REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
10-03-2011	Final	07 January 2011 to 10 March 2011

4. TITLE AND SUBTITLE

Final Remediation Completion Report Sub-Slab Soils at RVAAP-08 Load Line 1.

5a. CONTRACT NUMBER

W912QR-04-D-0025

5b. GRANT NUMBER

N/A

5c. PROGRAM ELEMENT NUMBER

N/A

6. AUTHOR(S)

Pratt, Brenda
Schuler, Peggy

5d. PROJECT NUMBER

N/A

5e. TASK NUMBER

Delivery Order 0006

5f. WORK UNIT NUMBER

N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

URS Group, Inc.
1375 Euclid Avenue, Suite 600
Cleveland, OH 44115

8. PERFORMING ORGANIZATION REPORT NUMBER

N/A

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

US Army Corps of Engineers
Louisville District ED-EE, Room 351
600 Martin Luther King Place
Louisville, KY 40202-2232

10. SPONSOR/MONITOR'S ACRONYM(S)

USACE

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

NA

12. DISTRIBUTION/AVAILABILITY STATEMENT

Internal Army

13. SUPPLEMENTARY NOTES

None

14. ABSTRACT

The Final Report documents the removal of contaminated sub-slab soil at building footprints within Load Line 1 at the Ravenna Army Ammunition Plant.

15. SUBJECT TERMS

RVAAP; Remediation Completion Report; Load Line 1 RVAAP-08.

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Jo Ann Bartsch
U	U	U	SAR	292	19b. TELEPHONE NUMBER *(Include area code)* (216) 622-2229

Reset

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

Final
Remediation Completion Report
Sub-Slab Soils at RVAAP-08 Load Line 1

Ravenna Army Ammunition Plant
8451 St. Route 5
Ravenna, OH 44266-9297

Contract No. W912QR-04-D-0025
Delivery Order No. 0006

Prepared for:
U.S. Army Corps of Engineers
600 Martin Luther King, Jr. Place
P.O. Box 59
Louisville, Kentucky 40201-0059

Prepared by:
URS Group, Inc.
1375 Euclid Avenue
Suite 600
Cleveland, Ohio 44115-1808

March 10, 2011

DOCUMENT DISTRIBUTION

Name/Organization	Number of Printed Copies	Number of Electronic Copies
Cleanup Program Manager National Guard Bureau	--	1
Environmental Specialist 2 OHARNG	1	1
Project Manager Ohio EPA	2	2
Facility Manager RVAAP	2	2
USACE/COR U.S. Army Corps of Engineers, Louisville District Contracting Officer's Representative	2	1
Project Manager URS Group, Inc.	1	--

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Acronyms and Abbreviations

ACM	Asbestos-Containing Material
ADR	Automated Data Review
AEC	Army Environmental Command
AOC	Area of Concern
bgs	Below ground surface
BMP	Best Management Practices
BRACD	Base Realignment and Closure Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLIN	Contract Line Item
COC	Chemical of Concern
CUG	Cleanup Goal
CY	Cubic Yard
E&S	Erosion and Sediment
FWSAP	Facility-Wide Sampling and Analysis Plan
GPS	Global Positioning System
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
IROD	Interim Record of Decision
IRP	Installation Restoration Program
ISM	Incremental Sampling Methodology
JSA	Job Safety Analysis
LCG5	Louisville Chemistry Guideline, Version 5
LCS	Laboratory Control Sample
MARC	Multiple Award Remediation Contract
MRL	Method Reporting Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NGB	National Guard Bureau
NOI	Notice of Intent

NOT	Notice of Termination
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PIKA	PIKA, Inc.
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RI/FS	Remedial Investigation/Feasibility Study
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine, also Royal Demolition Explosive
RPD	Relative Percent Difference
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SOW	Scope of Work
SRC	Site-Related Contaminant
SWP3	Storm Water Pollution Prevention Plan
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TNT	Trinitrotoluene also 2,4,6-Trinitrotoluene
URS	URS Group, Inc.
USACE	United States Army Corps of Engineers
USP&FO	United States Property and Fiscal Officer
UXO	Unexploded Ordnance

1.1 PURPOSE AND SCOPE

URS Group, Inc. (URS) was contracted by the United States Army Corps of Engineers (USACE) to sample soils below removed floor slabs at Load Lines 2, 3, and 4 and to excavate and transport contaminated soils to Load Line 4 (Buildings G-1, G-1A, and G-3) at the Ravenna Army Ammunition Plant (RVAAP) under their Multiple Award Remediation Contract (MARC), Delivery Order 0006. Subsequent modifications to the Delivery Order added Load Line 1 Buildings, Buildings F-15 and F-16, and several other buildings at Load Lines 3 and 4 that were demolished subsequent to the execution of the initial Delivery Order. The Delivery Order was also modified to include transport of contaminated soil to a licensed disposal facility rather than the originally designated Load Line 4 Buildings.

The purpose of the sampling was to determine whether any releases of chemicals of concern (COCs) had occurred at levels indicating a concern for human health, based on the Ohio Army National Guard's intended future use of the areas. The results of the sampling were to be used to determine the need for removal of contaminated soil.

