
										Slight odor I	bottom 10 i	inches, san	dstone			
							7	'		End of borin	ng at 7 ft bg	js				
								Η								
							8	+								
							9									
								Γ								
							10	$\left  \right $								
								L								
							11	Η								
							12	Ļ								
							12	Ή								
							13									
								L								
							14	ŀμ								
							15	$\left  \right $								
							15	Ή								
							16									
							17	Έ								
								Η								
							18	Ή								
							19	,H								
							20	Ъ								
								H								
							21	Н								
							22									
							~~~	Η								
							23	зЦ	1							
								Ľ								
							24	┞								
Logged	by:		T. Herr	andez P.G F	Prudent	Tech.			<u> </u>	Date:	14-Nov-12	2	Notes:	NA = Not	Applicable	
Drilling	Contract	or:	Frontz	Drilling			•				Joe Teter		_	See Samp	ele Summary	Sheets for
	SPECIFI		15:	Well not install Screen Inter						Sandpack:			Grout:	sampling i	nformation	
BOH:		7 ft bgs	;	Riser Interva						Bentonite:			Cover:			

				Environmen	tal Cho	mical				Job. No.	5461.004	Client	ACOE-Lo	uisville	Location CC-70	RVAAP DU06
ECC					oration	mual				Drilling Meth	nod:	Direct-Pus	h		Boring No. Wash Rack	SB05
			LOG O	F SOIL BORIN	IG					Sampling M	ethod:	Geoprobe 2" diamete	er-5 ft SS sa	ampler		
	Coordin Surface	ates:		X 499403.104 949.791600	Y 4562	326.744						MacroCore	e liner	•	Sheet 1 of	
	Casing	Below S	Surface:	949.791000	11 1151					Water Lev.					Start	illing Finish
	Referen	ce Elev	ation:						•		NA NA				13-Nov-12	13-Nov-12
										Reference	NA					
Digital Picture	Sample Type	In. Drvr / In.	Dpth. Csg.	Samp. # / Samp.	PID (ppm)	Blows per	Depth (feet)		USCS Log	Surface Cor	nditions:	Soil				
#		Recvrd		depth		6 in.			Ű							
		60/40	NA		0.0	NA	0	Ή		<b>D</b> ""						
							1	Н	CL	Brown silty	clay					
							1	Н								
							2									
							3	Ц								
								Н								
							4	Η								
							5									
		24/19			0.0	NA			CL	Transition to	o light brow	n silty clay	last 19 incl	nes sandsto	one	
							6									
					40.0			Ц	CL				last 19 incl	nes, sand s	eam, strong	odor
							7			End of borin	ng at 7 ft bo	js				
							8	H								
							0	Ĥ								
							9									
							10									
								Ц								
							11									
							12	H								
							12	Η								
							13									
								Ц								
							14	Н								
							45	H								
							15	Ή								
							16	H								
							17	'Ц								
								Н								
							18	Ή								
							19	H								
							13	Η								
							20									
								Д								
							21	Ц								
							22	Ή								
							23	H		<u> </u>						
								Н								
							24									
Ļ			<u> </u>													
Logged Drilling	l by: Contract		T. Herr Frontz	andez P.G F Drilling	Prudent	Tech.					14-Nov-12 Joe Teter		Notes:		Applicable	
WELL	SPECIFI	CATION		Well not install			•						-		information	2
Diam. c BOH:	of casing:			Screen Interva						Sandpack:			Grout: Cover:			
ЬОП.		7 ft bgs	)							Bentonite:	u-i ii bys					-

RVA	AP Pl Raver	BA 2 Ina / 845 Rave	018 Remedial Inve Army Ammunition F 51 State Route 5 enna, Ohio 44266 ortage County	estigati	70-4740-SB101           Start Date         : 2 February 2018           Field Data         : 2 Schwarzy 2018	Drilling Company: EnvirocoreDriller: Tony CramerDesignation of Drill: Geoprobe 7822DType of Drill Rig: Direct Push/AugerGeologist: Joe PeterlinOversight Company: ParsonsBorehole Diameter: 2"PID Model: MiniRAE LiteSampling Equipment: 1.5" x 4' long acetate liner: 2" x 4' dual tube
Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	Boring: 70-4740-SB101 ン モート Surf. Elev.: 950.23
0-				0.0	Railroad ties and gravel.	GP ANA
2	2	50	070SB-101-0062-SO	0.0	Brown, moist, CLAY, silt, sand, trace gravel.	Hole Plug 3/8" Sodium Bentonite
4- 5-	3	100	070SB-101-0063-SO	0.0		CL Sodium Bentonite
6- - 7-	4		070SB-101-0064-SO	0.0	Refusal at 7.0'.	
8 - 9						

	P RVA	AP P Rave	BA 2 nna 2 845 Rave	2018 Remedial Inve Army Ammunition F 51 State Route 5 enna, Ohio 44266 'ortage County	estigati	70-4740-SB102           Start Date         : 2 February 2018           Find Data         : 2 February 2018	Drilling Company: EnvirocoreDriller: Tony CramerDesignation of Drill: Geoprobe 7822DType of Drill Rig: Direct Push/AugerGeologist: Joe PeterlinOversight Company: ParsonsBorehole Diameter: 2"PID Model: MiniRAE LiteSampling Equipment: 1.5" x 4' long acetate liner: 2" x 4' dual tube
	Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	Boring: 70-4740-SB102 Surf. Elev.: 950.25
	0 - 1	1			0.0	Concrete Gravel	AR 🔆
	2	2	50	070SB-102-0065-SO	0.0	Brown, moist, CLAY, silt, sand, trace gravel.	
	4	3		070SB-102-0066-SO	0.0		CL Hole Plug 3/8' Sodium Bentonite
	6	4	100	070SB-102-0067-SO	0.0		
	8- - 9-		1	1		Refusal at 8.0'.	
	10-						
	11 - - 12 -						
	- 13-						
	14-						
	15-						
	16-						
	17-						
	18- - 19-						
UZ.DOL	20-						
190-0B	21 -						
04-16-2018 P.Navenna Arsenarboring Logs/10-4740-SB102.001	22-						
ig Logs	23-						
al/borin	24-						
Arsen	25-						
avenna	26						
F:\K8	27 _						
8-2016	29-						
-4-	30-						

04-18-2018 P:\Ravenna Arsenal\Boring Logs\70-4740-SB102.bor

RVA	AP P Ravei	BA 2 nna <i>I</i> 845 Rave	018 Remedial Inve Army Ammunition F 11 State Route 5 enna, Ohio 44266 ortage County	estigati	70-4740-SB103           Start Date         : 6 February 2018           Start Date         : 0 Schware 2012	Drilling Company Driller: Envirocore : Tony CramerDesignation of Drill Type of Drill Rig Geologist: Geoprobe 7822DType of Drill Rig Geologist: Direct Push/AugerOversight Company Borehole Diameter: ParsonsBorehole Diameter Sampling Equipment: MiniRAE LiteSampling Equipment: 2" x 4' long acetate liner : 2" x 4' dual tube
Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	SUS 201 SUS 20
0- 1- 2- 3-	1	50	070SB-103-0069-SO	1.4	Concrete Gravel Brown, moist, wet, SANDY CLAY and SILT, trace gravel.	AR CL
4	3	75	070SB-103-0070-SO	0.0	Wet, GRAVELLY/SANDY CLAY and SILT (possible fill material from around sump discharge line).	CL Hole Plug 3/8" Sodium Bentonite
04-18-2018 P:/Kavenna Arsenal/Boring Logs/70-4740-SB103.bor 10						

RVA	AP PI Raver	BA 20 nna A 845 <sup>2</sup> Ravei	P18 Remedial Inver rmy Ammunition F I State Route 5 nna, Ohio 44266 rtage County	estigati		CC RVAAP-70 70-4740-SB104Start Date: 5 February 2018End Date: 5 February 2018Weather: 10 F/CloudyNorthing Coord.: 566568.98Easting Coord.: 2379171.53Total Depth of Boring: 4.0'	Driller Designation of Drill Type of Drill Rig Geologist Oversight Company Borehole Diameter PID Model Sampling Equipment	Envirocore Tony Cramer Geoprobe 7822D Direct Push/Auger Joe Peterlin Parsons 2" MiniRAE Lite 1.5" x 4' long acetate liner 2" x 4' dual tube
Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)		DESCRIPTION		ing: 70-4740-SB104 f. Elev.: 946.65
0		50 -		0.0	Conc Grav Brow		AR CL	— Hole Plug 3/8" Sodium Bentonite
3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -	2		04-0072-SO	0.0	Brow	n, SANDY SILT and CLAY n, stiff, CLAY, silt, sand with trace gravel. sal at 4.0'.		Sodium Ēentonite
04-18-2018 P:\Ravenna Arsena\Boring Logs\70-4740-SB104.bor 								

RVA	AP PE Raver	BA 20 nna A 845 <sup>-</sup> Rave	218 Remedial Invert rmy Ammunition F 1 State Route 5 nna, Ohio 44266 ortage County	estigati	on Start Date : 5 Weather : 10 Northing Coord. : 56	-SB105 February 2018 February 2018 0 F/Cloudy 36443.45 879151.28	Drilling Company       : Envirocore         Driller       : Tony Cramer         Designation of Drill       : Geoprobe 7822D         Type of Drill Rig       : Direct Push/Auger         Geologist       : Joe Peterlin         Oversight Company       : Parsons         Borehole Diameter       : 2"         PID Model       : MiniRAE Lite         Sampling Equipment       : 1.5" x 4' long acetate liner         : 2" x 4' dual tube
Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCR	PTION	Boring: 70-4740-SB105 Surf. Elev.: 949.95
0-1-1-2-1-3-4-5-1-1-2-2-1-1-2-2-1-1-2-2-1-2-2-2-2-2-2		50	)70SB-105-0073-SO	0.0	Topsoil. Brown, moist, CLAY, silt, sand Weathered SANDSTONE. End of boring at 7.0'.	, trace gravel.	S       S    Hole Plug 3/8" Sodium Bentonite

	P RVA	AP P Raver	BA 20 nna A 845 <sup>7</sup> Ravei	2501 18 Remedial Inver rmy Ammunition F 1 State Route 5 nna, Ohio 44266 ortage County	estigatio	70-4740-SB106           Start Date         : 5 February 2018           Start Date         : 5 February 2018	Drilling Company       : Envirocore         Driller       : Tony Cramer         Designation of Drill       : Geoprobe 7822D         Type of Drill Rig       : Direct Push/Auger         Geologist       : Joe Peterlin         Oversight Company       : Parsons         Borehole Diameter       : 2"         PID Model       : MiniRAE Lite         Sampling Equipment       : 1.5" x 4' long acetate liner         : 2" x 4' dual tube
	Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	SOUND         Surf. Elev.: 949.28           Surf. Elev.: 949.28
	- 1- 2- 3- 4- 5- 6- 7-	1 2 3 4	75 75 - (	070SB-106-0074SO	0.0 0.0 0.0	Topsoil Brown, moist, slightly plastic, CLAY, silt, sand, trace gravel. Weathered SANDSTONE.	e CL Hole Plug 3/8" Sodium Bentonite
	8- 9- 10- 11- 12- 13- 14-	5	75		0.0	Refusal at 10.0'.	SS
0-SB106.bor	15- 16- 17- 18- 19- 20- 21-						
04-18-2018 P:\Ravenna Arsenal\Boring Logs\70-4740-SB106.bor	- 22 						

	• RVAA	AP PI Raver	BA 2 nna A 845 Rave	018 Remedial Inve Army Ammunition F 1 State Route 5 enna, Ohio 44266 ortage County	estigati		CC RVAAP-70 70-4740-SB107Start Date: 5 February 2018End Date: 5 February 2018Weather: 10 F/CloudyNorthing Coord.: 566519.03Easting Coord.: 2379140.28Total Depth of Boring: 10.0'	Drilling Co Driller Designatio Type of D Geologist Oversight Borehole PID Mode Sampling	on of D rill Rig Comp Diame	: Tony Cramer Drill : Geoprobe 7822D : Direct Push/Auger : Joe Peterlin any : Parsons
De ir fe	n	Samples	Recovery %	Sample ID 070SS-107-0075-SO	PID (ppm) 0.0	Orga	DESCRIPTION	nscs	GRAPHIC	Boring: 70-4740-SB107 Surf. Elev.: 949.54
	1- 2- 3-	1		070SS-107-0075-SO		Grav Mottl	elley SAND ed brown and gray, slightly plastic, CLAY, silt, and with trace gravel.	SP CL		
	3 - 4 - 5 -	3		070SB-107-0077-SO	0.0	Brow	n, stiff, CLAY, slit, sand, trace gravel.	CL		Hole Plug 3/8" Sodium Bentonite
	6- 7-	4		070SB-107-0078-SO		Weat	hered SANDSTONE			Sodium Bentonite
	8- - 9- 10-	5 6	100	070SB-107-0079-SO 070SB-107-0080-SO			sal at 10.0'.	SS		
inna Arsenal\Boring Logs\70-4740-SB107.bor	11 - 12 - 113 - 113 - 113 - 113 - 113 - 114 - 115 - 115 - 116 - 117 - 116 - 117 - 118 - 117 - 118 - 117 - 118 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 119 - 11									
04-18-2018 P	28 — 29 — 30 —									

# **APPENDIX C.2**

**Field Boring Logs** 

This page intentionally left blank.

1. COM	PANY NAME	Ecc	•		2. ORILLIN	B SUDCON	TRACTOR E	P.	NTZ 1	3	The second second	<u>58-1</u>	
3. PROJ	in the second					4. LOC	ITCH					2 96815	
5. MANE		NAA				8	CC 70	E	AST ELLAS	s varn	>		
-		DE TETO	R.			O, MAR	ALL AU	Par	ATTON OF DRULL	200	7		
	AND TYPES OF AMPLINE EDUP	Sections	2" 01A - 8 Ft 64	a de to		( 8. HOLE	LOCATION						
			AA ANOTA N	18012000	AK		ACE ELEVATIO		58-1				
						10.017	E (WAINTED					-	
10 045	URDEN THICKY	-					NOV 7			11. DATE CO	JOV Z	012	
						16. DEP	TH GROUNDW	ATER @	NCOLINTERED	NA			
13, 9 <b>6</b> 91	H DRILLED INTO	ROCK NA				18. DEP	TH TO WATER	NID EI	APSED TIME AFT	ER DRILLING C	OMPLETED		
14. TOTA	L DEPTH OF HO	LE C	PFT			17. OTH	ER WATER LET	EL ME	ASUREMENTS (SP	ECIEVI			
18. GEOT	ECHARCAL BANK		DISTLIRED	1 105	STURIED								
20 5.04	LES FOR CHEN	NA						MBER OF CORE BOXES		NA			
Sin	SAMPL	12	VOC	MET/		OTHE	R (SPECIFY)	0	THER (SPECIFY)	OTHER	SPECIFY)	21. TOTAL CO RECOVERY	
	AMY JA		BACKFILLED	MONITORIN	a week	0061	(IDEAIDA					*	
			V			OTHER (SPECIFY)		23. SIGNATURE OF INS					
5 P	а			FIELD 8		AEENING	GEOTECH SI	WP(£	ANNLYTICAL	ANOR2			
ELEV.	b	DESC	RIPTION OF MATERIALS C		RES	UL 19 0	OR CORE BO	K NO.	SANIPLE KO.	COUNTS		RENARCIS	
ĊL	EV		LTY LLAY		N	'n						······	
	-E-&	TRAN	S GRAY SIU	ryclay	<u> </u>						+	₽0.0	
CL	EA	51.	10-10-1										
	10								· ·			0.0	
							1.2.2						
	15							_					
1.1	2							-					
	-5							-+					
1	E									11.3			
	2-1												
1	. =												
	3	÷											
	=												
1	-							$ \downarrow $	71				
						l	$\langle \langle \rangle$	4	AX			. 6	
ľ	-							$\backslash l$	Th		AN	uv 12	
	7							И	T				
	and the second second		AltanA .										

The second		Ecc		L. UI		FR	antz U	RILLIVI		Z SHEETS	
3, PROJ	er Rave	NAM	AAR		14. LOC/	THE	AST CLASS			A district	
5. NAME	OF DRILER	GE TEM	t.		O. MAN	FACTURERS DEL	NATION OF DRUL	144-12			
7. 50255	ND TYPES OF D	RILLING 2	" 110		a 1016	E DOCATION	PROPERTY OF BRILL	620 18			
AND	ANPLING EQUIPM		Fr sr son		0	140					
			mAC HOC	URIL	- D. SUPP	ACE ELEVATION	••••••				
1	*				10. DAT	E STARTED NOV 2017	, 1	11. PATE CON	PLETED	-	
12. OVE	TURDEN THICKNE	-88				and the second	A ENCOLINTERED		un un	2	
13, DEPT	H DRILLED INTO P	IOCH ALA			16. DEP	TH TO WATER AN	A,	the stand have	All CITC		
14. TOTA	L OPTH OF HOLE	NA				18. DEPTH TO WATER AND ELAPSED TIME AFTER DIELLING COMPLETED  NA  17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)					
		t	offr		17. 011	ea water level	MEASUREMENTS (SP	Econya			
	ECHNICAL BANPL	VA	DISTURBED	UNDISTU	19ED 11	). TOTAL NUMBER	N OF CORE BOXES	14			
20. SM	TES FOR CHENIC	H ANALYSS	VOC	METALS	OTHE	(IPECIPY)	OTHER (SPECIFY)	OTHER IS	PECIPY)	21. TOTAL CO	
	KITTON OF HOLE									AECOVER	
22. 0404	RINUN OF HOLE	ł	BACKFILLED	MONITORING WE	LL OTHER	(SPECIPY) 2	3. BIOMATURE OF IN	SPECTOR		100	
	TT		X			GEOTECH SAMP	1. 143 1		2		
ELEV.	DEPTH b	DESC	RIPTION OF MATERIALS		RESULTS	OR CORE BOX N	LE ANALYTICAL IO. SAMPLE NO.	BLOW Counts	1	REMARKS	
CC	NI	BEN SILT	Yury		N/41 _		+	9	0.0		
	E-A	THANS -TITKE R	TO GRAY	) City Ling					0	.0	
CL	- A Tursed		errof Sury (f Daz - Stean	56-					0	.0	
	10-										
	E										
	1.11										
	15										
	13										
	201										
	2 2 111			-							
	24										
	2			_							
	3										
	3										
	20 20 3.5 3.1 3.1 3.1										
	2										
	24 24 3. 3.										
	24										
	3.					~			4 ~0~	in	

		_	HTW	DRIL	LING	3 LO	DG				HO	1END. 33-3
1. CO	PAN INE E	ce						20.	Nº82 6			#5-3
3. PRO		Contraction of the local division of the loc	4 . 0			1. 100	ATION	14.2.	NIL 1	RILLIVI	OF	LINGETS
5. NW	E OF DRILER	-	1.41			-	2 70 T	EAS	TCLASS	YNED		
7 (378)	S AND TYPES OF DRU	Jot	TETTA			8, 199	EUPR	ton	CGC 20	nt		
AND	SAUPLINS BOUPAGE		2" Pla s	M		a. HOL	E LOCATION					
		F	MALAOCO	States of the local division of the local di		D. SUR	DU ØI		6-2			
						10.00	TE STARTED	-				
12. OV	ADURDEN THICKNESS					119	NOV 1			11. DATE COM	Pleted ¢∨	2
						15. DS	TH GROUNDW/	ATER E	NCOLINTERED	M		
13, 08	TH DRILLED INTO ROC	NA				18. DEF	TH TO WATER	AND EL	LAPSED TIME AFT	ER DRILLING CON	PLETED	
14. TOT	AL DEPTH OF HOLE	6	OVIT .			17. 077	ER WATER LEV		ASUREMENTS (SP	<i>MA</i> ECIFN		
18. GEO	TECHNICAL SAMPLES		DISTURDED		DISTURIED				CORE BOXES	NA		
20. 544	PLES FOR CHEROCAL	ANALYSIS	VOC	1				-		- NM		
56	h Scmmm	SAKAT	TUL	MET	ALB	OTHE	R (SPECIFY)	0	HER (SPECIFY)	OTHER (SP	ecify)	21. TOTAL COR
2. DISP	DITION OF HOLE		BACKFILLED	MONITORIN	O WELL	OTHE	R (BPECIPY)	1		1-		K
			×		-	Unite	n (ersylen)	1	ILEINTLINE OF IN			
ELEV.	DEPTH	05309	IPTION OF MATERIALS		FIELD SC	REENING	GEOTECH BA	MALE	ANALYTICAL	BLOW T		
	b		6		PIESI		OR CORE BO	K HO.	SHAPLE NO.	COUNTS		RENARCIS
cc	EXI	JAN SI	LTY CLAY		N/n						-	
	1-1-	Tyha	-BENYSI	Sam	11.	~		-			-7	0.0
	A 1	[CFIC	S-BAN (S	71-	100							
	10	01)0	ir at dis	Sec. 14				1				
	E							- 1				
	15					-		$\rightarrow$				
				100						1		
	-					-		+				
	=									1		
	1					-		+			-	
	7							1				
	-											
	-									1		
	1											
	, . , .							1				
				1								
								1	1			
	****							L	A			
								ł	A	2	14 Ni	~ 12

	r r r			2. DRILLING SUBCONTRACTOR F.R. N. EZ DRILLING							LEND. JB-4	
ECT	ECC				Tana		Re.	Nº82 1	RILLIV	·/- OF	L SHEETS	
RAL	KENNA	AAP			4. LOC	CC. 70	Cal	TOLAS	VA			
OF DRULER					S. MAR	UFACTURENTS						
		2" Dia			A MO1	LACATION	Cr K	PROBIL	667	WUT		
ianpling edi	UPMENT	F FT	<u> </u>			19-41		SB-4				
			6-06		D. SUR	ACE ELEVATIO	IN _	/			1000	
			G IN D		10. DAT	E STARTED		1	11 DATE OF	WIN FIED		
ELIRDEN THE	CKINESE								19	NOVI	2	
									NA			
H CIRLED IN	TO ROCK NA				18. DEP	TH TO WATER	AND EI	APSED TIME AFT	R DRILLING C			
L DEPTH OF (	HOLE	STEF		2.2.2	17. OTH	ER WATER LEV	EL ME	ARI DRIEMENTS IND	1000	p		
ECHOICAL SI		The second se	1 100		_				/	r		
	NA	Matongeo	UNIL UNIL	anul <b>e</b> ed	1	9. TOTAL HUM			MA			
IL SAN	NPLA	VOC	META	1.8	OTHE	R (OPECIFY)	0	HER (SPECIFY)	OTHER	(SPECIFY)	21. TOTAL CO	
								$\sim$		-	RECOVER	
STILLING OF HIC	LL	BACKRILLED	MONITORIN	A MELL	OTHE	(SPECIFY)	23. 1	SCHATURE OF SK	PECTOR			
<b></b>		X	· ·	-	-				Nol 2			
DEPTH b		6		FIELD 90 AESI	AEENING ALTS 1	Geottech Sa Or Core Bo O	NPLE NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTB		FEMARIE	
ΚI		•	1 (14-1)	NI	A .		_			10	0.0	
N-												
ŤΞ	N	10 000005	• •									
15-								· · · ·				
E												
15-						-	-					
E												
2							-					
Ξ												
15-		7.2				1	-				a manadal an	
3												
7												
3												
21-1										}		
3												
11						_	2	$\bigcirc$				
Ξ					L	/				1.4 -	551/17	
5-					1		T	$\backslash / $	> 1	12 1	10410	
E								V				
	PROJE	ECT			- de		1					
	E OF DRILLER S AND TYPES ( BANPLINE ED) RELIROEN THIC RELIROEN THIC IN OULLED IN IN OBJETH OF ( TECHNICAL SIA PLES FOR CHE SAL JAN MITTON OF IN DEPTH	AND TYPES OF DRULING BAMPLING EDUPMENT RELIRICEN THICKNESS TH DRULED INTO ROCK MA IN DEFTH OF HOLE A TECHNICAL BAMPLES FUES FOR CHEMICAL AMALYSIS SAL JANAAN (h 12 fr MITCH OF HOLE DEPTH DED DEN SI C TCAN INTERPT JA JA JA JA JA JA JA JA JA JA JA JA JA	AND TYPES OF DRULING BAMPLING EDUPMENT K FT I MULLING RELIRCEN THICKNESS HE OFFILED INTO ROCK M. DEPTH OF HOLE MESS FOR CHEMICAL ANALYSIS VC MIDDIFTH DESCRIPTION OF HOLE DESCRIPTION OF MATERIALS C DEPTH DESCRIPTION OF MALE MIDDIFT DESCRIPTION OF MATERIALS C DEPTH DESCRIPTION OF MATERIALS C DEPTH D D D D D D D D D D D D D	COF DEPLEM AND TYPES OF DELLING RANPLING EDUPMENT K FT ST IMMILLER A AL ALCONE ALLER MICHAESE HOILLED INTO ROCK MA LOEPTH OF HOLE DESCRIPTION OF HOLE DESCRIPTION OF HOLE DESCRIPTION OF HOLE DESCRIPTION OF MATERIALS C DEPTH DESCRIPTION OF MATERIALS C DEPTH DESCRIPTION OF MATERIALS C ALCONE DESCRIPTION OF MATERIALS C ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE ALCONE A	COF DRILLER EARD TYPES OF ORLUND BANAYLOG EDUPWENT EARDEN THICKNESS REIR DEN THICKNESS REIR DEN THICKNESS REIR DIALED INTO ROCK MA IL OBPTH OF HOLE HAT DETURIED RES FOR CHERICAL MARYSS VOC METALS MESS FOR CHERICAL MARYSS VOC	DAD TYPES OF OPELING DAD TYPES OF OPELING L FT JT ANDREAM BEDUPMENT L FT JT ANDREAM BEDUPMENT L MORLEAM BEDUPMENT REARDENT THECKNESS TH OFFICE ANALYSIS AL DEPTIN OF HOLE TAMPACA MARYSIS TECHNICAL BANNES TO CHEATION ANALYSIS TO	BAND TYPES OF DRULIND     2."     D/A     6. MOLE GOLATION       SAMPLAGE EDUNATION     4. FT     T     DU-Q     DU-Q       AAA.AA.AA.C.U.O.Q     10. DATE STATTED     14. AAA.AA.C.U.O.Q     10. DATE STATTED       INDULED NTO ROCK     AAA.AA.AA.C.U.O.Q     10. DATE STATTED     14. DBTTH GOLARDS       IN DILLED NTO ROCK     MA     10. DBTTH TO WATER     10. DBTTH TO WATER       IN DILLED NTO ROCK     MA     10. DBTTH TO WATER     10. DBTTH TO WATER       IN DILLED NTO ROCK     MA     10. DBTTH TO WATER     10. DBTTH TO WATER       IN DESTRICAL AMALYSIS     VOC     METALS     OTHER (BRECET)       INTO HOLE     HAD JEFT     11. OTHER WATER LER.     11. OTHER (BRECET)       INTO HOLE     HAD JEFT     DATORNAL MALYSIS     VOC     METALS       INTO HOLE     HAD JEFT     DATORNAL MALYSIS     VOC     METALS       INTO HOLE     HAD JEFT     DATORNAL MALYSIS     VOC     METALS       INTO HOLE     HAD JEFT     DATORNAL MALYSIS     VOC     METALS     OTHER (BRECET)       INTO HOLE     HAD JEFT     DATORNAL MALYSIS     VOC     METALS     OTHER (BRECET)       INTO HOLE     DESCRUTTION OF MATERIALS     FELD SCHERENG GEOTECH SU     ON CORE     0       INTO HOLE     DESCRUTTION OF MATERIALS <td< td=""><td>IND TYPES OF DRULING     2.11     DIA     8. MOLE LOCATION       SAMPLADS EDUMIENT     4.11     1.11     DIA - QI       Add_Add_Add_Add_Add_Add_Add_Add_Add_Ad</td><td>ADD TYPES OF OPLIND     A MARKEN CONTRACT OF A CONTRACT ON A CONTRACT OF A CONTRACT ON A CONTRA</td><td>AND TYPES OF OPLIAND  AND TYPES OF OPLIAND  AND A ALL ALL CAN CO  AND ALL ALL CAN CO  AND ALL ALL CAN CO  AND ALL ALL CAN CO  IN DATE STATED  IN DATE STATES  IN DATE STATES</td><td>CONTINUES OF DRUMAN     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       MARINE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       MARINE EDUNMENT     3.0000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       MARINE EDUNAL     1.0000 MINOR OF DRUMAN     1.0000 MINOR OF DRUMAN     0.0000 MINOR OF DRUMAN       MARINE EDUNAL AMARTAS     VCC     MINOR OF DRUMAN     MORTODING WELL     OTHER (MERCIPI)       MARINE EDUNAL AMARTAS     VCC     MINOR OF DRUMAN     MORTODING WELL     OTHER (MERCIPI)       MARINE EDUNAL AMARTAS     VCC     MINOR OF DRUMAN     MORTODING WELL     OTHER (MERCIPI)       MARINE EDUNAL OF MARINE     MORTODING WELL     OTHER (MERCIPI)     OTHER (MERCIPI)       MARINE EDUNAL OF MARINE     MARINE EDUNAL DRUMAN DRUMAN     MARINE EDUNAL DRUMAN DRUMAN       MARINE EDUNAL OF MARINE     MARINE EDUNAL DRUMAN DRUMAN     MARINE EDUNAL DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN D</td></td<>	IND TYPES OF DRULING     2.11     DIA     8. MOLE LOCATION       SAMPLADS EDUMIENT     4.11     1.11     DIA - QI       Add_Add_Add_Add_Add_Add_Add_Add_Add_Ad	ADD TYPES OF OPLIND     A MARKEN CONTRACT OF A CONTRACT ON A CONTRACT OF A CONTRACT ON A CONTRA	AND TYPES OF OPLIAND  AND TYPES OF OPLIAND  AND A ALL ALL CAN CO  AND ALL ALL CAN CO  AND ALL ALL CAN CO  AND ALL ALL CAN CO  IN DATE STATED  IN DATE STATES  IN DATE STATES	CONTINUES OF DRUMAN     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       AMORTADE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       MARINE EDUNMENT     2.11 DLA     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       MARINE EDUNMENT     3.0000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN     0.1000 MINOR OF DRUMAN       MARINE EDUNAL     1.0000 MINOR OF DRUMAN     1.0000 MINOR OF DRUMAN     0.0000 MINOR OF DRUMAN       MARINE EDUNAL AMARTAS     VCC     MINOR OF DRUMAN     MORTODING WELL     OTHER (MERCIPI)       MARINE EDUNAL AMARTAS     VCC     MINOR OF DRUMAN     MORTODING WELL     OTHER (MERCIPI)       MARINE EDUNAL AMARTAS     VCC     MINOR OF DRUMAN     MORTODING WELL     OTHER (MERCIPI)       MARINE EDUNAL OF MARINE     MORTODING WELL     OTHER (MERCIPI)     OTHER (MERCIPI)       MARINE EDUNAL OF MARINE     MARINE EDUNAL DRUMAN DRUMAN     MARINE EDUNAL DRUMAN DRUMAN       MARINE EDUNAL OF MARINE     MARINE EDUNAL DRUMAN DRUMAN     MARINE EDUNAL DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN DRUMAN D	

I. CON	PANY MAME	Ge i		DRIL							_	5B-5
3. PRO		Ecc				T	F	Re	Nº82 6	RILLIV	/ OF	Z SHEETS
	RAVE	NAM	AAP			1 V. U.U			ST CLAS			
5. 4446	OF DIQUER					6. 1640	UFACTURENS	127.8	SATION OF DELL	S THCI		
	AND TYPES OF D		2" DIA	5 FT		A HOL	ELOCATION	0.30	L			
AND	IMPLING EQUIPM	BAT V	T Camper	12			NI S	6-	5			
			MACAOCO	Ad		D. GUR	ACE ELEVATIO	N				
		F				10. DA	E STARTED			11. DATE CO	PLETED	
12. OVE	UTDEN THICKNE	\$8					NOV 12			11. DATE CO. 14 N	OV 12	
13 0527	H ORILLED INTO A		 بودن مدر مارد ( ۱۰ مواهدین و در ۱۱ م							ng		
		IV A				18, DEP	TH TO WATER	AND E	APSED TIME AFT		DMPLETED	
14. TOTA	L DEPTH OF HOLE		to)ET			17. OTH	ER WATER LEV	el me	ASUREMENTS (SP	ecurn		
18. GEOT	ECHOICAL SAMPLE		DISTURBED	1 1	NDISTURBED					NA		
20. 844	LES FOR CHENCH	119					- IVIAL NUM		CORE BOXES	MA		
Sal n	mpla son	mare	VOC	ME	TALB	OTHE	R (SPECIFY)	o	HER (SPECIFY)	OTHER	IPECIFY)	21. TOTAL CO
22. DISPO	SH RAT			+ -		-	_		_			RECOVER
	2. DISPOSITION OF HOLE		BACKFILLED	MONITOPI	NG WELL	OTHE	(SPECHPY)	23. (	IGNATURE OF IN	SPECTOR		
i entre e			_X	L					, HIAMA	ANDEZ		
ELEV. A	DEPTH	DESC	RIPTION OF MATERIALS		RES		Geotech Sa Or core bo	HPLE ( NO,	ANALYTICAL SAMPLE NO.	BLOW		<b>EMARKS</b>
ĊL.	1 -	BEN SI	LALLAT		+	d	•			9		h
	EA	Tran	S LT BEN	726	M/A			_			-0	0,0
	X-I-	- <del>100 0</del>	DAAC	-							<u> </u>	
	r a											
	10							_		-		
				•								
	15				<b> </b>							
	-							1				
								+			-	
	E				1							
								+				
	3-1-							╉				
	3											
	2											
	infinition in the second se											
								P			14 N	ov 12
									A	5	14 N	ov 12
; ; ; ;	minimu		Altana						A	STATUS	14 N	ov 12

.