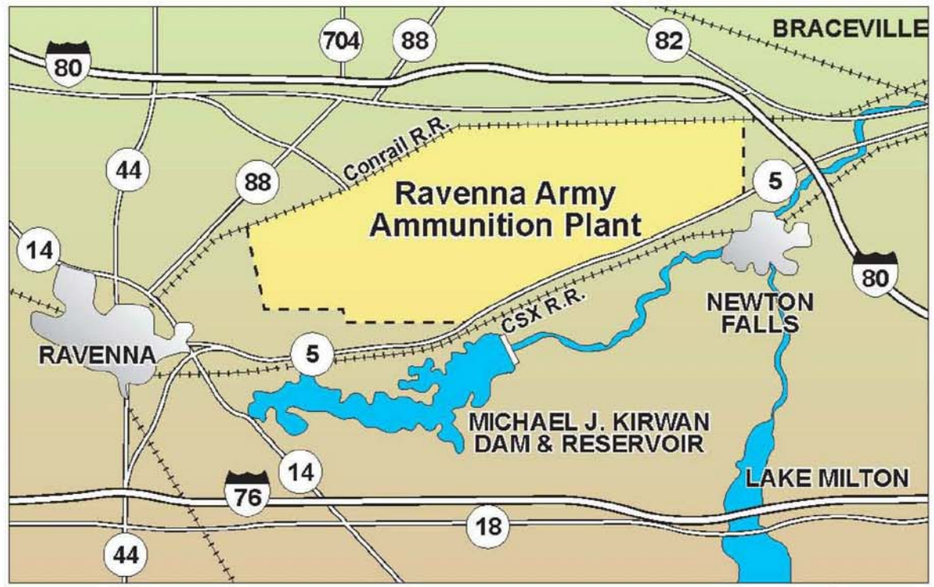
As part of the Scope of Work (SOW) for Task Order 0006, a Work Plan to address all SOW activities was prepared and approved (URS, 2008). The Work Plan was later amended to provide for additional sampling at the additional buildings (Load Line 1 and others) and to provide details on the excavation and removal of contaminated soil (URS, 2009b). The sampling plan for each building footprint included both screening for explosives and confirmation sampling using an incremental sampling methodology (ISM) for a larger suite of chemicals.

The Work Plan (including Addendum # 1) is a supplement to the 2001 Facility-Wide Sampling and Analysis Plan (FWSAP) for the RVAAP (SAIC, 2001b). The FWSAP provides the base documentation (i.e., technical and investigative protocols) for conducting environmental investigations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at RVAAP.

This report provides documentation of the excavation and disposal of contaminated soil at Load Line 1.

1.2 SITE DESCRIPTION AND PROJECT BACKGROUND

The RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 1.6 km (1 mile) northwest of the city of Newton Falls and 4.8 km (3 miles) east-northeast of the city of Ravenna. The facility is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry Roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east (Figure 1-1). As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been transferred to the United States Property and Fiscal Officer (USP&FO) for



US Army Corps of Engineers®

ORIENTATION OF RVAAP

0 3 6

SCALE IN MILE

N

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

RVAAP LOCATION MAP

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:	PAGE No:
JSC	BP	13812319	10/25/10	1-1	1-2

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Remediation of Sub-slab Soils\Ravenna-Figure 1-1 RVAAP Location Map.dwg User: jessica_cotton Oct 21, 2010 - 2:02pm

Ohio and subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of Camp Ravenna. The RVAAP's remaining parcels of land are located completely within Camp Ravenna.

Camp Ravenna did not exist when RVAAP was operational, and the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The RVAAP Installation Restoration Program (IRP) encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP and, therefore, references to the RVAAP in this document are considered to be inclusive of the historical extent of the RVAAP, which is inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated.

Figure 1-2 shows the locations of the various portions of the facility. As the installation is remediated, acreage is transferred from the Base Realignment and Closure Division (BRACD) to the National Guard Bureau (NGB) for OHARNG training. The Ohio Environmental Protection Agency (Ohio EPA) is the lead regulatory agency for remediation being conducted by the Army.

The RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly and loading. In 1950 the facility was placed on standby status until production activities were resumed in 1954 to 1957 and again in 1968 to 1972. Demilitarization activities continued until 1992. The only activities currently being carried out at RVAAP are environmental restoration, ordnance clearance, and demolition of discovered ordnance during those activities, as well as building decontamination and demolition.

The Area of Concern (AOC) for the work accomplished in this report is Load Line 1 (Figure 1-3). Industrial operations at this location consisted primarily of melting and loading trinitrotoluene (TNT, also 2,4,6-trinitrotoluene) and Composition B (TNT and Royal Demolition Explosive, also hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)) into large caliber shells. From approximately 1941 to 1971 building wash-down water and wastewater from load line operations collected in concrete sumps, were pumped through sawdust filtration units, and then discharged to either a settling pond or to drainage ditches leading to a settling pond.

The operations of these load lines produced explosive dust, spills, and vapors that collected on the floors and walls of the process buildings. Periodically, the floors and walls were cleaned with water and steam. The resulting liquid contained both TNT and Composition B and was known as "pink water" because of its characteristic color.

A performance-based contract was awarded to Shaw E & I in September 2003 to complete an interim soil and dry sediment removal at Load Lines 1 through 4. The Remedial Investigations/Feasibility Studies (RIs/FSs), as well as remedial actions, are complete; and an Interim Record of Decision (IROD) has been signed. The IROD included a provision to periodically inspect remaining slabs and foundations to ensure their integrity until their removal. In January, 2008, BRACD sent correspondence detailing the agreed upon approach for slab

LEGEND OF SITES

IRP SITES (29 SITES)

- RVAAP-01 ..... RAMSDELL QUARRY LANDFILL
- RVAAP-03 ..... OPEN DEMOLITION AREA 1
- RVAAP-05 ..... WINKLEPECK BURNING GROUNDS
- RVAAP-06 ..... C BLOCK QUARRY
- RVAAP-08 ..... LOAD LINE 1
- RVAAP-09 ..... LOAD LINE 2
- RVAAP-10 ..... LOAD LINE 3
- RVAAP-11 ..... LOAD LINE 4
- RVAAP-12 ..... LOAD LINE 12
- RVAAP-13 ..... BLDG 1200 AND DILLUTION/SETTLING POND
- RVAAP-16 ..... FUZE AND BOOSTER QUARRY LANDFILL/PONDS
- RVAAP-19 ..... LANDFILL NORTH OF WINKLEPECK BURNING GROUND
- RVAAP-28 ..... MUSTARD AGENT BURIAL SITE
- RVAAP-29 ..... UPPER AND LOWER COBBS POND
- RVAAP-33 ..... LOAD LINE 6
- RVAAP-34 ..... SAND CREEK DISPOSAL ROAD LANDFILL
- RVAAP-38 ..... NACA TEST AREA
- RVAAP-39 ..... LOAD LINE 5
- RVAAP-40 ..... LOAD LINE 7
- RVAAP-41 ..... LOAD LINE 8
- RVAAP-42 ..... LOAD LINE 9
- RVAAP-43 ..... LOAD LINE 10
- RVAAP-44 ..... LOAD LINE 11
- RVAAP-45 ..... WET STORAGE AREA
- RVAAP-46 ..... BUILDINGS F-15 AND F-16
- RVAAP-48 ..... ANCHOR TEST AREA
- RVAAP-50 ..... ATLAS SCRAP YARD
- RVAAP-51 ..... DUMP ALONG PARIS-WINDHAM ROAD
- RVAAP-66 ..... FACILITY-WIDE GROUNDWATER
- RVAAP-67 ..... FACILITY-WIDE SEWERS

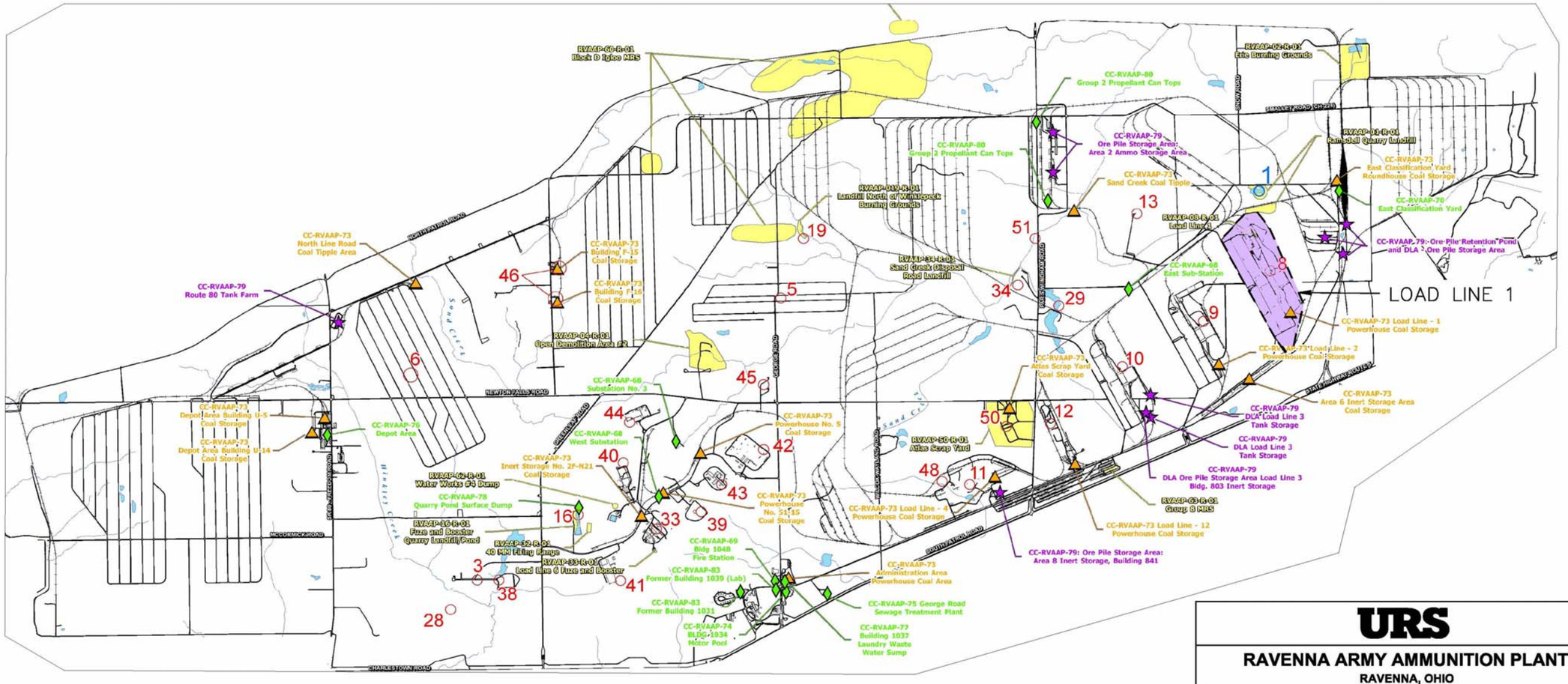
COMPLIANCE RESTORATION SITES (13 SITES)