3. 780	Dan 12 an	Ecc.	4.0			4. 100	think	A	vez b	RILLIV 1-	lor	A DEED
5. 144	COF INVILLEN	tring			-			70	DU-3 1	34117-	10	-
7. 659	AND TYPES O		TATAL		_			+BE	BIRDH OF ONLL	07		
	MAPLINS EDU		2" OR SS SAMPI			a. Hole	LOCATION	5	6-01			
		-	MALAOCO	1¢		9. CUIP	ACE ELEVATIO					
		F	and the participant			10. DAT	E STARTED		. 1	11. DATE COMP	LETED	-
12. ONE		KNE39	_				N GROLINOW			1310	24	112
13, 067	IH DINLED OF	O ROCK					-	-		AP CHILLING CON		
14. 707	L DEPTH OF H	NA NA			_					NA	PLETER	
		/	311						NSUREMENTS (SP	eom NA		
	ICHICKL SN	NA	DISTURBED	UND		1	. TOTAL HUN		CORE BOXES	MA		
		SCH MUNITES	VOC	META	8	ONE	(SPECUPY)	o	HER (SPECIFY)	OTHER	HOPY)	21. 101AL.COM
and street on the local division of the loca	arian of Ho		-	-				L	-	-		AECOVERY N
	aanaa ye niy		BACKFILLED	MONITORING	WELL	(THE)			MENATURE OF M			
1-	1.1			Ļ	ABD SC		GEOTECH BA	7	MULTICAL	BLOW T	_	
eux.	b	065	CRIPTION OF MATERIALS C		/EX	K.78	OR CORE BO	K ND.	SAMPLE ND.	COUNTS		ABMAG
ir	EX	DK BEN	sity cut		NIA	-		_		-7		0.0
1.1	12-1	1xANS2	CLAY 5.47				1					
1 1	A-7	0.00										
	下于	ONLY A!	55 TDEI		22.			-				
			1 3	9.9.	-74	7	$h \subset \mathbb{Z}$		100			
	12-3			TA		-		-				
1	a.I.	-	-							T		
								1				
i I	Est						1					
	Ξ							T	T			
	7					1						
	E			1								
	34-	1										
	E											
	1							1	1	$\gamma$		
	es=1							L	1			
	- 2						2	1	11	X	13 N	ov 12
										1 1		

	-		HTW	DRILL				L			13	£HQ. B- ØZ
		Ecc	•	2	ORDLING S	UBCONT	NCTOR F.	Rel	v.t.2 p.	RILLIV/-	ale OF	EL 1 L SHIFTS
9. PRDJ	RAV	ENAA	AAP		1	LOCAT	on ee 7	þ	10-3	BIJ- A	577	<del>ү</del> с
i. NAME	OF DRILLER		THATBUR	200 V	6	. HANGUT	ACTURENTS	CERTINA .	ATION OF BRILL			
	NID TYPES OF	ORILINO	2" 219 1	a state of the second sec		HOLE	OCATION	pro-	<u>1912 0</u>	670 07		
			MALAO CU			SURFN	ELEVATIO	N N	642		-	
		-				-	STARITED					
2 (1664	INURDEN THIC	/ME90				13	NOV ZO	-		1. DATE COMP 13 No	URIED JV Z	012
			-		-	-			COUNTERED	NA		
_	H ORBILED SATA	IVA			11	8. Depth	TO WATER	ND EL	APSED TIME AFTE	R DELLANS COM	PLETED	
4. TOTA	l depth of H	DLE /	7871		11	T. OTHER	WATER LEV	EL ME	SUREMENTS (SPE			
8. <b>GEOT</b>	ECHNICAL SAL	NA	DISTURIED	UNIO	STURDED	19.	TOTAL NUM		CORE BOXES	NA		
0. 200	CAM/L	CAL MALYSE	VOC	META	8	OTHER	SPECIFY)	01	HER (SPECIFY)	OTHER (SP	ECIFY)	21. TOTAL CORE
ST	AHET			-	-	_						RECOVERY
2. (0590)	Sitton of Ho	£	BACKRILLED	MONITORING	WELL	OTHER	epeckfy)	1	EDMATURE OF INS			
-	T		- in the second	1	RELD SCR	ENNS T	BEOTECH SA	MALE	HERNA NULYTICAL	NA2		
ELEV.	DEPTH		C C		RESULT		OR CORE BO		SAMPLE NO.	COUNTS		REMARKS b
CL	EX	BUN CLA	+ 18" D. CLAY		0.	0						
	\$-J	TN TEK-BE	DED 55 / 1141	ļ		_		_				
ĊL	E A				0.	0						
	1/1	35 16	TD C 8	104	TOAM	-					-	
				nt								
	1 I					1						
	21-					_						1.1
	E			-								
	15					+		-				and in
	Ξ			1.1								
	3 -			1		1						
						1						
	Ē									- 1		
	12-											
	=							1	-18			
	45-							5	$\triangleleft$	$\lambda$	13^	Non FUT
	E								ノ	$\mathcal{U}$		
		(RDI)	Al bunn	AAP		-	-	-		HOLE NO.	-	

3. PRD/E	et 12 au	Ecc-							VEZ D		OF	Z SHEETS
S. HAME	OF DRALLER	Tran	TRIAN			CC 6. MARK	FACTUREN'S D	N/-	3 Bidy 1	7-40		
7. SIZES	ND TYPES O		2" DIA 5	FT		1	ACADON .	toP.	roga c	62001	-	
	WIRLING EQU		S.S. Samper	A			<u>S</u> ß	-	3			
			MALAO LUNG			9. 8UW	NCE ELEVATOR	N.		~		
						10. DAT	STARTED	2		11. DATE COM	PLETED	017
12. OVER	BURDEN THIC	NAME	-		ŀ	15. DEPI	H GROUNDWA	TER E	COUNTERED		rA	
13. DEPTI	I GRILLED INT	TO ROCK NA	and the second beautiful light and a second			18. DEPT	H TO WATER	ND EL	APSED TIME AFT	/*	PLETED	
14. TOTA	DEPTH OF A		7 FT	-		17. OTH	A WATER LEV	EL MEJ	SURE ENTS (SP	ECIFY	NG	
18. GEOT	CHRICAL BA	MPLES	DISTURCED	and the second second	STURBED	Te	TOTAL NUM	ER OF	CORE BOXES		NA	
20. SAMP	LES FOR CHE	NIA DECAL ANALYSIS IL SUMMAN	VOC	NETA		_	(SPECIFY)		NER (SPECIFY)	1 ones in	NA	21. TOTAL COR
SER		IL SUMMAN				Vinta			mar (precert)	OTHER (8	PEGIPT)	RECOVERY
22. DISPO	SITTION OF HO	the second s	BACKFILLED	MONITORIN	WELL	OTHER	(SPECIFY)	23. 5	IONATURE OF IN	SPECTOR		
	·····	_	X						1 HAN	MANUN .	e	
ELEV.	OBPTH b		CRIPTION OF MATERIALS C		PIELD SCA RESU	LTS	GEOTECH SA OR CORE BO	MPLE X ND.	ANALYTICAL SAMPLE NO. 1	BLOW COUNTS B		HEMARICS h
ĊL	X	DK BLK TEANS	BRN CLAY		NA			_			0	's <b>Ø</b>
	YE	0.6'	-55					-				
	10-3		DE7'	10:56	pm			1	е. Т		0.	0
				TH								
	15-	······		•••		_		_				
	3											
	2-							-				
	-											
	7											
	=											
	-10											
	E									-		
	1								11			
	45-I							1	$\Box$	X	130	vol 12
	1								- d	< 0	•	
- 6	1		TAL'EARA							HOLE NO.		-

ANY NAME	In a st				CIRCUMAN	TO ASTRONO					
UPT .	Eci-	•		2. UNILING	auacoa	INACTOR P.	Re	Nº82 0	RILLING	OF	ZENETS
RAV	tring	AAP			a. LOC	670	NU	-3 Bid	-47-4	6	
OF DRILLER	Joh	TETAR			a, maa	FACTUREN'S	DESIGN A-CA	ATTICH OF GRUL	DT		-
	OFILLING	2" 019 5	-FT		8. HOLE	LOCATION		a vor			
		MACAOLO	PRÉ								
	}	·			10.00	E GTAINED					
INIDALY TURN	INCOR	-			13	Nov 12			13 N	UV 17	
						<u>م</u>			MA		
H DRULLED DIT	DROCK NA				16. DEP	TH TO WATER	AND EL	APSED TIME AFTI	A DRILLING CON	10 C	
L DEPTH OF HI	ALE .	ther			17. OTH	ER WATER LEV	EL ME	ASURGAINTS (SP	ECIFY)		
ECHNICAL SAN		DISTURBED	U	HOISTURBED	1	. TOTAL NUM	BER O	F CORE BOXES		-	-
LES FOR CHE	POR ALLES VOID	VOC	I ME	TALB	OTHE	R (BPECIFY)	l o	THER (SPECIFY)		-	21. TOTAL CO
No. of Concession, name		-	+	1							RECOVERN N
istricki of Hol	E	BACKFILLED	MONITOR	NG WELL	OTHE	(SPECIFY)	23. 1	NEWATURE OF IN	SPECTOR		
		<u>×</u>		Intion		Lagoreou bu	12	the second s		-	
DEPTH	OESI	C C		RES	ULTS d	OR COME BO	UL HO.	SAMPLE NO.	COUNTE		REMARKS P
N F	DK BEN	SITTY CLAY	1	NP	-						0.0
T-T	TEA	NS SILTY	WY	-							
FI	- m	Frankel @	515	-						0	0
10-	55	67.	1: 22 4	1-							
E		ne i	4				Ì				
15-		1	#	1			-				
2						1			-		
-				1					1		
5-		·		-	-						
E											
7-				1							
. =											
E											
1/2 - 3				1				- 1	$\sim$		
Ξ								$\neg$			
45-						Ċ	1		A	12	5 N 12
=								9	$\langle O \rangle$	121	
1_ 155	Inter	द्या		L					HOLE NO.		
	OF DIRLER AND TYPES OF ANIPLING EQUI UNROBH THICH H DRULED DITT L DEPTH OF HI ECHNICAL SAA SA MALLES FOR CHER SA MALLE THICH OF HO	OF DIRLER AND TYPES OF DILLING ANIPLING ECALIPMENT BURDEN THICKNESS H DRULED INTO HOCK <u>M</u> L DEPTH OF HOLE ECHICAL SAMPLES <u>M</u> MACT BURDEN OF HOLE DEPTH DEPTH DEPTH DEFTH DEPTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEF DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH DEFTH D	TOR TRIANS AND TYPES OF DRULING AND LAD COMPLENT ST SAMPLEN ST	OF DIRILER TOK TRITICA AND TYPES OF DIRILIND AND TYPES OF DIRILIND AND TYPES OF DIRILIND AND TYPES OF DIRILIND AND TO BOOK AND THE CHMESS H DRULED INTO ROCK A DEPTH OF HOLE ECHACCAL SAMPLES DISTURBED USS FOR CHEMICAL ANALYSIS VOC ME PACT BITCH OF HOLE DEPTH DESCRIPTION OF HOLE DESCRIPTION OF MOLE DESCRIPTION OF MOLE TEANS S & TO & TIME TO	AND TYPES OF OPELLIND AND TYPES OF OPELLIND AND LAD COARS ELARDEN THEXNESS H DRILED DITO ROCK AL DEPTH OF HOLE ECONCOL SAMPLES DISTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDSTURDED UNDST	AND TYPES OF DELLIND     2" PLA 5" FT     0. HOLE       ST FMMPLAN     DALADCONE     0. BUR       DALADCONE     0. BUR       BURDEN THEOMESS     10. DUR       HI DRULED RTO NOCK     MA       HI DRULED RTO NOCK     MA       LIDEPTH OF HOLE     JAT       EDWICHL SAMPLES     DISTURED       USE FOR CHEMICAL ANALYDS     VOC       MONTORING WELL     OTHER       DIPTH     DECORPTION OF MATERIALS       TEAM S     HI TELD SCHEMICS       MIL DEPTH     DECORPTION OF MATERIALS       TO B COULE     SHEMITY       MIL CLAWEL     SHEMITY       DEPTH     DECORPTION OF MATERIALS       RED.D SCHEMICAL ANALYDS     MONTORING WELL       DIC B COULE     BACHTURED       MIL CLAWEL     SHEMITY       DIC B COULE     SHEMITY       DIC B COULE     SHEMITY       MIL CLAWEL     SHEMITY       MIL CLAWEL	AND TYPES OF PRILING AND TYPES OF PRILING DE LACE ON E AND LAC LONE DE LACE LOANE ID. DATE STATTED (3 NUM (2 NUM (2 NU	AND TYPES OF DELLING AND LASS OF DELLING $2^{\prime\prime}$ DLA $5^{\prime}$ FT $3^{\prime\prime}$ DLA $5^{\prime\prime}$ FT $3^{\prime\prime}$ DLA $5^{\prime\prime}$ DLA $5^{\prime$	AND TYPES OF PRILING $21^{\circ}$ $12^{\circ}$ $12^{\circ}$ $5^{\circ}$ $5^{$	AND TYPES OF DRULING AND TARES OF DRULING IS ALLONG OF DRULING	OF PRILER     JOB     T&TATA     E. MARKETURGES DESIGNING OF PRILIT       NO THES OF BRILLIN AND THE AND ELARGES THE AFTER DRILLING COMPLETED IS NOT 12     II. DATE COMPLETE IS NOT 12       BURDEN INCOMEST     IS. NOT 14 AND THE OWNER HOUSE IS NOT 12     II. DATE COMPLETE IS NOT 12     II. DATE COMPLETE IS NOT 12       BURDEN INCOMEST     IS. NOT 14 AND THE AND ELARGES THE AFTER DRILLING COMPLETED IS NOT NOT NOT NAME     IS. DEFTH OWNER HOUSE INFORMATION IS NOT NOT NOT NAME     II. DATE COMPLETE IS NOT NOT NOT NAME       BURDEN INFORMATION IS NOT NOT NOT NAME     INDETINIES     INDETINIES     INDETINIES       IS NOT

1. CONP	NIT MAKE	· · · ·	HTW		JING						5	eno. β 45
3. PROJE		Ecc					P.	Re!	VEZ D	RILLIN	/- OF	L SHEETS
	RAVE	NAM	AAP			4. LOCA	70 N		3 Bida	47-40	C	
5. NAME	of Dhaler		E TETAL			8. HANKU	CANTA COMPANY	ICONDA!	ATTON OF DIGL			
	MID TYPES OF		2" 911 5	NT SS		B. HOLE	LOCATION	100				
			MACAOCO	of E		D. SURF	SB-0				-	
1							STARTED					
		<u>_</u>			_		JUV 20	12		11. DATE 00 13 NO	V ZOLA	
12. OWER	BURDEN THÇCKI	NESS			1.1	15. DEPT	H GROUNDW/	ITEA B	COUNTERED	NA		
13. <b>DEP</b> T	I DRULED INTO	HOCH NA				16. DEP1	H TO WATER	AND EL	APSED TIME AFTE			
14. TOTA	OPTH OF HO	LE	7 1.1			17. 0716	A WATER LEV	EL ME	ASURIEMENTS (SPI	com No	,	
18. GEOT	ECHNICAL SAM		DISTURBED	UN	ISTUR ED	-	-		CORE BOXES	NA		
20. SAMP		CAL ANALYSIS C. M.M.A.F	VOC	MET	IR	07450	(SPECIPY)	Ta	THER (SPECIFY)		(OPECIFY)	21. TOTAL COR
SAR.	SAMPIA ST	SC MMAL BIT						f	men (proor i)	Uinen		RECOVERY
22. DKP0	BITCH OF HOL	E	MCKFILLED	MONITORIN	G WELL	OTHER	(SPECIFY)	23. (	INMATURE OF IN	PECTOR		
	و و و و و و و و و و و و و و و و و و و		K			~	-	1	HJANA	non 2		
ELEV.	DEPTH b	DESC	RIPTION OF MATERIALE	)	FIELD SC RESI	<b>l 13</b>	Geotech Si or core bo •	WPLE	ANNLYTICAL	BLOW COUNTS S		REMARKS PLO
ĊL	XI	BLK CL	TO BEN	RUY	N/1							0.0
CC	Y	<u>CC</u> *	TDC7		pm				•		6	9. U
	1			11+			-				100	
	15-											
	Ē										1	
	20-						-					
	3											
	25							- 13 1				
	E											
	2-1											
	. 3											
	~ 3	•										
	11 -						_		$\frown$			
	1						$\frown$	.	$\sim$ L	•		
	45-						L	$\dashv$	, X		13 N	SIVO
	E							ľ	' 4			
		Icen	त्वी							Luncost	L	
IDM PL	55	17	tal bana	AAP						HOLE NO.		