- CC-RVAAP-68 ..... ELECTRIC SUBSTATIONS (E,W,No.3)
- CC-RVAAP-69 ..... BUILDING 1048 - FIRE STATION
- CC-RVAAP-70 ..... EAST CLASSIFICATION YARD
- CC-RVAAP-72 ..... FACILITY-WIDE USTS (45 SITES)
- CC-RVAAP-73 ..... FACILITY-WIDE COAL STORAGE
- CC-RVAAP-74 ..... BUILDING 1034 MOTOR POOL HYDRAULIC LIFT
- CC-RVAAP-75 ..... GEORGE ROAD SEWAGE TREATMENT PLANT
- CC-RVAAP-76 ..... DEPOT AREA
- CC-RVAAP-77 ..... BUILDING 1037 LAUNDRY WASTE WATER SUMP
- CC-RVAAP-78 ..... QUARRY POND SURFACE DUMP
- CC-RVAAP-79 ..... DLA ORE STORAGE SITES
- CC-RVAAP-80 ..... GROUP 2 PROPELLANT CAN TOPS
- CC-RVAAP-83 ..... FORMER BUILDINGS 1031 AND 1039

MMRP SITES (14 SITES)

- RVAAP-001-R-01 ..... RAMSDELL QUARRY LANDFILL MRS
- RVAAP-002-R-01 ..... ERIE BURNING GROUNDS MRS
- RVAAP-003-R-01 ..... OPEN DEMOLITION AREA #2 MRS
- RVAAP-008-R-01 ..... LOAD LINE 1 MRS
- RVAAP-013-R-01 ..... FUZE AND BOOSTER QUARRY MRS
- RVAAP-015-R-01 ..... LANDFILL NORTH OF WINKLEPECK MRS
- RVAAP-032-R-01 ..... 40MM FIRING RANGE MRS
- RVAAP-033-R-01 ..... FIRESTONE TEST FACILITY MRS
- RVAAP-034-R-01 ..... SAND CREEK DUMP MRS
- RVAAP-039-R-01 ..... ATLAS SCRAP YARD MRS
- RVAAP-039-R-01 ..... BLOCK D IGLOO MRS
- RVAAP-061-R-01 ..... BLOCK D IGLOO -TD MRS
- RVAAP-062-R-01 ..... WATER WORKS #4 DUMP MRS
- RVAAP-063-R-01 ..... GROUP 8 MRS

- ..... CERCLA
- ..... RCRA
- ..... MMRP SITES
- ..... COMPLIANCE RESTORATION SITES - APPROVED
- ..... DLA ORE STORAGE AREAS (7 SITES)
- ..... COAL STORAGE AREAS (17 SITES)
- ..... UNDERSLAB SAMPLING PROJECT AOC



US Army Corps of Engineers®

0 2000 4000 8000

SCALE IN FEET

N

MAP SOURCE:
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

RVAAP FACILITY
MAP

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:	PAGE No:
JSC	BP	13812319	12/13/10	1-2	1-4

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Excavation Sampling Load Line 1\Ravenna-Figure 1-2 RVAAP Plant Facility Map.dwg User: jessica_cotton Dec 20, 2010 - 12:58pm

LEGEND

- BUILDING AND WALKWAY
- ASPHALT ROAD
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- CONTOUR (2 FT. INTERVAL)
- CONTOUR (10 FT. INTERVAL)
- TREE OR TREELINE
- STEAM STANCHION
- OVERHEAD STEAM LINE
- EXCAVATION AREAS
- SEE FIGURES 4-1 AND 4-2 FOR ADDITIONAL DETAIL

US Army Corps of Engineers®

0 125 250 500
SCALE 1" ~ 500'

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
LOAD LINE 1 PLAN VIEW

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:	PAGE No:
JSC	BP	13812319	10/25/10	1-3	1-5

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Remediation of Sub-slab Soils\Ravenna-Figure 1-3 LOAD LINE 1 Plan View.dwg User: jessica_cotton Oct 28, 2010 - 2:01pm

removal (US Army, 2008). The slab removal and any removal actions of contaminated soil will be documented in the final Record of Decision (US Army, 2008).

Site-related contaminants (SRCs) identified in soils at the load lines included the following: inorganics (aluminum, antimony, arsenic, barium, cadmium, hexavalent chromium, and manganese), explosives (TNT and RDX), polychlorinated biphenyls (PCBs), and semivolatile organic compounds (SVOCs). The semivolatile SRCs included the following polycyclic aromatic hydrocarbons (PAHs): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene. Based on assessments completed during the RIs for the four load lines, explosives are mobile in water and may potentially leach from soils. Inorganics, PCBs, and the PAHs are not expected to readily leach from soils. The RI analytical data indicated that Load Line 1 was the most contaminated of the four load lines as evidenced by the widest variety of contaminants detected, the highest frequencies of detection, and the highest COC concentrations. Load Line 4 was the least contaminated of the four load lines (Shaw, 2007).

The planned future land use for Load Lines 1 through 4 is for National Guard training. This area is slated to be developed as a vehicle maneuver area.

Under contract to the Army Environmental Command (AEC), Shaw E & I completed its remediation of surface soils and dry sediments outside the footprints of the buildings at Load Lines 1, 2, 3, and 4. Demolition of building superstructures at Load Lines 2, 3, and 4 was completed in winter 2007. A contract line item to remove the building slabs was exercised in winter 2007. As required by the IROD for soil remediation at Load Lines 1 through 4, the Army committed to performing periodic inspections of the concrete building slabs and building foundations to ensure their integrity had not been compromised, in order to prevent infiltration to potentially contaminated soil underlying the slabs and foundations. However, the IROD also recognized that the Army would eventually remove the building slabs (Shaw, 2007).