			HTW	DRIL	LING		)G				HÓ	B-(1-5)
1. COM		ELC	•		2. OPILIN	NICO		Ro	NTZ	Deneiro		
3. PROJ	RAL RAL	ENNA	AAP			- LI (7 P	A2 1 3		inst cua			
S. MANE	OF WILLER		TOL TETRA		5	8. 1411	UFACTURETIS	É SI C	WITCH OF DHLL	23 Tarol	121	
	NO TYPES O	IF OFFILING	2" B(A	5.FT		8. HOL	LOCATION	6 X.	of ASAL	6670	er	
ANDS	anting eol	AMER .	SS SK	CONG	1	<	ACE ELEVATIO		5.7		37-	
		F		B - L/ .						1. 199		
	-					7%	E STATTED		17 (APT-89)	11. DATE CON 76 D	FURED EC 12	
2	BUNDEN THĘC	RELON	CONC. THE	on	1	16. DEF	TH GROUNDWA	TEH E	NCOLINTERED	NA		
13, 0970	N CHILLED BO	IO NOCH NA		14(2)		18, <b>DE</b>	TH TO WATER	WD E	LAPSED TIME AF	TER DILLING CO		
	. DEPTH OF H	DE 1,"	- 48"		4	17. OTN	ER WATER LEV		ASTREMENTS (C	PECIPI)		
and the second se	ECHNICAL BA	MPLES	DESURED	UN.	SARCED	1	. TOTAL NUM	ER O	COME NOVES	N	-	1. A
20. 544	ES FOR CHE	NA MCAL ANALYSIS	VOC -	MET		OTHE	R (SPECIPIN	0	THER (SPECIFY)	OTHER (		21. TOTAL COR
SUT R		R SUMMAR			- 1						- Carry	RECOVERY
22. 019P0	Sition of Ho	u i	MONTELED	MONTON	G WELL	OTHER	(OPECIPY)	22.	edenative of D	SPECTOR		
2			K		-	-		2	HIM	NAME	2	
BEV.	DEPTH b	DES	CRIPTION OF MATERIALS C		PED SG RESU	122013 118	Geotech Sa Or Core BC	NPLE ( NO.	ANNLYTICAL SAMPLE NO.	BLOW COUNTS g		HEMAKS PI
ċL	Υ	1' 55	1002		15" 5	4.2	0-36"0	6	0-30" OK BEN SOTYLL		Ţ.	S Frin
	". —	herus	IT AT I'	·	NH H	n	36-49" TA	NS	30 76"45	24 \$		
CC	E A	519-	10 V		DIS		10 45					
	15	)/)	· · · · · · · · · · · · · · · · · · ·		<u>5B·2</u>		59-3		513-4	56-5		- A
l.	,, =			•								
	~ <u> </u>											
	20-7			SULPPIE	sols	lid	35,000	k				
	E			a.								
- 1	×5							_				
	7											
· .	<sup>7</sup> 1											
	1						•					
ſ	<b>1</b>	•		ł						[		
Č.												
-	Ē											
ľ	v			Í				1		D	$\mathbf{>}$	
	3								(	$/ \downarrow$	/	
RK A	L SK	7804	Altann 4	AP				-		HOLE NO.		

1. COM	MEN BAME			DRILLING						- <	B-dl			
J. PROJ	_	Ecc		a. 144114		MACTOR F.	Re	VEZ D.	RILLIVI	- 0F	ET 1 ZSHEETB			
J. Phila	RAU	tring	AAP		4. 1004	NON Y 20	0.	\$5 For	MEG	14				
5. NAME	OF DRILLER		E TETER		a man	FACTURER'S (	E D1 (1)	ATION OF DRUL			2			
	AND TYPES (	OPILLIND	2" 014 5	FT	A HOLE	LOCATION	opt	MAR 60	52001	-				
ANDE	UNPLINE EDI	Delevel	SS SAMPLAN	2.		SB-1			_					
		1	MACPA CO	14	9. SUAF	NCE ELEVATIO	M							
		F				E STARTED		T	1. DATE CON					
12. OVE	RUNDEN THE	XNESS			the second s	H GROUNDW/		ION INTERED	13 NO	1 201	٤			
13 0692	TH ORILLED IN							M						
		101	1		1.000			APSED TOME AFTE	N	1				
14. TOT/	n. Depth of (	IOLE	) FT		17. OTH	ER WATER LEV	EL ME	SUREMENTS (SPE	com m	4				
IB, GEO	TECHNICAL SA		DISTURIED	UNDISTURBED	-	_	-	CORE BOXES	NA					
20. ŞANI	LES FOR CH	MICAL ANALYSIS	Vac	METALS		R (SPECIFY)	-		_	HER (EPECIPY) 21. TOTAL CO				
SAX	Sphall	2 1468 T			Uma		1-"	NER (SPECIFY)	UINER (E	recarvi)	RECOVERY			
	Simon of H	the second s	BACKFILLED	MONTONNO WELL	OTHE	(SPECIFY)	23. 8	IONATURE OF INS	PECTOR		4			
			X	·····	-		1	HEAMA		-				
ELEV.	DEPTH	h	SCRIPTION OF MATERIALS	FIELD S	CREEKING	GEOTECH S	WPLE	ANALYTICAL	BLOW					
1	b	land in the local data	C	HE	d d	OR COME BO	ix ND,	SAMPLE HD. 1	COUNTS E		REMARKS PIP			
ec	NE	LT BAr	a silty cuay	N						- C	2.0			
	7-	10 - 7			* _									
CL	73	D.7 C								1				
	10-							•						
	15-													
	3			1										
	2-													
	E			17 N.										
	1.5-													
	Ξ													
	3-													
	3		+											
	51-	40							1					
	1 E													
	1/2 -													
	E				1	10	1							
	45-			/	- X			$\mathbf{\mathbf{\nabla}}$	13	10112	0.0			
	-				4			D	-					
			RALEARA A			U								
									HOLE NO.					

. .

د

1. 00%	MARY WANTE				ING LO				HOLE	1-7
	E	cc.		2	. UHILLING SUBCO	TRACTOR FI	RANTZ A	DRILLIVE		Z SHEETS
9. PROJ	RAVEN.	NA	AAP		•. ug	eto r	DU45 For	SEC HER	R	
S. NAME	OF DRILLER		ETAR.		B. MA	NFACTURER'S DA	ESIGNATION OF DITLL			
	AND TYPES OF DRU	LING	Contraction of the local division of the loc	SFT	a. HOL	ELOCATION	PAGE C	620 07		-
AND S	iampuns eduphen		SAMPLIA MACAUC		The second s	53-3				
		F	111401-00		_	ACE ELEVATION				
		-				ie started Jov 12		11. DATE COM		
2. OVE	REURDEN THICKNESS		-		The rest of the local division in the local	States of the local division of the local di	ER ENCOUNTERED			
3. Dept	H OMILLED DITO HOC	* NA			18. DE	TH TO WATER A	ND ELAPSED TIME AF	TER DRILLING CON	PLETED	
4. TOT/	L DEPTH OF HOLE						L MEASUREMENTS (8		VA	A.4.
8 050	ECHNICAL BANPLES		TH	T				rsur1)	NA	
_	n	A	DISTURIED	UND	ISTURIED	9. TOTAL NUME	ER OF CORE BOXES	NA	•	
S & l.	LES FOR CHEMICAL SAMPLE		VOC	META	LB OTH	R (IPECIPY)	OTHER (SPECIFY)	OTHER (S	PECIFY)	21. TOTAL COR
	MMAN SA	2KT	BACKFILLED	MONTORING		-	<u>م</u> ـ			NEUCVENT N
	Contraction of the Party		y North Carlos	SAVET DEN	THELL OTH	in (Specify)	23. SIGNATURE OF I			
	I				FIELD SCREENING	GEOTECH SHE		BOW		
ELEV. A	DEPTH	DE3	CRIPTION OF MATERIALS		RESULTS d	OR CORE BOX		COUNTS	F	IEMARIKS
ic	N 36	cay 3	IN SITY LLA	-V	MA -	1				
			- VERY STRON		165					0.0
	A I	811 >5	- VERY STROP	NG-	20-47				25	0
	10				PID PP	1 FER	AP-AR 3	-0F		
	15									
	EI				1.					
	20-									
	-2-									
	=									
	1									
	. <u>-</u>									
	1									
	1/2 -									
1	-					1	$\gamma(\zeta)$	-		
	1						1-1	$\langle  $	13 NO	Jn
	45-							N I		
	45-11					C	V 4	/ /		
	\$5-11	Ison	AVENAA A			-	V 4	HOLE NO.		

1.000	PANY MANE		HTW							_	5	end. 13 - 3			
-	EC	ć				SUBCOM	F.	Ru	v.12 p.	RILLIVI	and OF	et 1 Zanetb			
3. PhDJ	RAVENIA	A	4.40				PB Du	Ý.	5 Forme	CHELS					
5. NAME	OF DRILLER	(	TOR TIMA			A COLOR	the second s	IN STAT	TOP OF OFIL		2 10				
	AND TYPES OF ORLEN	0		511		8. HOLE	LOCATION	Ø	10M1+011	2 00.	4001				
	HALF BALLY CAPTA HERE		nACAGC			And in case of the local division of the loc	B-3	N		_	-				
		F				10 000	STARTED	_			-				
12 (16)	RIVIDEN THOMESE					13 N	05 201	-		11. DATE CON	V 20	2			
							H GROUNDWA			NA					
	TH ORILLED INTO ROCK	NA				16, <b>Dep</b> 1	H TO WATER	NID EL	APSED TIME AFTE	R DRILLING CO	MPLETED				
14. TOTA	L DEPTH OF HOLE		7H			17. OTH	R WATER LEV	EL ME	ACUREMENTS (SPE	Artho	up)				
18. GEOT	TECHNICAL SAMPLES	0	DISTURNED	UNE	NATURDED	11	TOTAL NUM	ALER QI	F CORE BOXES		NA OTHER (SPECIPY) 21. TOTAL COR RECOVERY				
20. 5440	LES FOR CHENCH N	4	VOC	META	1.8	OTHER	(OPECIPY)	Ő	THER (SPECIFY)		DTHER (SPECIFY) 21. TOTAL COP RECOVERY %				
SUMI	MANY SHALT						-		_	- 1		RECOVERY			
22. DISP(	deition of hole		BACKFILLED	MONITORIN	D WIELL	ORE	(OPECIFY)	1	IICNATURE OF INS						
	1		<u> </u>		Lesio et	DECUM	GEOTECH SI		ALEAN						
ELEV.	DEPTH b	OFECI	EPTION OF MATERIALS		RESL	ULTS d	OR CORE BO	at MQ.	SANIPLE NO.	BLOW COUNTS		REMARKS h			
iL	NEDK	6km	BEN SILTY	CLAY	N	1						0,0			
-	1-1-1	ANST	6 LT 622			μ. 						ſ			
cc	IA I		140" > F												
	10							-	·						
	15			•											
	I / I manual second second							-							
	1° 1				1										
	20														
						-		-							
						_		_			-				
						_		_							
						_		_							
						_		_							
								_							
								_							
					7	9	-1		13 10	12					
					2	9	-		13 10	12					

		HTW				10.00 L				ISE	5-4								
	Ecc.	•	2.	DATITING	SUBCONT	RACTOR F	Ren	172 D.	RILLI-F	OF _	Z SHEETS								
PROJECT RAV.	tring	AAP			A LOCAT	TO DU	\$5	Former	HERB	C 20 OF DIGNETED OV 12 A DOMPLETED AA VA (SPECIFY) 21. TOTAL COR HECOVERY 1									
. WANE OF DRILLER		TETER			o, manu	FACTURER'S C		ATION OF OFILL		2000	-								
. SIZES AND TYPES OF AND SAMPLING EDUA	and the second se	2" 21A SS SAMPLIA			O. HOLE	SB-	4	<i>u</i>											
		MACHOGU	and the second			VCE ELEVATIO													
•	E					STATTED			11. DATE COMP	LETED	-								
2. OVERBURDEN THICH	UESS				and the second second	NCV VL	TEA EN	COUNTERED	13NOV	12									
3. DEPTH ORTLED INT	DROCK NA				16. Dept	H TO WATER	AND EL	APSED TIME AFTE	A INILLING CON										
4. TOTAL DEPTH OF H	Concernance ( a second				17. OTHE	R WATER LEV	EL HE	ASURELIENTS (SPI		A									
8. GEOTECHNICAL SA	PLES			TUI ED			a comp	F CORE BOXES	NA										
0. SAMPLES FOR CHE	NA ANALYSIS	VOC	METAL	a	-	(OPECIFY)		THER (SPECIFY)	NA	67150	-								
SAR SAMPL. SUMMAAL S	e in				Viren	- seren ri				ELAPT)	RECOVERY								
2. DISPOSITION OF HO	the second s	BACKFILLED	MONTORING	WELL	OTHER	(SPECIFY)	23. 6	SIGNATURE OF IN	PECTOR										
		X						HENN											
ELEV. DEPTH	DES	CRIPTION OF MATERIALS C		FIELD SC Aesi (	ilts	Geotech Si or core BC e			BLOW COUNTS 9	F	emarks b								
CL X I	DK GR	AY LLAY 52-15640-		N/O							0,0								
N	GRAN	52-/5C+C-			·	-	-												
								· .	10.1										
										1									
15-											harrie								
1 3																			
20						-													
7.5				<u>.</u>															
Ē																			
7																			
34-1																			
40-																			
						- (	$\neg$												
45				/			$\mathcal{H}$	$\times  $	13 NO	/12									
1 1						$\mathcal{V}$		$\mathcal{D}$	( > / vu										
	FID																		

1 004	PANY MALE		HTW								HOL	5-5
		EC C.	•		2. DROLLANS	SUBCON	TRACTOR F.	Re:A	v. EZ D.	AILLIV F	and of	ar 1 Kandeans
3, PRDJ	RAVE	VAN	AAP			4. 10CI ( / /	TO DI	: 95	- FULME	ac HERR		
6. MAME	E OF DRULEN		E TETAN			o, Man	ITAN DECKO	COMM	ATTACAL OF INCOME			
	S MID TYPES OF D	RILLING	2" DYA	SFT		0. HOLE	e location		GOTAOA,	E 00,	1001	
NULL C	over-time Ethnishi	HII -	SS SAMPL MACHOCO			A (196	S B	_				
		F				,						
							NOV 1	2		11. DATE COM		
	Rounden Thicking					15. DEP	TH GROLIXOWA	TEA EN	COUNTERED			
13. DEP	TH OFFILLED INTO P	OCK N/	1	999999) (*******************************		18. DEP	TH TO WATER	WD EL	APSED TIME AFT		PLETED	
14. 707/	AL DEPTH OF HOLE		771			17. OTH	ER WATER LEV	EL NEA	VSURIEMENTS (SPI	MA ECIPY MA	, ,	
18. GEO	TECHNICAL BAMPL		DISTURIED	UNC	ISTURIED				CORE BOXES			
20. <b>SAM</b>	PLES FOR CHEMIC	AL ANALYSIS	VOC	NET/						NA		
リベイ	SAMPLE AMAMAN SA		100	- ME1/	-	UNE	R (SPECIFY)	01	HER (SPECIFY)	OTHER (S	PECIFY)	21. TOTAL CORE RECOVERY
	ORITION OF HOLE	110-1	BACKFILLED	MONITORIN	G WELL	OTHE	R (SPECIFY)	23. 8	SIGHATURE OF IN	PECTOR		<b>%</b>
			X	-	-1		<u> </u>		TI HE.		1 19	
ELEV.	DEPTH	DE	ESCRIPTION OF HATERIALS	<b></b>	FIELD SCA	EENING 179	GEOTECH SA	MPLE	ANALYTICAL SAMPLE NO.	BLOW COUNTS		
8		716 6-10	and CLAY		0		0	- 1121	1			nekariks h
CL	N I	TENN	s lt bain		NIA	-						0.0
	N	1722100	S LT BEN SS	·								
									• .			
	15			•								
	E											
	2		·····					_				
	-5							-				
	E											
	r I								1			
	E.								1			
	E							1	$\sim 1$			
	¥e"-						(		}			
							$\sim$	4	$\rightarrow$			
	45-							X		ŀ	3 NO	いし
	E							V				
	the second se		RALbunn					- E				

••

•

. CONPANY NAME	HTW D								8-41	
ECC.			Te ter	P.	Rel	v12 p	RILLIVI	OF	SHEETS	
RAVENIAN	A.A.P.		CC70 DUG WASH ROCK							
A MAKE OF DRALLER JE	K TRIER		O. MARK		B PC PM	ATTICH OF DHILL			*	
AND SAMPLING EQUIPMENT	2" DIA 5 IS SAMPL	MT	B. HOLE	LOCATION	5- 9					
	MACAOCO		D. SURF	ACE ELEVATIO						
ł			10. DAT	E STARTED			11. DATE COM	RETED		
2. OVERIMINEN THICKNESS	13	NOV TH GROUNDW	the second s		13 No	NR				
3. 050014 /01 130 MIN BOOM				-	100		NA			
	A		-	_		APSED TIME AFT	/	PLETED		
4. TOTAL DEPTH OF HOLE	) FT		17. OTH	er water let	VEL ME	ASUFEMENTS (SP	ECIFY)	NA		
8. GEOTECHNICAL SAMPLES	DISTURDED	UNDERTUR	11 11	D. TOTAL NUM	HEER OF	F CORE BOXES	NA			
O. SAMPLES FOR CHEMICAL ANALYSS SER SAMPER	VOC	METALS	OTHE	A (SPECIFY)	To	THER (SPECIFY)	OTHER (S	PECIFY)	21. TOTAL COR	
SHRAT				-		-	-		RECOVERY	
2. DISPOSITION OF HOLE	BACKFILLED	MONTORING WE	L OTHE	n (specify)		SIGNATURE OF IN				
	<u> </u>	TRE	D SCREDINA	GEOTECH &		ANNEYTICAL	BLOW			
ELEV. DEPTH a b	CESCRIPTION OF MATERIALS		RESULTS d	OR CORE BO		SAMPLE NO.	COUNTS		REMARKS h	
C N E BEN	SILTY LLAN	N	V/n					Ъ	0.0	
CL THE	SILTY CLAY SILTY CLAY AST 19" SAND SEA							-	6.00	
A BUNL	TRONG UDUR	~  r	ا ج		1.0	· //	1 - A			
	TRENC CIOK	·)	<u> </u>	M 6	· lex	they	1 mi	N	(open)	
15		·								
/3										
20								_		
E				1						
2.5										
7										
			1							
		1			1	1				
\$40°					(		-			
% <sup></sup>				6			XI			
90°				2	T	$\supset$	M	3	NOV:2	
%:				Z		$\sum$	D	3	NOVIZ	

STATISTICS AND INCOME.			HTW	and the second se							ISR	5-2
I. COMP/	NOT HANKE EC	ce		1	DATIONS	SUCON!	RICTOR F.	Ren	V72 1	RILLIVE	DOE	L1 Autom
3. PROJE	TRAVEN,	1-1	AAP	- ar an ada		4. LOCA	10W 270	Du	6 WAS	A RACE		- Drizzio
5. HAME (	of thissen		E TOTEL			8. MANU	FACTURER'S I	DESURIN	TIQN OF DRLL	1620	AT	
	AND TYPES OF DRUL	NG	2" QIA	SFT		A. HOLE	LOCATION			1020	01	
		-	SS SAN				SB-				-	
		F					STARTED					
						131	NOT 12	-		11. DATE COMP 13 NOV		
12. OVEN	BURDEN THICKNESS					15. <b>Dep</b> 1	h Groundw/	ATER E	COUNTERED	NA		
13. DEPTH	H DRILLED INTO ROCI	NA				16. DEP1	H TO WATER	AND EL	APSED TIME AFT	ER DRILLING CON	PLETED	
14. TOTAL	DEPTH OF HOLE		7 FT			17. OTH	R WATER LEV	IEL ME	SUREMENTS (SI		A	
ie. Geoti	ECHNICAL BAMPLES		DISTURNED	UND	ISTURGED	19	. TOTAL NUM	BER OF	CORE BOXES	NA		
20. SAMP	LES FOR CHEVICAL		VOC	META	LS	OTHE	(SPECIPY)	To	HER (SPECIFY)	OTHER (SP	-	21. TOTAL COR
-	SAMPLE MANY SAN	err				-						RECOVERY
	SITICH OF HOLE		BACKFILLED	MONITORIN	G WELL	OTHE	(SPECIFY)	23. 6	INATURE OF P	SPECTOR		
			X						the second s	Trinn	1102	
							CRAMPOU DA	ANTIE	ANALYTICAL	BLOW		
ELEV. A	DEPTH b	DESC	RPTICH OF MATERIALS C		AES	AEENING ULTS d	GEOTECH S		SAMPLE ND.	COUNTS	F	BINKS h
	b		C	TRAVES	RES	d J	OA CORE BO			COUNTS S	-	
•	Y = LT	i dri ' Enio	C SILTY LLAY - M GRAVEL	TRAMS BRN	RES	d d	OA CORE BO			COUNTS	-	<u>h</u>
4	Y = LT	i dri ' Enio	C	TRANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•	Y = LT	i dri ' Enio	C SILTY LLAY - M GRAVEL	Traws BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	Teans BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•	Y = LT	i dri ' Enio	C SILTY LLAY - M GRAVEL	Teants BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TRANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TRANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TRANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	Teants BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	Teants BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TEANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TEANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TRANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
•		i dri ' Enio	C SILTY LLAY - M GRAVEL	TRANTS BRN R	RES	d J	OA CORE BO			COUNTS S	-	<u>h</u>
- CC CC		i dri ' Enio	C SILTY LLAY - M GRAVEL	TEANTS BEN R	RES	d J	OA CORE BO				-	h
- CC CC		i dri ' Enio	C SILTY LLAY - M GRAVEL	TEANTS BRN R	RES	d J	OA CORE BO				0,	h

 $\bigcirc$ 

	HTW	DRILL	ING	LOG			HOLEND. 58-43			
COMPANY MAKE ECC		2	DRILLING SU	CONTRACTOR	BIEET 1					
PROJECT RAVENAM	4 4 0	L	4	ALLOCATION FRONTEZ DRILLING OF & DEETS A LOCATION CC70 DUB WASH RACK						
				MANUFACTURENTS	DESIGNATION OF DELL	and the second se	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
SIZES AND TYPES OF DRULING	E TETOR		_		6 Toppoon	6620	ØT			
AND BAUPLINS EQUIPMENT	2" DIA SI SP			HOLE LOCATION	13		14			
		ocophi	Đ.	SURFACE ELEVATIO						
			10	DATE STARTED		11. DATE COMP	I STEN			
OVERGURDEN THICKNESS				13 NOV 1	the second s	13 NO	V 12			
			15.	DEPTH GROUNDW	ATER ENCOUNTERED	MA				
, DEPTH ORLIED INTO ROCK NA			18.	DEPTH TO WATER	AND ELAPSED TIME AFT	ER DAILLING COM				
. TOTAL DEPTH OF HOLE	FT		17.	OTHER WATER LE	VEL MEASUREMENTS (SI	NECIPI)				
. GEOTECHNICAL SAMPLES	DISTURGED	UND	STURBED	19. TOTAL NUM	MER OF COME BOXES	NI	4			
A SAMPLES FOR CHEMICAL ANALYSIS	VOC		o – F			Np				
IDE SAMPLE SUMMANT		META		DTHER (BRECIFY)	OTHER (SPECIFY)	OTHER (SP	ECIFY) 21. TOTAL CORE RECOVERY			
SKA&T	BACK/TILLED MONITOR		WELL	STHER (SPECIPY)	23. SIGNATURE OF P	and the second sec	*			
7	¥						· •			
			FIELD SCREE	HING GEOTECH S	T. H. A.N.	BLOW				
a b	RIPTION OF MATERIALS C		RESULTS	OR CORE BO	OX NO. SAMPLE NO.	COUNTS E	REMARKS h			
C N I BANS	ILTY CLAY		N				0,0			
A TEAN	5 17-1-1-1-1-1-1-1-			-		Y	UIC			
K X I BAN	1214 CLAY 15 17 <del>4 CULY</del>	Δ								
10-17	AST 19" SAN	AM		<u> </u>	_					
= (-				1	1.1					
15							-			
				100						
20		100								
1 3				1						
1.5-]										
1										
3										
3										
						$\mathbf{D}$				
ýc ·					2 ()					
			-	イヘ		$\times$				
45						$() \mid$	[3 Nov 12			
1 3										

C

			HTW	DRILL	ING	LOG			HOLE NO		
1. COM	PANY MAKE	Ecc		2.	DFILLING S	UCCONTRACTOR	RONTZ A	DAU	and the second se		
, Proj	ect RAVE	NAA	AAR		I	LOCATION			JOF A	SHEETS	
. HILLE	OF DRILLER		2	~		MANUFACTUPETS	DU LS WASI	H KACK			
. SIZES	AND TYPES OF	Internet I	POE TET	RR E 41			(ADUPRUD	2 6620	DT		
AND S	SANFLING EQUIP	NENT THEM	SS SAM	NPLAN	°	SB-4	3				
			MICAOC	UNR		SURFACE ELEVATIO	H				
		F			-	D. DATE STARTED 13 NOV 12		11. DATE CONF	LETED		
2. OVER	IBURDEN THICKN	ESS				5. DEPTH GROUNDW/	TEA ENCOUNTERED	13401			
3, DEPT	H DRILLED INTO	ROCH NA	and the second second second second		1	. DEPTH TO WATER	AND ELAPSED TIME AF	TER DRILLING CON	PLETED		
. TOTA	L DEPTH OF HOL		2			. OTHER WATER LEV	EL MEASURENTS (S	OF/NENA	A		
B. GEOT	ECHOICAL SAMP	LES	7 FT	Linter	TURBED		BER OF CORE BOXES	10	A		
n suus	LES FOR CHIDA	NA						NA			
SAK	E Spapes		VOC	METALO		OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SP	ECIPY) 21	. TOTAL CORI RECOVERY	
SEMMANY SLAFT 2. DISPOSITION OF HOLE				MONITORING WELL		OTHER (SPECIFY)	23. GIONATURE OF I	NSPECTICO	8		
			X			_	ANDE 2				
hev.	OEPTH	DESC	RIPTION OF MATERIALS		TELD SCRE		MARE ANALYTICAL	BLOW		and the	
			C AY TEANS B		d		I I	COUNTS S	7	pig	
C					NA			·	~ //	.0	
.(		Benuar	TRANS DK-	LT treas					-		
C.	NH	any it								<b>.</b>	
îC.	X	alay lt				1.1			0.0	9	
	A	CLAY Lt					_		0.0		
	4	aloy Lt							0.0		
rC.	A man								0.0		
ςς.	4								0		
	4								0.0		
ςς L	4								0.0		
	4								0.0		
	4	<u> </u>							0.0		
	4								0.0		
	4								0.0		
	4	ζ <u>ζ</u> ,							0.0		
	4	ά <b>ι</b> «Υ ι. <del>ι</del>							0		
	4	αι«Υ ι: 							0.0		
	4	ά <b>ι</b> <sup>ρ</sup> Υ ιτ							0		
	4 15 - 15 - 15 - 15 - 15 - 15 - 15 - 15	ά <b>ι</b> <sup>μ</sup> Υ ιτ							0-0		
	4	ά <b>ι</b> <sup>μ</sup> Υ ιτ									
	4 15 - 15 - 15 - 15 - 15 - 15 - 15 - 15	ά <b>ι</b> <sup>μ</sup> Υ ιτ						8	0-1		
	4 15 - 15 - 15 - 15 - 15 - 15 - 15 - 15		and E is					HOLE NO.			

0

. 3-

			MTW	DRIL	and the second second second		and the second se				3	eno. 8-5
). COM	WINY INVITE	Ecc			2. ORDLING	SUBCON	MINACTOR P	Re	NT2 4	DAULINI	DI	EI,1
. PRDA	RAVE	NAN	AAP			4. 100	Go	DU	B Btz	WASH RA	rek .	4 SHE IS
J. HAME OF DIRLER JOE THTER						6. MR	UP PL IL PERS	. e i i	ATTON OF DIEL			
SIZES AND TYPES OF DILLING 2" 11A						8. HOLI				60700	/	
AND S	NEW SHOW	CAT -	MACING		-		The second	-	-5			
			201-0-0-00				ACE ELEVATIC					
	1.1	-			-	10. DAT	NOV 1	2		11. DATE CONT		<u></u>
2. OVER	BURDEN THICKN	E\$6				Contra State	TH GROLADAW	-	NCOLINTERED			
3, DEPT	H DRILLED INTO	HOCK ALA				18. DEP	TH TO WATER	AND E	LAPSED TIME AFT	LA DELLING CON	PLETED	
4. TOTA	L DEPTH OF HOL								ASURELIENTS (S	N	-++	
B. GEOT	ECHORCAL SAMP	158	7 PF	1 100	NSTURIED	-		-	F CORE BOXES		VA	
h (141/2	LES FOR CHENO	NA		-	-			-		RIA		
s er	SAMPIA	SUMMANT	VOC	MET		OTHE	A (SPECIFY)	+ o	THER (SPECIFY)	OTHER (SF	ECIFY)	21. TOTAL CORE RECOVERY
. DISPO	KITTON OF HOLE	BA T	BACKFILLED MONTO		SHITCHING WELL		OTHER (SPECIFY)		ETC MATURE OF IN	COECTION -		8
			X			entre.		1				
ELEV.	DEPTH	DES	CRIPTION OF MATERIAL		RELD SC RESI		GEOTECH B	WPLE		BLOW	-	
<u>a</u>	1		C				0 COME 50		SANFLE NO.	COURTE		REMARKS h
ec	KE		TY CLM		N/	4	-					0.0
	K-1-	14	4NS 51LTYCLAN A>T 19" SA					-				
K	r i	14	17' 19' SA	FAR	10		1100	1.00	in (ap	2		
	10		(STLONG 03	the first	700	<u>c</u>		-	1. 14			
	E				q = -					and the		
	15-							-				
10	E				1.00							
		and the				-		-				
								- 1				
								-				
						1						
	-			1.1		- 9						
						. 4			S 3			
								1	1	n I		
	11-1								X	/		
	E						1	F	2/1	1		
	45-					1	L	1	0		13 ~	012
	-							X	T	/	(719	
_	+	Ime	CAL ENINA		-							
		S PHILE	CM-I							HOLE NO.	v	

This page intentionally left blank.

### **APPENDIX D**

### DATA VERIFICATION REPORT

(Note—to be provided on disc only)

This Page Intentionally Left Blank.

#### **APPENDIX E**

# ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

(Note—To be provided on disc only)

This page intentionally left blank.

# ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 1 ANALYTICAL RESULTS

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 2 LABORATORY ANALYTICAL REPORT 240-22663-1

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 3 LABORATORY ANALYTICAL REPORT 240-17230-1

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 4 LABORATORY ANALYTICAL REPORT 240-17317-1

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 5 LABORATORY ANALYTICAL REPORTS 240-17669-1 240-17669-2

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 6 LABORATORY ANALYTICAL REPORTS 240-17768-1 240-17768-2

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 7 LABORATORY ANALYTICAL REPORT 240-18581-1

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 8 LABORATORY ANALYTICAL REPORTS 240-18735-1 240-18735-2

### ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

#### PART 9

# LABORATORY ANALYTICAL REPORTS 240-26618-1 240-26639-1 240-26663-1

# ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

# PART 10 CHAIN OF CUSTODY FORMS

### **APPENDIX F**

Data Validation Report (Note – To be provided on disc only)

#### **APPENDIX G**

#### **IDW DISPOSAL LETTER REPORT**

# **APPENDIX H**

Site Photographs



- 2 Photo 1 (2012): The view is looking south toward the eastern portion of the exterior perimeter of Building
- 3 47-40 (DU03). Stakes with pink flagging show the areal extent of the ground surface made of asphalt-
- 4 containing fill material which consists of fine-grain gravel fill material with asphalt (1-1.5 inches thick).
- 5 The orange pin-flag in the center of the region demarcated by the stakes with pink flagging is the location
- 6 shown in Photo 6 and Photo 7.



8 Photo 2 (2012): The northeast corner of Building 47-40. The view is looking south along the eastern

9 portion of the exterior perimeter of Building 47-40 (DU03). The region between DU03 and the Former

10 Herbicide Storage Shed (DU05) is also shown. In this region the ground surface is made of gravel fill

11 material (3 to 6 inches thick) consisting of coarse-grain gravel, pieces of concrete, and asphalt.



13 Photo 3 (2012): The view is looking south towards the north end of Building 47-40. Railroad tracks and

14 railroad ties adjacent to the west side of the Former Herbicide Storage Shed and within the sampling area

15 of DU05 are shown.



- 17 Photo 4 (2012): The view is looking south towards the north end of Building 47-40. Deteriorating asphalt
- 18 pavement of the South Service Road is shown in the photo. The western side of the Former Herbicide
- 19 Storage Shed (DU05), marked by Seibert stakes in the left portion of the photo, and the exterior perimeter
- 20 of Building 47-40 (DU03) are in close proximity to the South Service Road.



- 22 Photo 5 (2012): A close-up view of the ground surface in between the Former Herbicide Storage Shed
- (DU05) and Building 47-40. This ground material is made of gravel fill material (3 to 6 inches thick)
   consisting of coarse-grain gravel, pieces of concrete, and asphalt.



26 Photo 6 (2012): A close-up view of the ground surface material in the eastern portion of the exterior

27 perimeter of Building 47-40 (DU03). The photo was taken at the location of the orange pin-flag shown in

28 Photo 1. The surface material, to a depth of 0-2 inches below ground surface, was exposed and turned on

29 its side to present a cross-section view. The pen is pointing towards a black layer of asphalt material.



30

31 Photo 7 (2012): A close-up view of the ground surface material in the eastern portion of the exterior

32 perimeter of Building 47-40 (DU03). The photo was taken at the location of the orange pin-flag shown in

33 Photo 1. A large segment of the surface material, to a depth of 0-2 inches below ground surface, was

34 lifted up to expose a cross-section profile of the asphalt-containing fill material.



Photo 8 (2012): The photo shows a plan view of a portion of the ground surface of the asphalt-containing
fill material obtained from the location shown in Photo 7. The material was obtained from the asphalt-

containing fill material along the eastern exterior perimeter of Building 47-40 (DU03).



- 40 Photo 9 (2012): The photo shows a cross-section view of the black asphalt material layer present in the
- 41 segment of asphalt-containing fill material shown in Photo 8. The material was obtained from the
- 42 asphalt-containing fill material along the eastern exterior perimeter of Building 47-40 (DU03) at the
- 43 location shown in Photo 7.



- 45 Photo 10 (2012): The Outdoor Wash Rack Area (DU06). The view is looking north at the southern end of
- 46 Building 47-40. The photo shows the railroad tracks and railroad ties bisecting the Outdoor Wash Rack
- 47 Area (DU06).



- 49 Photo 11 (2015): The Drainage Ditch East of Building 47-40 (DU07) containing standing water, as
- 50 observed in April 2015. The view is looking west towards the eastern side of Building 47-40.



- 52 Photo 12 (2012): The photo shows the multiple railroad tracks and railroad ties of the East Classification
- 53 Yard located east of Building 47-40. The view is looking north-northwest.