During the IROD preparation, the Ohio EPA had raised questions regarding preparation of a work plan detailing how the slabs would be removed, identification of associated environmental controls to minimize the potential spread of contamination, and soil sampling protocols. The Ohio EPA also identified that further remedial action may be needed for soil under the slabs, depending on the analytical results. The URS Delivery Order 0006 was issued to address the issues raised by the Ohio EPA regarding potential contamination of the underlying soil. The Work Plan accordingly describes the rationales used to support the Army's proposed sampling protocol.

The work covered by URS' Delivery Order 0006 (as modified) was to evaluate potential contamination below the floor slabs and to excavate, transport, and dispose of contaminated earth fill materials above the chemical-specific cleanup goals (CUGs) for TNT and RDX. Once the evaluation was completed, the earth fill materials exceeding the SOW chemical cleanup criteria were to be excavated and disposed at a licensed disposal facility.

The removal of the buildings down to the floor slabs was completed by MKM Engineers, Inc. under a contract from BRACD. The BRACD exercised a Contract Line Item (CLIN) to remove floor slabs and any associated foundation walls to grade at these buildings. Floor slab removal by the BRACD contractor was completed at Load Line 1 during May 2009. Additional cover was applied at a number of high potential building footprints within 2 days of slab removal, in anticipation of Work Plan Amendment approval and subsequent sampling. The plastic cover was placed to minimize potential infiltration of water through exposed soil areas and the movement of potentially contaminated soil beyond the underslab area. The plastic cover was applied at building footprints CB-4, CB-4A, CA-6, CA-6A, CB-4VP1, CB-4AVP1, CB-10VP1, CB-10VP2, CB-10VP3, CA-28, and CA-28A. Additional plastic covering was applied within and outside footprints wherever staining was observed.

A limited number of soil samples were collected from locations beneath the building slabs and analyzed for SRCs during the completion of the Load Line 1 RI (Shaw, 2004). Results of this sampling indicated that soil beneath the building sub-floors was generally uncontaminated. However, this conclusion was somewhat uncertain since it was based on a limited data set. Details of that sampling are described as follows:

Seventeen samples of soil beneath building floor slabs at Load Line 1 were collected and analyzed for field explosives and target analyte list (TAL) metals. All field results for TNT and RDX were less than 1 mg/kg; thus, no sub-floor soil samples were submitted for fixed-base laboratory analysis of explosives. The TAL metal concentrations in all samples generally reflected an absence of inorganic contamination that may be attributed to facility operations. Maximum detected concentrations of six metals (aluminum, barium, chromium, iron, manganese, vanadium) were below the installation-specific background criteria. Concentrations of antimony, arsenic, beryllium, cadmium, calcium, cobalt, copper, lead, magnesium, mercury, nickel, potassium, selenium, sodium, thallium, and zinc were generally below background criteria. For these metals, only a few detections (no more than two out of 17) were above their respective criteria. Thallium was detected in almost all samples, but was not detected in background. The detections of thallium were all less than 1 mg/kg. Copper was also detected in most (10 of 17) of the samples above the background criteria. The highest detection of copper was 25.9 mg/kg, a result slightly above the background criteria of 17.7 mg/kg.

Based on the above RI information, a sampling program was implemented to provide sufficient data at each Load Line 1 building so that removal actions could be planned and accomplished as needed. The sampling design for each building location was based on historical information such as past usage, RI data, and similar operations at other ammunition plants. Field screening samples for TNT and RDX were collected for all building footprints to determine if any material required removal and fixed laboratory analyses were also used to determine if any further removal was warranted.

The details of the sampling and the results at Load Line 1 are described in the following report sections.

3.1 LOAD LINE 1 SUB-SLAB SAMPLING

As described previously, the sampling of soil below the removed building slabs at Load Line 1 was designed to determine whether concentrations of SRCs were at levels that represented a concern for human health, based on the reuse of the load lines for National Guard Training.

The load line buildings were grouped into three categories based on their potential for the presence of contamination in earth fill beneath the building floor slabs. The three categories were designated as high, medium, or low potential, and a field screening sampling scheme was developed for each category (URS, 2009b). Screening samples were analyzed for TNT and RDX using soil test kits. Results were compared to the CUGs established in the IROD and adjusted based on the results of a correlation study of the accuracy of the field screening techniques (when compared to a fixed laboratory analyses). The details of the correlation study are included in the Field Screening Report for Load Lines 2, 3, and 4 (URS, 2009a). If there were no exceedances, an ISM sample of the building footprint was then collected and analyzed for a more extensive suite of chemicals at a fixed-base laboratory. Table 3-1 summarizes the CUGs in these investigations.

The details of the screening analysis and the ISM sampling and the results are included in URS (2010b). Summaries of those activities follow.

3.1.1 Field Screening Summary

At each low and medium potential building, one field screening sample was collected from the approximate middle of the building footprint from approximately 0 to 12 inches below ground surface (bgs). Thirteen medium potential buildings were sampled at Load Line 1; eight low potential buildings were sampled. The samples were biased toward any visual indications of contamination, if present. Additional samples were collected both within and outside building footprints as needed when visually impacted earth fill was observed.

Nineteen high potential buildings were identified at Load Line 1. High potential buildings were believed to have the highest possibility for the presence of sub-slab contamination and were screened for RDX/TNT from multiple cores within each building footprint. Cores were taken down to 4 feet bgs and five portions of each core were selected for field analyses: the top, three portions within the core that best represented the range of lithologies found in the core, and the bottom. Because of sub-slab conditions (i.e., refusal), not all cores could be taken down to 4 feet and five samples could not always be obtained from every core.

A total of 476 field screening samples were collected and processed in the temporary field screening laboratory located in Building 1036. The investigation was conducted between October 19, 2009, and November 2, 2009.