- 55 Photo 13 (2012): The view is looking north from the northwest corner of Building 47-40 towards the
- 56 Seibert stakes marking the location of the Former Herbicide Storage Shed (DU05). The deteriorating
- 57 condition of the South Service Road to the west and the extent of the ground material, made of gravel fill
- 58 material (3 to 6 inches thick) consisting of coarse-grain gravel, concrete, and asphalt, between Building
- 59 47-40 and the Former Herbicide Storage Shed (DU05) is shown in this view.



- 61 Photo 14 (2012): The view is looking east towards the Seibert stakes marking the location of the Former
- 62 Herbicide Storage Shed (DU05).



63

64 Photo 15 (2012): The view is looking south towards the Drainage Ditch East of Building 47-40 (DU07).

The asphalt-containing fill material present at the exterior perimeter of Building 47-40 (DU03) is to the

66 west.



- 67
- 68 Photo 16 (2012): Panoramic view looking south towards the location of the Former Herbicide Storage Shed (DU05), marked by Seibert stakes, and a portion of the
- 69 exterior perimeter of Building 47-40 (DU03) showing the multiple railroad tracks, railroad ties, the South Service Road, and the gravel fill material region between
- 70 DU05 and DU03.



74

- 72 Photo 17 (2012): The Former Fuel Oil Spill Area (DU01) with the west side of Building 47-40 in the
- 73 background. The view is looking east.



75 Photo 18 (2012): The earthen berm of the Former Fuel Oil Spill Area (DU01).

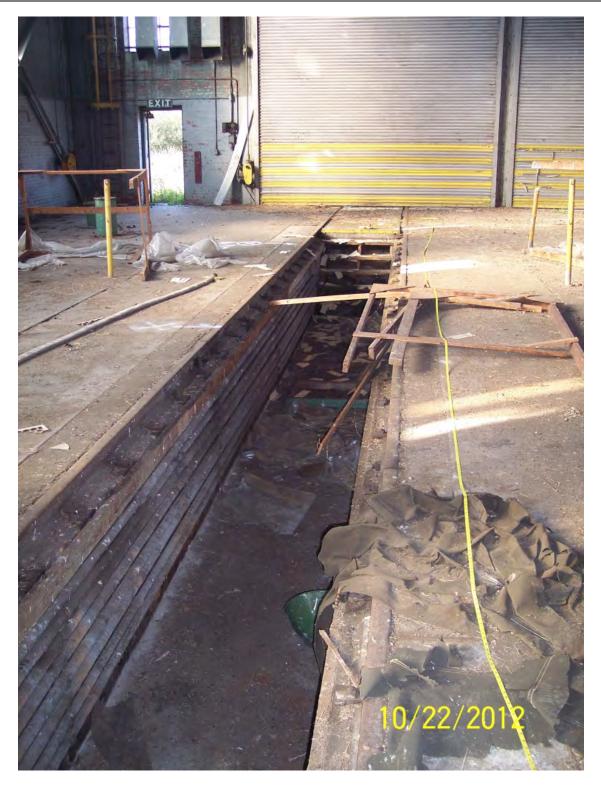


Photo 19 (2012): The view is looking north at the interior repair pit (DU04) within Building 47-40.



Photo 20 (2012): Direct push boring activities at the interior repair pit (DU04) within Building 47-40.



- 82 Photo 21 (2012): Soil core from direct push boring location SB03 at DU04 within Building 47-40, with
- 83 refusal at 4 feet.



Photo 22 (2012): Direct push boring activities along the eastern exterior perimeter of Building 47-40

- 86 (DU03). The view is looking south.
- 87



- Photo 23 (2012): Direct push boring activities along the western exterior perimeter of Building 47-40
- 90 (DU03). The view is looking south along South Service Road.



92 Photo 24 (2012): Direct push boring activities at Former Herbicide Storage Shed (DU05). The view is

93 looking east.

94

CC 70 DU - 66 1 SB\$1 1 I'- 4'	WASH RACK 13 NOV 2012
1 1'-7'	

Photo 25 (2012): Soil cores from direct push boring activities at SB01 at the Outdoor Wash Rack Area(DU06).



99

Photo 26 (2012): Soil cores (1-4 feet and 4-7 feet) from direct push boring activities at SB05 within the
Former Fuel Oil Spill Area (DU01).



Photo 27 (2012): The view is looking south showing the complete length of the interior repair pit inside
Building 47-40. The pit is approximately 3.5 feet deep and 4 feet wide. Shown along the top edge of the
pit are the rail road tracks, tie plates, and spikes. Stairs are set at both ends of the pit. The bottom of the
pit is covered with a black colored grime and debris. There are no visible cracks on the floor of the pit.



Photo 28 (2012): The view is looking north at Building 47-40 Interior Repair Pit (DU04) showing the
bottom rungs of the pit's southern egress stairs. The pit bottom is coated with black grime and debris

bottom rungs of the pit's southern egress stairs. The pit bottomwith no visible cracks on the bottom floor of the pit.



113 Photo 29 (2018): View is facing North at the southern end of Building 47-40 Round House. Brush in the

114 Outdoor Wash Rack Area was cut and removed on January 30, 2018.



- 116 Photo 30 (2018): View is facing northwest from inside Building 47-40 Round House, the wooden floor is
- 117 littered with debris prior to cleanup.



Photo 31 (2018): Building 47-40 Round House oily residue and debris at the old storage rack andsurrounding wooden floor prior to sludge removal.



- 122 Photo 32 (2018): A few boreholes inside the pit were not sealed. Open boreholes were filled with
- 123 bentonite prior to sludge removal from the pit.



125 Photo 33 (2018): Storm drain located at the southwest corner of Building 47-40 Round House. Wash 126 water from the Outdoor Wash Rack Area may have drained into this storm drain.



127

Photo 34 (2018): View facing northeast. Storm drain located at the southwest corner of Building 47-40 128

129 Round House. Wash water from the Outdoor Wash Rack Area may have drained into this storm drain. Appendix H Site Photographs



Photo 35 (2018): View facing southwest from within Building 47-40. Small excavator and shovels usedto remove sludge from within the pit.



133

134 Photo 36 (2018): View facing south within. Building 47-40 Round House Interior showing floor and

135 pit after removal of sludge of debris.

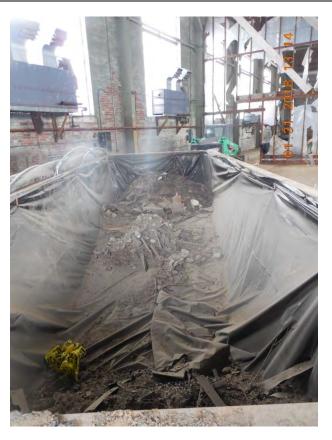


Photo 37 (2018): Debris was removed from Building 47-40 Round-House Interior floor and pit and 137

placed inside a roll-off bin lined with plastic. 138



139

Photo 38 (2018): Building 47-40 Round House Interior boring SB101 installed at the East track where the 140 concrete and wood floors meet (view facing south). 141



Photo 39 (2018): Soil core (0-4 feet) from boring SB101 near the East track where the concrete and wood
floors meet within Building 47-40 Round House Interior (DU04).



145

Photo 40 (2018): Soil core (4-7 feet) from boring SB101 near the East track where the concrete and woodfloors meet within Building 47-40 Round House Interior (DU04).



- 148
- 149 Photo 41 (2018): Building 47-40 Round House oil storage rack was removed, and the floor cleaned of
- debris and sludge. Staining is present on the floor. Boring SB102 at the oil storage area within Building
- 151 47-40 Round House Interior (DU04).



- 153 Photo 42 (2018): Soil core (0-4 feet) from boring SB102 near the oil storage area within Building 47-40
- 154 Round House Interior (DU04).

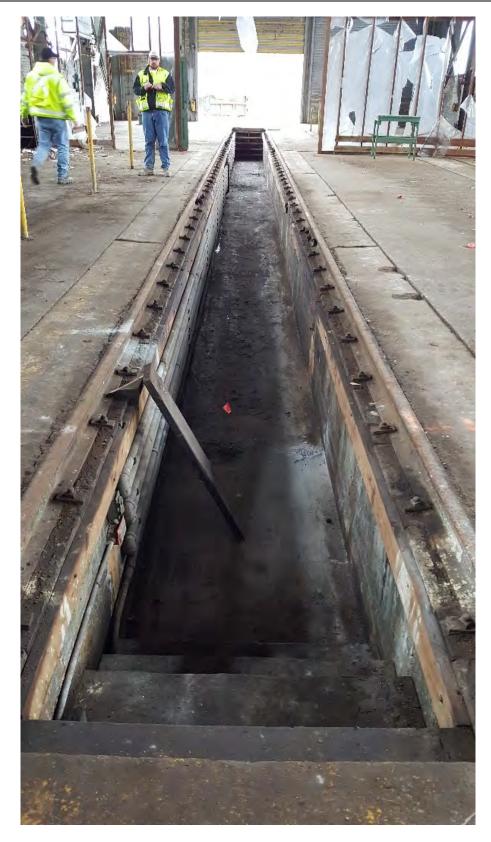


- 156 Photo 43 (2018): Soil core (4-8 feet) from boring SB102 near the oil storage area within Building 47-40
- 157 Round House Interior (DU04).



158

Photo 44 (2018): Building 47-40 Round House Interior pit boring SB104 installed at the South end of thepit.



162 Photo 45 (2018): Building 47-40 Round House Interior pit boring SB104 (orange flag) installed at the

Page 28 of 35

163 South end of the pit (view facing north).



Photo 46 (2018): Soil core (0-4 feet) from boring SB104 within Building 47-40 Round House Interior(DU04).



- 168 Photo 47 (2018): Boring SB107 drilled adjacent to the storm drain located at the southeast corner of
- 169 Building 47-40 Round House.



- 171 Photo 48 (2018): Soil core (0-4 feet) from boring SB107 located adjacent to the storm drain on the
- southeast corner of Building 47-40 Round House. SB107 is associated with the Outdoor Wash Rack Area(DU06).



174

- 175 Photo 49 (2018): Soil core (4-8 feet) from boring SB107 located adjacent to the storm drain on the
- southeast corner of Building 47-40 Round House. SB107 is associated with the Outdoor Wash Rack Area

177 (DU06).



- 179 Photo 50 (2018): Soil core (8-11 feet) from boring SB107 located adjacent to the storm drain on the
- southeast corner of Building 47-40 Round House. SB107 is associated with the Outdoor Wash Rack Area
  (DU06).



- 182
- 183 Photo 51 (2018): Outdoor Wash Rack Area boring SB106 drilled at the South end of Building 47-40
- 184 Round House.



Photo 52 (2018): Soil core (0-4 feet) from boring SB106 is associated with the Outdoor Wash Rack Area(DU06).



- 189 Photo 53 (2018): Soil core (4-8 feet) from boring SB106 is associated with the Outdoor Wash Rack Area
- 190 (DU06).

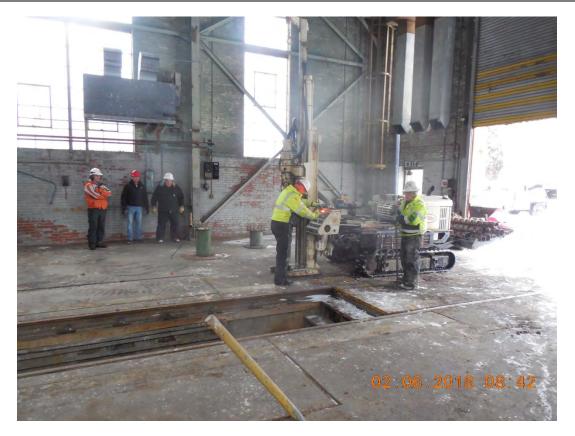


Photo 54 (2018): Soil core (8-10 feet) from boring SB106 is associated with the Outdoor Wash Rack Area(DU06).



194

Photo 55 (2018): Soil core (0-4 feet) from boring SB105 is associated with the Outdoor Wash Rack Area(DU06).



198 Photo 56 (2018): Building 47-40 Round House Interior boring SB103 drilled at the North end of the

199 building (view facing northwest).



200

201 Photo 57 (2018): Soil core (0-4 feet) from boring SB103 within Building 47-40 Round House Interior



Photo 58 (2018): Soil core (4-7 feet) from boring SB103 within Building 47-40 Round House Interior
(DU04).



206

207 Photo 59 (2018): Dry sediment sample collected with hand auger from SS108 located inside the storm

drain on the southeast corner of Building 47-40 Round House. SB108 is associated with the Outdoor

209 Wash Rack Area (DU06).

This Page Intentionally Left Blank.

## **APPENDIX I**

**Survey Data** 

This page intentionally left blank.

# 2018 RVAAP ENVIRONMENTAL AREAS SURVEY

ENVIRONMENTAL SURVEY REPORT FOR PARSONS & CAMP RAVENNA JOINT MILITARY TRAINING CENTER

PREPARED BY: WELLERT CORPORATION | 5136 BEACH RD. MEDINA, OH 44256 DATE PREPARED: March 15, 2018

## Table of Contents

Level Report CC-RVAAP 69	0
Level Report CC RVAAP-74	2
Level Loops Closure Report	3
CC RVAAP-69 COORDINATE REPORT	4
CC RVAAP-74 COORDINATE REPORT	5
CC RVAAP-70 COORDINATE REPORT	6
HORIZONTAL CONTROL COMPARISON	7
PUBLISHED CONTROL	8
RAV 1	8
MB 2338	9
MB 2328	10
MB 2342	
RAV 2	12
RAV 9	13
RAV 10	14
RAV 11	15

#### LEVEL REPORT CC-RVAAP 69

<u>Station</u> 1	<u>BS(+)_</u> 6.353	<u>BS Dist</u> 49.280	<u>HI</u> 1,030.273	<u>IS(-)</u>	<u>IS Dist</u>	<u>FS(-)</u>	<u>FS Dist</u>	<u>Elev</u> 1,023.920	
2				7.097	48.620			1,023.176	MW-005 TCASING
3				6.512	48.730			1,023.762	MW-005 TCONC
4				6.437	49.440			1,023.836	MW-005 THUB
5				6.660	45.560			1,023.614	WP014 GS
6				6.645	59.710			1,023.628	WP007 GS
7				6.085	42.780			1,024.188	MW-004 PVC
8				5.525	42.463			1,024.748	MW-004 CONC
9				5.485	41.040			1,024.788	MW-004 MAG
10				4.446	65.920			1,025.828	WP-008
11				4.524	41.500			1,025.749	WP-004
12				5.410	63.770			1,024.863	SB-112 GS
13				5.301	34.910			1,024.972	WP-002 GS
14				5.185	67.750			1,025.088	WP-005 GS
TP-1	4.798	64.820	1,030.211			4.860	50.560	1,025.413	T2TP
15				4.940	74.090			1,025.271	WP-003 GS
16				4.279	88.830			1,025.933	SB-113 GS
17				4.231	123.260			1,025.980	WP-009 GS
18				2.927	52.570			1,027.284	MW-003 PVC
19				5.482	50.940			1,024.729	MW-003 HUB

20				2.965	49.610			1,027.246	MW-001 PVC
21				5.517	48.430			1,024.694	MW-001 HUB
22				5.128	33.460			1,025.083	SB-111 GS
23				1.929	94.783			1,028.282	MW-002 PVC
24				5.103	94.150			1,025.108	MW-002 HUB
TP-2	3.150	92.310	1,028.200			5.161	64.730	1,025.050	T2TP
25				4.578	46.060			1,023.622	WP-017 GS
26				4.828	86.900			1,023.372	WP-015 GS
TP-3	4.845	127.503	1,028.686			4.359	92.130	1,023.841	T2TP
27				5.128	58.630			1,023.559	WP-011 GS
28				5.873	38.480			1,022.813	WP-012 GS
29				6.375	84.866			1,022.311	WP-013 GS
TP-4	5.600	92.850	1,029.440			4.846	127.560	1,023.840	T2TP
1						5.522	92.850	1,023.918	RAV1
Total	24.747	426.763				24.748	427.829		
Check								1,023.920 1,023.918 0.002	

#### LEVEL REPORT CC RVAAP-74

Station 1	<u>BS(+)</u> 4.574	<u>BS Dist</u> 251.659	<u>HI</u> 1,028.494	<u> IS(-)</u>	IS Dist	<u>FS(-)</u>	FS Dist	Elev 1,023.920	<b>Desc</b> RAV1
TP-1	4.668	129.050	1,025.794			7.368	253.203	1,021.126	T2TP
30				3.782	91.613			1,022.012	MW-001 PVC
31				3.338	91.610			1,022.457	MW-001 CONC
32				4.154	66.400			1,021.640	MW-002 PVC
33				3.348	66.183			1,022.447	MW-002 CONC
34				3.374	67.347			1,022.420	SB25
35				3.349	68.283			1,022.446	SB23
36				3.394	64.010			1,022.400	SB24
37				3.790	52.320			1,022.004	WP-002 GS
38				4.559	47.750			1,021.235	WP-003 GS
39				4.983	66.400			1,020.811	MW-003 PVC
40				4.558	66.470			1,021.236	MW-003 CONC
TP-2	7.309	250.959	1,028.436			4.667	129.050	1,021.127	T2TP
1						4.515	253.456	1,023.922	RAV1
Total	16.551	631.669				16.549	635.709		
Check								1,023.920 1,023.922 -0.002	

### Level Loops Closure Report

	2018 CAMP RAVENNA ENVIRONMENTAL SURVEY									
	Level Loop Closure Report (Third Order)									
Loop Misclosure Misclosure										
Loop	BS Total (ft)	BS Dist (ft)	FS Total (ft)	FS Dist (ft)	Loop Dist (ft)	Allowable (ft)	(ft)	PASSED/FAILED		
AREA 69	24.74700'	426.76'	24.74800'	427.83'	854.592'	0.020'	0.001'	LOOP PASSED		
AREA 74	16.55100'	631.67'	16.54900'	635.71'	1267.378'	0.024'	-0.002'	LOOP PASSED		
			Total Distance		0.40 miles					

Elevation Determination Procedure Notes (CC RVAAP-69 & CC RVAAP-74):

-Elevations collected using Trimble DiNi Digital Level.