Table 3-1
Summary of Cleanup Goals for the National Guard Trainee
Ravenna Army Ammunition Plant
Ravenna, Ohio

Chemical of Concern	IROD Cleanup Goal, mg/kg [1]	Adjusted Cleanup Goal, mg/kg [2]
Inorganics		
Aluminum	34,942	Not Applicable
Antimony	2,458	Not Applicable
Arsenic	31	Not Applicable
Barium	3,483	Not Applicable
Cadmium	109	Not Applicable
Chromium, hexavalent	16	Not Applicable
Lead	1,995	Not Applicable
Manganese	1,800	Not Applicable
Explosives		
2,4,6-TNT	1,646	878
RDX	838 [3]	Not Applicable
PCBs		
Aroclor-1254	35	Not Applicable
SVOCs		
Benzo(a)anthracene	105	Not Applicable
Benzo(a)pyrene	10	Not Applicable
Benzo(b)fluoranthene	105	Not Applicable
Dibenz(a,h)anthracene	10	Not Applicable

(1) Cleanup Goals used in comparisons to ISM sampling data.
(2) Adjusted cleanup goal for TNT used only in comparisons to field screening data.
(3) Cleanup goal for RDX used in both ISM sampling and field screening sampling comparisons.

No exceedances of either the TNT adjusted CUG (878 mg/kg) or the RDX IROD CUG (838 mg/kg) were detected in any of the samples collected from the low or medium potential building footprints. At two high potential buildings within Load Line 1, two TNT exceedances were noted. These occurred at Buildings CB-4AWS and CB-4WN.

Locations with TNT CUG exceedances were covered with plastic in anticipation of subsequent excavation.

3.1.2 ISM Sampling Summary

The purpose of the ISM confirmatory sampling was to determine if additional excavation was required at any of the building locations beyond that already determined by the field screening effort. Multi-increment sampling was conducted at each footprint where the screening analyses indicated that TNT and RDX concentrations were below established CUGs. At some large building footprints, the footprint was divided into multiple ISM decision units. At some smaller footprints, multiple footprints were combined into one ISM decision unit. The sampling was conducted between October 19 and November 4, 2009. A total of 40 primary (i.e., exclusive of quality control (QC)) ISM samples were collected for Load Line 1. The details of the sampling are included in URS (2009c).

The analytical data from the ISM samples were evaluated by a comparison to soil CUGs established for RVAAP. The CUGs initially provided for the project were those listed in the IROD (Shaw, 2007). These levels were established based on a National Guard Trainee scenario for those chemicals considered SRCs for Load Lines 1 through 4. However, additional chemicals were detected in the ISM samples. Additional CUGs were used based on either the draft Facility-Wide Cleanup Goal report (SAIC, 2008) or from USEPA's Regional Screening Levels (RSLs) (USEPA, 2010). In addition, potential additivity of adverse health effects from simultaneous exposure to multiple chemicals was accounted for in the comparative analysis.

No additional areas for remediation were identified based on ISM sampling.

3.1.3 Determination of Remediation Areas

The 2009 field screening effort identified areas at two high potential buildings at Load Line 1 that exceeded the CUG for TNT (878 mg/kg). These areas were designated for future remediation excavation work as indicated on Figure 3-1. This figure also shows the field screening results. These two areas are summarized below:

- Building CB-4WN: This building was a wash out annex connected to the melt pour building CB-4. The TNT exceedance (2,630 mg/kg) was detected in the core taken from the northeast corner of the annex. The highest level of TNT in two other cores in the vicinity of the exceedance was 11 mg/kg. Therefore, extent of contamination within the building footprint has been defined, but there may be contamination outside the building

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	ND
003	19
004	ND
005 (3.5FT.)	2630

DEPTH INTERVAL	TNT CONC. MG/KG
001	13
002	ND
003	342
004	19
005 (4FT.)	ND

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	ND
003 (2FT.)	9.8

DEPTH INTERVAL	TNT CONC. MG/KG
001	5.6
002 (1FT.)	1.4

DEPTH INTERVAL	TNT CONC. MG/KG
001	0.9
002	ND
003	173
004 (2.5FT.)	7.4

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	2.4
003 (2FT.)	11

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	ND
003	1.2
004	ND
005 (4FT.)	7.9

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	3.8
003 (2FT.)	ND

DEPTH INTERVAL	TNT CONC. MG/KG
001	7.6
002	ND
003	ND
004 (3.5FT.)	3.7

DEPTH INTERVAL	TNT CONC. MG/KG
001	1.8
002	1.0
003	0.8
004 (3.5FT.)	0.8

DEPTH INTERVAL	TNT CONC. MG/KG
001	1.9
002	ND
003 (3FT.)	ND

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	33
003 (2.3FT.)	4520

DEPTH INTERVAL	TNT CONC. MG/KG
001	ND
002	ND
003 (2.4FT.)	432

LL1CB4-SB-058SN
LL1CB4-SB-059SN
LL1CB4WS-SB-047SN
LL1CB4WN-SB-061SN
LL1CB4-SB-057SN
LL1CB4WS-SB-046SN
LL1CB4WN-SB-060SN
LL1CB4-SB-056SN (ND)
CB-4
CB-4WN
LL1CB4-SB-055SN (ND)
LL1CB4-SB-054SN (ND)
CB-4VP1
LL1CB4VP1-SB-062SN
LL1CB4-SB-053SN (ND)
LL1CB4-SB-052SN (ND)
LL1CB4-SB-051SN (ND)
LL1CB4-SB-050SN
LL1CB4-SB-048SN (ND)
LL1CB4-SB-049SN (ND)
LL1CB4A-SB-043SN
LL1CB4A-SB-042SN
LL1CB4AWN-SB-044SN
LL1CB4A-SB-040SN (ND)
LL1CB4AWS-SB-031SN
LL1CB4A-SB-041SN (ND)
LL1CB4AWS-SB-030SN
CB-4AWS
LL1CB4AWN-SB-045SN (ND)
CB-4A
LL1CB4A-SB-039SN (ND)
LL1CB4A-SB-038SN (ND)
LL1CB4A-SB-037SN (ND)
LL1CB4AVP1-SB-029SN
CB-4AVP1
LL1CB4A-SB-036SN (ND)
LL1CB4A-SB-035SN (ND)
LL1CB4A-SB-034SN (ND)
LL1CB4A-SB-033SN (ND)
LL1CB4A-SB-032SN (ND)
1000
1000
1000
100

LEGEND

- FIELD SCREENING SAMPLE
- FOOTPRINT BUILDING
- ASPHALT ROAD
- WALKWAYS
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- CONTOUR (2 FT. INTERVAL)
- CONTOUR (10 FT. INTERVAL)
- TREE OR TREELINE
- PROPOSED EXCAVATION AREA, BASED ON FIELD SCREENING RESULTS
- ADDITIONAL OUTBUILDINGS
- VACUUM BAG HOUSE

US Army Corps of Engineers®

0 12.5 25 50
SCALE 1" ~ 50'

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
PLANNED EXCAVATION AREAS
BUILDINGS CB-4WN AND CB-4AWS
LOAD LINE 1

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:	PAGE No:
JSC	BP	13812319	10/25/10	3-1	3-4

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Excavation Sampling Load Line 1\Ravenna-Figure 3-1 Planned Excavation Areas - LL1 Buildings CB4-CB4A.dwg User: jessica_cotton Jan 03, 2011 - 11:41am

footprint in the easterly direction. The TNT exceedance occurred in the 3.5 ft bgs sampling interval, which was the deepest sample collected and analyzed. Based on this information, the removal area is estimated to be approximately 20 feet by 20 feet by 5 feet deep.

- Building CB-4AWS: This building was a washout annex connected to the melt pour building CB-4A. The TNT exceedance (4,520 mg/kg) occurred in the core taken from the northern portion of the footprint. The TNT CUG was exceeded in the deepest interval screened (2.3 feet). Figure 3-1 indicates an area approximately 20 feet by 20 feet by 5 feet deep that required excavation.

The confirmatory sampling conducted at the buildings at Load Line 1 confirmed that no further areas required remediation.

This section describes the tasks performed to complete the remedial activities at Load Line 1. The tasks conducted by URS consisted of the excavation and off-site disposal of contaminated surface and subsurface soils from two discrete areas as described in Section 3.1.3. The remedial activities were conducted in accordance with the approved Work Plan (URS, 2008 and 2009b).

4.1 PRE-MOBILIZATION AND MOBILIZATION ACTIVITIES

Prior to field sampling and excavations, a series of pre-mobilization activities were undertaken to ensure that all applicable requirements were met. These included obtaining any necessary permits, notifications to the RVAAP Facility Manager, Ohio EPA, the operating contractor, PIKA, Inc. (PIKA) or Vista Sciences, and other stakeholders.

4.1.1 Pre-Construction Activities

Pre-construction tasks included establishing soil stockpile areas, haul routes, equipment and vehicle decontamination stations, and the installation of engineering controls in accordance with the Storm Water Pollution Prevention Plan (SWP3) (URS, 2010). A visual survey of the excavation areas was conducted on September 20, 2010, by a qualified Unexploded Ordnance (UXO) Technician prior to any construction activities to ensure there were no visible fragments of energetic material that had surfaced. Areas planned for excavation were flagged at that time.

4.1.2 Required Permits

The SWP3 was developed to specify the storm water erosion and sediment (E&S) controls for the remediation activities at Load Lines 1, 2, and 3 as required under the Ohio EPA General Permit for Storm Water Discharges Associated with Construction Activities (Ohio EPA Permit No. OHC000003) (URS, 2010a). As part of the RVAAP permitting requirements, URS submitted a Notice of Intent (NOI) application and associated fee to the Ohio EPA to obtain coverage under the General Permit. URS prepared the NOI for BRACD, the agency responsible for management of environmental AOCs at RVAAP. The requirement for this General Permit is State law and mandatory for any project that disturbs 1 or more acres of ground. The approval for coverage under the Ohio EPA General Permit (OHC000003) was received March 24, 2010. The approval letter is included in Appendix A.

4.1.3 Backfill Source

Approved, clean backfill from an off-site source was required to restore the excavated areas to original grade. Soil samples from Patrick Excavating and Route 5 Sand and Gravel were collected on March 10, 2010, for use as possible backfill sources. The analytical results from soil located at Patrick Excavating did not exceed any CUG and was approved for use as backfill for the excavated areas. A summary of those data is included in Appendix B. Sample BF002 in Appendix B is the sample collected from Patrick Excavating.

4.1.4 Utility Clearance

Prior to intrusive excavation, any subsurface utilities identified as part of the slab removal effort were reviewed during the site walk over. No live utilities were present at either excavation area.

4.1.5 Establishment of Truck Routes

Designation of truck routes was established for incoming and outgoing vehicles in order to minimize any impact to either RVAAP or the surrounding communities. All truck routes utilized the gate at Post 1 for both entering and exiting RVAAP. Haul routes for Load Line 1 were initially determined in the SWP3. Field changes to these routes are shown on Figure C-1 in Appendix C. All roadways were kept clear of dirt and debris.