-Elevations are tied to NAVD88 Per Ravenna Arsenal Control Monument RAV 1.

CC RVAAP-69							
POINT	NORTHING	EASTING	ELEV	DESCRIPTION			
1	551472	2357923	1023.92	RAV 1 DISK (BASIS FOR ELEVATIONS)			
2	551478	2357921	1023.18	MW-005 TOP PVC			
			1023.76	MW-005 TOP CONCRETE			
			1023.84	MW-005 HUB (GS)			
3	551455	2357922	1023.61	WP-014 GS			
4	551419	2357922	1023.63	WP-007 GS			
5	551415	2357873	1024.19	MW-004 TOP PVC			
			1024.75	MW-004 TOP CONC			
			1024.79	MW-004 MAGNAIL (GS)			
6	551413	2357828	1025.83	WP-008 GS			
7	551456	2357835	1025.75	WP-004 GS			
8	551472	2357814	1024.86	SB-112 GS			
9	551468	2357760	1025.93	SB-113 GS			
10	551442	2357738	1025.98	WP-009 GS			
11	551517	2357766	1027.28	MW-003 TOP PVC			
			1024.73	MW-003 HUB (GS)			
12	551525	2357766	1027.25	MW-001 TOP PVC			
			1024.69	MW-001 HUB (GS)			
13	551537	2357718	1028.28	MW-002 TOP PVC			
			1025.11	MW-002 HUB (GS)			
14	551532	2357781	1025.08	SB-111 GS			
15	551478	2357854	1025.27	WP-003 GS			
16	551490	2357863	1024.97	WP-002 GS			
17	551525	2357872	1025.09	WP-005 GS			
18	551555	2357919	1023.62	WP-017 GS			
19	551457	2358004	1023.37	WP-015 GS			
20	551349	2358011	1023.56	WP-011 GS			
21	551363	2358097	1022.81	WP-012 GS			
22	551405	2358118	1022.31	WP-013 GS			
HORIZO	NOTES: HORIZONTAL DATUM: NAD 83(2011) VERTICAL DATUM: NAVD88						

CC RVAAP-74	COORDINATE	REPORT

	CC RVAAP-74								
POINT	NORTHING	EASTING	ELEV	DESCRIPTION					
1	551472	2357923	1023.92	RAV 1 DISK (BASIS FOR ELEVATIONS)					
25	551013	2358250	1020.81	MW-003 TOP PVC					
			1021.24	MW-003 CONC (GS)					
26	551023	2358266	1021.24	WP003 GS					
27	551044	2358257	1022.00	WP002 GS					
28	551044	2358246	1022.40	SB-24					
29	551041	2358241	1022.45	SB-23					
30	551037	2358243	1022.42	SB-25					
31	551040	2358243	1021.64	MW-002 TOP PVC					
			1022.45	MW-002 CONC (GS)					
32	551042	2358218	1022.01	MW-001 TOP PVC					
			1022.46	MW-001 CONC (GS)					
NOTES:									
HORIZO	HORIZONTAL DATUM: NAD 83(2011)								
VERTICA	AL DATUM: NA	VD88							

CC RVAAP-70								
POINT	INT NORTHING EASTING ELEV DESCRIPTION							
36	566652	2379163	950.23	SB-103				
37	566592	2379195	950.25	SB-102				
38	566565	2379200	950.23	SB-101				
39	566569	2379172	946.65	SB-104				
40	566519	2379140	949.54	SB-107				
41	566515	2379168	949.28	SB-106				
42	566443	2379151	949.95	SB-105				
NOTES:								
HORIZONTAL DATUM: NAD 83(2011)								
VERTICA	VERTICAL DATUM: NAVD88							

## CC RVAAP-70 COORDINATE REPORT

CC-RVAAP-70 Procedure Notes:

-Horizontal & vertical coordinates collected using Spectra Precision Epoch 50 GNSS Receiver & Trimble S5 Robotic Total Station.

## HORIZONTAL CONTROL COMPARISON

	HORIZONTAL CONTROL COMPARISON									
PUBLISHED CONTROL CONVERTED TO NAD83(2011)				PROJECT COORDINATES (OHIO VRS) NAD83(2011)				Δ		
POINT	NORTHING	EASTING	DESC.		POINT	NORTHING	EASTING	DESC.	$\Delta$ NORTH	∆ east
999	551471.869	2357923.437	RAV1		1	551471.86	2357923.31	RAV1	0.01	0.13
1000	549651.443	2357928.555	PID MB2338		48	549651.54	2357928.58	DISK PORTAGE COUNTY 1977	-0.10	-0.03
1001	558490.199	2357792.745	RAV2		47	558490.31	2357792.59	RAV2	-0.11	0.15
1008	566921.885	2377934.289	RAV9		44	566922.05	2377934.32	RAV9	-0.16	-0.03
1009	555003.805	2367417.913	RAV10		46	555003.84	2367417.83	RAV10	-0.03	0.08
1010	557047.393	2372207.044	RAV11		45	557047.46	2372207.07	RAV11	-0.07	-0.03
1013	548218.769	2354665.465	PID MB2342		50	548218.76	2354665.50	DISK MB2342	0.01	-0.04
1014	551578.086	2367363.874	PID MB2328		49	551578.05	2367363.98	DISK MB2328	0.04	-0.11

PROJECT HORIZONTAL CONTROL PARAMETERS ± 1'

RAVENNA ARSENAL CONTROL POINTS CONVERTED FROM NAD83(1986) TO NAD83(2011) USING NGS COORDINATE CONVERSION AND TRANSFORMATION TOOL (NCAT). PIDs MB2342, MB2328, & MB2338 CONVERTED FROM NAD83(1995) TO NAD83(2011) USING NCAT.

Horizontal Coordinates Procedure Notes (all areas):

-Horizontal coordinates collected using Spectra Precision Epoch 50 GNSS Receiver & Trimble S5 Robotic Total Station

-Horizontal coordinates are tied to the Ohio State Plane Coordinate System, Ohio North Zone 3401, NAD83 (2011) per ODOT VRS Network System

-Horizontal coordinates were verified by locating existing NGS & Ravenna Arsenal Control Monuments to confirm coordinates meet project accuracy requirements.

## PUBLISHED CONTROL

CORPS OF ENGINEERS         US Army Corps of Engineers       PROJECT:         PROJECT:       RAVENNA AZSENIL         DATE:       DATE:         STATION       ZAV 1 (937         GEOGRAPHIC COORDINATES (NAD 53.)       DATE:         LATITUDE       41.102         LATITUDE       21.02.132.10         GEOGRAPHIC COORDINATES (NAD 53.)         LATITUDE       10.16.06503         LONGITUDE       21.07.42132         WELEVATION       10.23.72         DATE:       DATE:         CONCI TUDE       21.07.42132         WITITS (FEET OF METERS)       Exer         NORTHING       551.472.462         EASTING       2.357.923.326         STATE       DH         CONV. 4       0.55.14557115         COMB. FACTOR       0.991891807         SS.11       From Ref 1, 2016 51.420         ST.11       State of Song of 2 trans. poles         S7.51       From Ref 3. Corner of State Station         S0.51       from Ref 3. Corner of State Station         <	· (mana) V.	S. ARMY SNGINSER 015:	TRIGT, LOUISVILLE
US Army Corps of Engineers PROJECT: <u>EAVENNA Azemini</u> DATE: <u>Dec. 1997</u> <u>GEOGRAPHIC COORDINATES INAD 83</u> ) LATITUDE <u>41</u> 10 <u>18.06503</u> <u>N</u> LATITUDE <u>41</u> 10 <u>18.06503</u> <u>N</u> LONGITUDE <u>81 05 07.42132</u> <u>W</u> ELEVATION <u>1973</u> <u>12</u> DATUM <u>NAVD 88</u> STATE PLANE COORDINATES (NAD 83.) UNITS (FEET OF METERS) <u>FEET</u> NORTHING <u>551,472.462</u> EASTING <u>7,357,223.326</u> STATE <u>0H</u> ZONE <u>3401</u> CONV. 4 <u>0 55 4557115</u> COMB. FACTOR <u>0.991891807</u> SKETCH OF STATION 142.5' from Ref 1, <u>30</u> Corner of Size 2401 S5.1' from Ref 1, <u>30</u> Corner of Size 2401 S5.1' from Ref 1, <u>30</u> Corner of Size 2401 DATE: <u>00</u> STATE <u>0H</u> ZONE <u>1007</u> SKETCH OF STATION			
of Engineers         PROJECT: $EAV/ENNA_Azstnat.$ DATE: $Dete:$ STATION $ZAV 1$ STATION $ZAV 1$ GEOGRAPHIC COORDINATES INAD B3 1         LATITUDE $41$ LONCITUDE $81$ STATE $10^{\circ}$ BS: $10^{\circ}$ LONCITUDE $81^{\circ}$ CONCITUDE $81^{\circ}$ STATE $10^{\circ}$ DATE: $10^{\circ}$ STATE $10^{\circ}$ STATE $10^{\circ}$ DATE: $10^{\circ}$ DATE: $10^{\circ}$ DATE: $10^{\circ}$ DATE: $10^{\circ}$ DATE: $10^{\circ}$ DATE: $10$			
STATION       ZAV 1 1937         GEOGRAPHIC COORDINATES INAD \$3 )         LATITUDE       41         IO       18.36533 "N         LONGITUDE       81         STATE       0         STATE       0         STATE       0         NORTHING       551,472.462         EASTING       2.357.923.326         STATE       0         CDNV. 4       0         STATE       0         CDWS. 5       4557115         CDMB. FACTOR       0         STATE       0         STATE       0         STATE       0         GENER       0         STATE       0         STATE       0         STATE       0         STATE       0         STATE       0	_		
$\begin{array}{c} \text{GEOGRAPHIC COORD INATES (NAD $=3 )} \\ \text{GEOGRAPHIC COORD INATES (NAD $=3 )} \\ \text{LATITUDE } \underline{4!} & 10 & 18.0 \\ \underline{65} & 57.42132 & \text{W} \\ \text{ELEVATION 1023.42 } \text{patum NAVD BB} \\ \text{STATE PLANE COORD INATES (NAD $=3 )} \\ \text{UNITS (FEET or METERS) } \underline{521, 472.462} \\ \text{EASTING } \underline{551, 472.462} \\ \text{EASTING } \underline{551, 472.462} \\ \text{EASTING } \underline{551, 472.462} \\ \text{CDNV. 4 } \underline{0.55 & 45557115} \\ \text{CDNV. 4 } \underline{0.55 & 45557115} \\ \text{CDNV. 4 } \underline{0.9949891907} \\ \text{SKETCH OF STATION} \\ \hline 142.5' \text{ iron Rel 1, 30 Corner of Side. 1037} \\ \hline 55.1^{1} \text{ from Ref 1, Corner of Side. 1037} \\ \hline 142.5' \text{ iron Ref 1, Corner of Side. 1037} \\ \hline 55.1^{1} \text{ from Ref 2, Corner of Side. 1037} \\ \hline 55.1^{1} \text{ from Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 3, Corner of Side. 1037} \\ \hline 10.5' \text{ iron Ref 4, 11997}'' \text{ set in a 36'' concrete post 12''} \\ \hline 10.5' \text{ iron Ref 4, 11997}''' \text{ set in a 36'' concrete post 12'''} \\ \hline 10.5'  iron Ref 3, 1080, and 1080, and 1090, and 1090, and 1090, and 1000, and 10$			DATE: <u>1022 1997</u>
LATTIONE $\underline{R1} + \underline{CO} + C$	STATION ZAV ( 1937		
LATTIONE $\underline{R1} + \underline{CO} + C$	GEOGRAPHIC COORDIN	NATES (NAD 83)	7 37
ELEVATION_1023.12'_DATUM_NAVD_BB         STATE PLANE COORDINATES (NAD 83.)         UNITS (FEET OF METERS)_FEET         NORTHING	LATITUDE 41 10 18	3.26583 <sup>″</sup> N ≰	
ELEVATION_1023.12' DATUM_NAVD_BB         STATE PLANE COORDINATES (NAD 83.)         UNITS (FEET or METERS)_FAUET         NORTHING		7.4ZI32 "WO	4
STATE PLANE COORDINATES (NAD &3 )         UNITS (FEET OF METERS)         NORTHING       551,472.462         EASTING       2,327,923.326         STATE       OH         CONV.       CO         STATE       OH         STATE <td></td> <td></td> <td></td>			
NORTHING <u>551,4-72.4-62</u> EASTING <u>2,357,923.326</u> STATE <u>OH</u> ZONE <u>3404</u> CONV. $\checkmark$ <u>0 55 4557115</u> COMB. FACTOR <u>0.999891807</u> SKETCH OF STATION 142.5' iron Rel 1, $\frac{34}{2}$ Corner of Bidz. 1037 55.1' from Ref 2. Face of 5 one of 2 trans. poles 57.8' from Ref 3. Corner of Fire Station 30.5' from Ref 4.c/lAsphalt Road 1.0' East of Corsonite Witness Post The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12" in diameter and belled to 18" at base, and flush with ground.		1	0 6
EASTING       2,357,923.326       ASPHALT         STATE       OH       ZONE       34         CDNV.       O       55       4557115       94         CDMB. FACTOR       O       999891807       SKETCH OF STATION         142.5'       iron Ref 1, 30 Corner of Bidz. 1037       SKETCH OF STATION         142.5'       iron Ref 2, Face of S ong of 2 trans. poles       55.1'       from Ref 3. Corner of Fire Station         30.5'       from Ref 3. Corner of Fire Station       30.5'       from Ref 4.c/lasphalt Road         1.0'       East of Consonite Witness Post       The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12"       State of Consonite Vitness and flush with ground.			
EASTING       2.357.523.326       A3PHALT         STATE       OH       ZONE       3401         CONV.       O       55       4557115       PARKING         COMB. FACTOR       O.993891807       SKETCH OF STATION         142.5' from Ref 1, 5% Corner of Blog. 1037       SKETCH OF STATION         55.1' from Ref 2, Pace of S one of 2 trans. poles       57.8' from Ref 3. Corner of Fire Station         30.5' from Ref 3. Corner of Fire Station       30.5' from Ref 4.c/lAsphalt Road         1.9' East of Corsonite Vitness Post       The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12"         'in diameter and belled to 18" at base, and flush with ground.	NORTHING 551 4-77 4-6	. 19/	
STATE OH ZONE TRADI       Precision         CONV. 4       0       55       4557115         COMB. FACTOR 0. 999891807       SKETCH OF STATION         142.5' iron Rel 1, 3% Corner of Blog. 1037       SKETCH OF STATION         142.5' iron Rel 1, 3% Corner of Blog. 1037       SKETCH OF STATION         35.1' from Ref 2. Face of S one of 2 trans. poles       S7.8' from Ref 3. Corner of Fire Station         30.5' from Ref 3. Corner of Fire Station       30.5' from Ref 4.cc/lAsphalt Road         1.0' East of Corsonite Witness Post       The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12"         'in diameter and belled to 18" at base, and flush with ground.			
COMB. FACTOR			
COMB. FACTORO.993891807       SKETCH OF STATION         142.5' iron Rel 1, 3W Corner of Bidg. 1037       SKETCH OF STATION         55.1' from Ref 2, Face of S ong of 2 trans. poles       S7.8' from Ref 3. Corner of Fire Station         30.5' from Ref 3. Corner of Fire Station       S0.5' from Ref 4.c/lAsphalt Road         1.0' East of Corsonite Witness Post       Stanped "RAV 1 1997" set in a 36" concret post 12"         'in diameter and belled to 18" at base, and flush with ground.       State of Corner of State at base, and flush with ground.	F		0 1 1 1 1
142.5' iron Ref 1, SW Corner of Bidg. 1037         55.1' from Ref 2, Face of S ong of 2 trans. poles         57.8' from Ref 3, Corner of Fire Station         30.5' from Ref 4, c/lAsphalt Road         1.0' East of Corsonite Witness Post         The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12"         in diameter and belled to 18" at base, and flush with ground.			Ϋ́ι.
55.1' from Ref 2. Face of S ong of 2 trans. poles         57.8' from Ref 3. Corner of Fire Station         30.5' from Ref 4.c/lAsphalt Road         1.0' East of Corsonite Witness Post         The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12"         in diameter and belled to 18" at base, and flush with ground.			SKETCH OF STATION
57.8' from Ref 3. Corner of Fire Station         30.5' from Ref 4.c/lAsphalt Road         1.0' East of Consonite Vitness Post         The station is a brass Corps. Of Engineers disk         stamped "RAV 1 1997" set in a 36" concrete post 12"         'in diameter and belled to 18" at base, and flush with ground.	142.5' from Rel 1, 5W Corner c.	1 3102. 1037	
30.9' from Ref 4, c/lAsphalt Road         1.9' Ease of Carsonite Vitness Post         The station is a brass Corps. Of Engineers disk         stamped "RAV 1 1997" set in a 36" concrete post 12"         in diameter and belled to 18" at base, and flush with ground.			
1.0' East of Corsonite Vitness Post         The station is a brass Corps. Of Engineers disk         stamped "RAV 1 1997" set in a 36" concrete post 12"         in diameter and belled to 18" at base, and flush with ground.			
The station is a brass Corps. Of Engineers disk			
	The station is a brass Corps. Of En- stamped "RAV 1 1997" set in a 36	gineers disk 5" concrete post 12"	
			· · · · · · · · · · · · · · · · · · ·

#### MB 2338

## The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.4
1 National Geodetic Survey, Retrieval Date = MARCH 15, 2018
MB2338 ******************
                                       *****
MB2338 DESIGNATION - 63 016 1 P CO
MB2338 PID

    MB2338

MB2338 STATE/COUNTY- OH/PORTAGE
MB2338 COUNTRY - US
MB2338 USGS OUAD - WINDHAM (1994)
MB2338
MB2338
                                 *CURRENT SURVEY CONTROL
MB2338
MB2338* NAD 83(1995) POSITION- 41 10 00.07372(N) 081 05 07.73986(W) ADJUSTED
MB2338* NAVD 88 ORTHO HEIGHT - 309.1 (meters) 1014. (feet) VERTCON
MB2338

        MB2338
        GEOID HEIGHT
        -
        -33.712 (meters)

        MB2338
        LAPLACE CORR
        -
        -1.96 (seconds)

        MB2338
        HORZ ORDER
        -
        SECOND

                                                                           GEOTD128
                                    -1.96 (seconds)
                                                                           DEFLEC12B
MB2338
MB2338. The horizontal coordinates were established by classical geodetic methods
MB2338.and adjusted by the National Geodetic Survey in April 1998.
MB2338.
MB2338. The NAVD 88 height was computed by applying the VERTCON shift value to
MB2338.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
MB2338
MB2338.Significant digits in the geoid height do not necessarily reflect accuracy.
MB2338.GEOID12B height accuracy estimate available here.
MB2338
MB2338.The Laplace correction was computed from DEFLEC12B derived deflections.
MB2338
MB2338. The following values were computed from the NAD 83(1995) position.
MB2338
                                                    Units Scale Factor Converg.
MB2338:
                            North
                                           East
                   - 167,534.086 718,698.045 MT 0.99994063 +0 55 45.4
- 549,651.41 2,357,928.50 sFT 0.99994063 +0 55 45.4
- 4,557,264.706 492,828.866 MT 0.99960063 -0 03 22.6
MB2338;SPC OH N
MB2338; SPC OH N
MB2338:UTM 17
MB2338
MB2338
                     - Elev Factor x Scale Factor = Combined Factor
                   - 0.99995680 x 0.99994063 = 0.99989743
- 0.99995680 x 0.99960663 = 0.99955745
MB2338!SPC OH N
MB2338!UTM 17
MB2338
MB2338:
                       Primary Azimuth Mark
                                                                    Grid Az
MB2338:SPC OH N - 63 022 2 P CO
                                                                    241 23 28.8
MB2338:UTM 17
                     - 63 022 2 P CO
                                                                     242 22 36.8
MB2338
MB2338_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TMF9282857264(NAD 83)
MB2338
MB2338 -----
MB2338 PID Reference Object
                                                      Distance Geod. Az
MB2338
                                                                      dddmmss.s
```

MB 2328

## The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.4
1 National Geodetic Survey, Retrieval Date = MARCH 15, 2018
MB2328 *****************
                                       *****
MB2328 DESIGNATION - 63 018 1 P CO
MB2328 PID

    MB2328

MB2328 STATE/COUNTY- OH/PORTAGE
MB2328 COUNTRY - US
MB2328 USGS OUAD - WINDHAM (1994)
MB2328
MB2328
                                 *CURRENT SURVEY CONTROL
MB2328
MB2328* NAD 83(1995) POSITION- 41 10 17.57778(N) 081 03 03.96526(W) ADJUSTED
MB2328* NAVD 88 ORTHO HEIGHT - 299.0 (meters) 981. (feet) VERTCON
MB2328

        MB2328
        GEOID HEIGHT
        -
        -33.739 (meters)

        MB2328
        LAPLACE CORR
        -
        -1.47 (seconds)

        MB2328
        HORZ ORDER
        -
        SECOND

                                                                           GEOTD128
                                    -1.47 (seconds)
                                                                           DEFLEC12B
MB2328
MB2328. The horizontal coordinates were established by classical geodetic methods
MB2328.and adjusted by the National Geodetic Survey in April 1998.
MB2328.
MB2328. The NAVD 88 height was computed by applying the VERTCON shift value to
MB2328.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
MB2328
MB2328.Significant digits in the geoid height do not necessarily reflect accuracy.
MB2328.GEOID12B height accuracy estimate available here.
MB2328
MB2328.The Laplace correction was computed from DEFLEC12B derived deflections.
MB2328
MB2328. The following values were computed from the NAD 83(1995) position.
MB2328
MB2328:
                            North
                                           East
                                                    Units Scale Factor Converg.
                   - 168,121.327 721,573.937 MT 0.99994078 +0 57 06.7
- 551,578.05 2,367,363.82 sFT 0.99994078 +0 57 06.7
- 4,557,802.214 495,713.451 MT 0.99960023 -0 02 01.1
MB2328;SPC OH N
MB2328; SPC OH N
MB2328:UTM 17
MB2328
MB2328
                     - Elev Factor x Scale Factor = Combined Factor
                   - 0.99995839 x 0.99994078 = 0.99989917
- 0.99995839 x 0.99960023 = 0.99955864
MB2328!SPC OH N
MB2328!UTM 17
MB2328
MB2328:
                       Primary Azimuth Mark
                                                                    Grid Az
MB2328:SPC OH N - 63 025 1 P CO
                                                                    179 04 17.7
MB2328:UTM 17
                     - 63 025 1 P CO
                                                                     180 03 25.5
MB2328
MB2328_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TMF9571357802(NAD 83)
MB2328
MB2328 -----
MB2328 PID Reference Object
                                                      Distance Geod. Az
MB2328
                                                                      dddmmss.s
```

MB 2342

## The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.4

    National Geodetic Survey, Retrieval Date = MARCH 15, 2018

MB2342 *****************
                                     *****
MB2342 DESIGNATION - 63 022 1 P CO
MB2342 PID
                 - MB2342
MB2342 STATE/COUNTY- OH/PORTAGE
MB2342 COUNTRY - US
MB2342 USGS QUAD - WINDHAM (1994)
MB2342
MB2342
                                *CURRENT SURVEY CONTROL
MB2342
MB2342* NAD 83(1995) POSITION- 41 09 46.44011(N) 081 05 50.70274(W) ADJUSTED
MB2342* NAVD 88 ORTHO HEIGHT - 324.0 (meters) 1063. (feet) VERTCON
MB2342

        MB2342
        GEOID HEIGHT
        -
        -33.700 (meters)

        MB2342
        LAPLACE CORR
        -
        -1.88 (seconds)

        MB2342
        HORZ ORDER
        -
        SECOND

                                                                       GEOTD128
                                  -1.88 (seconds)
                                                                       DEFLEC12B
MB2342
MB2342. The horizontal coordinates were established by classical geodetic methods
MB2342.and adjusted by the National Geodetic Survey in April 1998.
MB2342.
MB2342. The NAVD 88 height was computed by applying the VERTCON shift value to
MB2342.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
MB2342
MB2342.Significant digits in the geoid height do not necessarily reflect accuracy.
MB2342.GEOID12B height accuracy estimate available here.
MB2342
MB2342. The Laplace correction was computed from DEFLEC12B derived deflections.
MB2342
MB2342. The following values were computed from the NAD 83(1995) position.
MB2342
MB2342;
                           North
                                         East
                                                  Units Scale Factor Converg.
                  - 167,097.406 717,703.451 MT 0.99994052 +0 55 17.1
- 548,218.74 2,354,665.41 sFT 0.99994052 +0 55 17.1
- 4,556,845.340 491,827.249 MT 0.99960082 -0 03 50.8
MB2342; SPC OH N
MB2342; SPC OH N
MB2342:UTM 17
MB2342
MB2342
                    - Elev Factor x Scale Factor = Combined Factor
                  - 0.99995446 x 0.99994052 = 0.99989498
MB2342!SPC OH N
                    - 0.99995446 x 0.99960082 = 0.99955530
MB2342!UTM 17
MB2342
MB2342_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TMF9182756845(NAD 83)
MB2342
MB2342 -
                 -----
MB2342 PID Reference Object
                                                 Distance Geod. Az
MB2342
                                                                  dddmmss.s
MB2342 MB2340 63 022 2 P CO
                                                 384.163 METERS 07618
MB2342
MB2342
MB2342
                                SUPERSEDED SURVEY CONTROL
```

W. O. ARMY ENDINEER DISTRICT, LOUISVILLA CORPS OF ENGLAGERS LOL 100 100 P.O. 60X 58 US Army Corps LOU SVILLE, KY 1020! of Englineers DATE: DEL 1997 PROJECT: RANCHIMA ARSONAL STATION RAN 2 1997 GEOGRAPHIC COORDINATES (MAD 83 1 LATITUDE 41 11 27.42499 Ņ LONGITUDE St 05 07.6412; 4 W ZEFZ ELEVATION INAL DATUM NAVE DE 255 3. REF 1 SFATE PLANE COORDINATES (NAD.83 : UNITS (FEET OF METERS) THEET. TON FALLS RD NOATHING 558, 490, 787 EASTING \_\_\_\_\_ 2,357,791.668 2**4** A General Co 340 STATE OH ZONE DHIPH 0 55 CONV. 🐇 🔚 COMA. FACTUR 0.999890672 SKETCH OF STATION The station is a brass Corps. Of Engineers disk stramped "RAV 2 1997" set in a 36" ennorete post 12" in dismeter and belled to 18" at base, and flush with ground. At the Intersection of George & Newton Falls Roads REFIRINCES-10.0° from Ref 1, top C/L of concrete basis 21.5 from Rof 2. namer pole 22.5 from Rof 3. C/L of Secrie Road 46.7 from Rof 4. C/L of Mexicon Folls Ruad 1.0' Tast of carsonite ultoese post QUAD ; WINDHAM , DH.

U.S. ARMY CHAINEER DISTRICT, LOUISVIEUS N. SORAG OF SNOTNEERS 1.20% على 20% لي 20% US Army Corps of Engineers PROJECT: RAVENNA ARSENAL DATE: 12EC. 1897. STATION RAV 9 1991 GEDGRAPHIC COORDINATES (HAD 33 1 LATITUDE 41 . 2 47.41352 N LONGT TUDE 81 00 42.3355! 1 ELEVATION 961.90 DATUM MAYDEB V RAV 2 TP RAV 2 STATE PLANE COORD [NATES (NAD 87 1 257 87 ----\$FF.3 .... REFS UNITS (FEET or WETERS) Freet HANGANH KAND HORTHING \$64.922.433 EASTING 2.377, 334.290 STATE OH ZONE 54-01 CONY. 4 \_\_\_\_ 0 58 37.71934 CONS. FACTOR 0. 9398-96347 SKETCY OF STATION RAV 9 - TO REACH FROM INTERSECTION OF SNOW RD And RAWSDELL RD. GO EAST ALANG RA SDELL O.Z MIKS PASSING BY BAY & AT OLD QUARKY ON RTTHEME O.3 MIKS MORE TO STATON ON THE LEFT APROX. 2.54 FORT EAST OF RD LERDING SUNTH-EAST. S. A COPPLE FRATED CLOFE. DISECSTMMENT "RAVO" (MMY) SET IN A BEAMCH CONCLETE POST 12 MCH IN DIA. AND RELED TO IS MCHIER AT RAFE AND FIGH (MTH GROUP) 3787804/15: REF1 ; I. + PK WAIL W CONTRE HOM OF POMODELL Rd SOUTH OF STA. 12.05 Feet REF.Z : IS A PA WALL INT. SENTER AND IN FRANCISCUL RAL. AND BRITH-EAST KOND WEST OF STATION - 252 PT FOLT QUAD: WINDHAM OH

U.S. ARMY ENSINES	R DISTRICT, SOUISVILLE
GORPS O	* RNG.NBEKS 9. BOX 59 ±1,009 NG, KY 40201
OF Engineers	*
STATION       PANIO 1997         GEOGRAPHIC CODSDINATES (NAD B3 )         LATETUDE       41 * 10 * 51.41927       N         LATETUDE       51 * 03 * 02.51499 *       N         LONGITUDE       51 * 03 * 02.51499 *       N         ELEVATION       983 **       04100 **       N         STATE       PLANE COORD (NATES (NAD 83 *       1         UNITS (FEET ** METERS)       FEET       N         NORTHING       535,004.363       2         STATE       04       20NE       34.01         CONY.       0       51 * 01.62867	ATT
COMB. FACTOR D. 999 9.89.44029 The station is a brans Corps. Of Engineers disk stamped "RAV 10 1997" set in a 36" consecto post 12" in diameter and bylical to 18" at base, and flash with ground	SKETCH OF STATION
REFERENCES: 32.5' SEE C/L of seuth service road ST.10' east C/L of Paris Kindham Road 117.41' EX morch cetter of Bldg 627834 115.6' C/L South service road and Paris W1 11.3' C/L SSW value 15.6' C/L NE value	ndbas Rogd
QUAD: WINDHAM, CH	

RAV 11

US Army Corns Louisvill	R DISTRICT, LOUISV LLD 19 200100000 9. 180% 55 \$1010 LLC, XY 90201 DATE: <u>OBT 199</u> 7
STATION       RAV 11       10-5         GEOGRATHIC COORDINATES (NAD 33.)         LATITHOE       41       11       10-81772       N         LONGITUDE       61       61       39.439.3       Y         STATE       948.73       0ATUM       NAV088       Y         STATE       PLANE       CONDINATES (NAD 33.)       Y       Y         UKITS (FEET OF WETERS)       FRET       NAV089.3       Y         NORTHING       557.047.939       STATE       94.0641         STATE       04       20NE       34-01       Y         CONV.       057.44.006.979       14.0641       Y         CONV.       057.44.0083507       Y       Y	A COMPANY CO RATE ROAD A COMPANY CO RATE ROAD BESTING REPORTOR 7. It. /8/ A COMPANY CO RATE ROAD ROAD RELIGION CO RATE ROAD ROAD ROAD RELIGION CO RATE ROAD ROAD ROAD ROAD ROAD ROAD ROAD ROAD
STATION IS : A COPPE	SKETCH OF STATION ROM SOUTHERN SERVICE RD AND PARK SO EAST NORTH EAST ALANG SOUTHER: RUTS MARES 76 STATION ON LEFT. R CONTED C. OF E. DISK (STRAKED FR W. & 36INCH CONCRETE FAST-12 WAA WALL.
Pet 1: 35 the centering of Southern East of Station 1000, 6 Feet. FFE? : Is A PK. WAY Conderline of 50.7 STATION - 28, 21 Feet. REF3: Is the Conternor of Southern Wet of Station 0.25 MURS.	SERVICE RA CBE AND S.E. UT

# **APPENDIX J**

**Regulatory Correspondence Letter** 

This page intentionally left blank.



John R. Kasich, Governor Mary Taylor, Lt. Governor Craig W. Butler, Director

October 23, 2018

Mr. David Connolly Army National Guard Directorate Environmental Programs Division ARNG-ILE-CR 111 S. George Mason Dr. Arlington, VA 22204 Re: US Army Ravenna Ammunition Plt RVAAP Remediation Response Project records Remedial Response Portage County 267000859220

Subject: Draft Site Inspection Report, CC-RVAAP-70 East Classification Yard, September 13, 2018, Portage/Trumbull Counties, OHIO EPA ID # 267000859220 Dear Mr. Connolly:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office has reviewed the Draft Site Inspection Report for CC-RVAAP-70, East Classification Yard dated and received by Ohio EPA on September 13, 2018.

Additional sampling was conducted in accordance with the 2017 Work Plan for Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034-Motor Pool Hydraulic Lift. Seven decision units (DUs) were defined and investigated. Ohio EPA concurs with the recommendation for further evaluation in a Remedial Investigation (RI) and has no further comments.

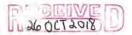
If you have any questions or concerns related to this review or would like to schedule a meeting or conference call, please free feel to contact me at (330) 963-1170.

Sincerely

Edward J. D'Amato Project Coordinator Ohio EPA - Division of Emergency and Remedial Response

ED/nvp

ec: Rebecca Schreffler, Chenega Kevin Sedlak, ARNG Angela Schmidt, USACE Louisville Mark Johnson, Manager, DERR, NEDO Bob Princic, Supervisor, DERR, NEDO Katie Tait, OHARNG RTLS Craig Coombs, USACE Louisville Gail Harris, Vista Sciences Corporation Thomas Schneider, Ohio EPA, SWDO, DERR



Northeast District Office • 2110 East Aurora Road • Twinsburg, OH 44087-1924 epa.ohio.gov • (330) 963-1200 • (330) 487-0769 (fax) This page intentionally left blank.