4.2 MOBILIZATION AND SITE PREPARATION

Mobilization and site preparation included the following:

- Verification of utility layout,
- Coordination with site security at Post 1,
- Review of job safety analysis (JSA) with field crews for the activities conducted,
- Established any environmental monitoring operations in accordance with the Health and Safety Plan (HASP),
- Installation and maintenance of E&S control measures and stockpile/laydown areas,
- Set up of on-site field screening laboratory,
- Inspection and transportation of construction equipment to the site,
- Assurance that all necessary equipment was on site and ready for use, and
- Set up of decontamination facilities for vehicles exiting the excavation areas and a temporary area for decontaminating sampling equipment and personnel.

URS did not disturb any heavily wooded areas during mobilization and site preparation activities; only grass/shrubs within and near former building footprints that were overgrown due to inactivity at the facility were removed. These disturbed areas were graded and seeded after construction activities were completed as described in Section 4.7.

4.2.1 Erosion Control

In accordance with the SWP3, E&S controls were accomplished by controlling runoff and then stabilizing soil. Diversion structures consisting of temporary earth dikes were formed upgradient of construction areas where the volume of overland flow was such that it was necessary to divert flow around disturbed portions of the Load Lines. As a best management plan, excavation operations were conducted in a manner to prevent muddy water, eroded materials and other undesirable constituents of project construction waters from being discharged through storm water runoff.

To protect nearby waterways and environmentally sensitive areas, silt fencing and straw bales were installed along the downgradient perimeter at all work areas. Silt fences were constructed of filter fabric that prevented the transport of silts, fines, and debris yet allowed passage of runoff. Selection and type of grade of fabric were made to allow adequate passage of water. Stakes used to construct silt fences were made of wood with squared butt ends and tapered driving points. Filter fabric was stapled to stakes. All silt fences were maintained and inspected throughout excavation and disposal activities and will be removed after their function has been fulfilled and before filing of the Notice of Termination (NOT). The locations of the silt fences are shown on the Figure C-1 in Appendix C. These figures include field changes made to the original SWP3 figures.

4.2.2 Stockpile Area

A soil stockpile/laydown area at each building footprint was constructed for excavated soil and fill material brought to RVAAP. The soil stockpile and lay down areas are shown on the figures within Appendix C. These figures include field changes made to the original SWP3 figures. The bottom of each stockpile was lined with two layers of 10 mil plastic and covered with a single layer of 10 mil plastic. Soil berms were placed around the perimeter of the stockpiles to prevent storm-water and silt runoff and run-on during stockpiling activities.

4.3 EXCAVATION

URS mobilized a crew consisting of a Site Supervisor, two equipment operators, a truck driver, UXO technician, and a laborer on September 20, 2010. The crew utilized an excavator, rubber-tired loader, and off-road dump truck to perform excavation, on-site transportation, and stockpiling activities. Excavations were conducted in identified areas to a visible clean. An additional one foot laterally and vertically were then excavated. The areas were observed and cleared by UXO personnel throughout the excavation process.

Field screening samples were collected for analysis of TNT. The samples were collected from the side walls, the excavation bottom, and any area that contained stained soil. If the concentrations were below the adjusted CUG (878 mg/kg), an additional 6” of soil was removed over the entire excavation. If any concentration was above the adjusted CUG, an additional foot

of soil was removed in the associated area and additional field screening samples were collected and evaluated until all TNT concentrations were below the adjusted CUG.

After the excavations were completed, two ISM samples were collected for each excavation. One ISM sample was collected from the floor of the excavation; the second ISM sample was collected from the side walls. Each ISM sample was analyzed for all chemicals listed in the IROD.

Once the ISM samples were obtained, the Global Positioning System (GPS) coordinates of each of the corners as well as the depths of the excavation were determined. The excavation areas were then backfilled to final grade with the approved clean fill and stabilized with permanent open area seed from Ohio Prairie Nursery mixed according to Ohio Army National Guard specifications.

Excavations for Load Line 1 were conducted from September 20 through 23, 2010. Excavated soils were stockpiled temporarily prior to transporting to an approved disposal facility. Approximately 359 cubic yards of contaminated soils were excavated to a maximum depth of 5 feet below ground surface. Table 4-1 summarizes the amount of soil excavated from each building footprint. Figures 4-1 and 4-2 illustrate the excavated areas and locations of the field screening and ISM samples. Field sampling forms and field sketches of the excavated areas are included in Appendix D.

An iron pipe wrapped in insulation was discovered on September 21, 2010, in the subsurface soils during excavating activities at CB-4A. The USACE, the BRACD Facility Manager, and Ohio EPA inspected the material on September 22, 2010, and identified the insulation as possible asbestos-containing material (ACM). A URS employee certified as a State of Ohio Asbestos Hazard Evaluation Specialist (ES33606) sampled the insulation on September 23, 2010. The samples were analyzed by URS Corporation, Salem, New Hampshire. The material was identified as 70% other fibrous material, 15% non-fibrous material, 10% cellulose, and 5% mineral wool. No asbestos was detected. The asbestos report is included in Appendix E.

During excavation activities control measures were not necessary to prevent airborne releases of dust due to frequent precipitation. Additionally, most of the haul routes were located on old rail beds that contained track ballast which also helped prevent the airborne releases of dust. Visual and real time monitoring for dust during excavation activities was done in accordance with the HASP (URS, 2008).

4.4 FIELD SCREENING SAMPLING

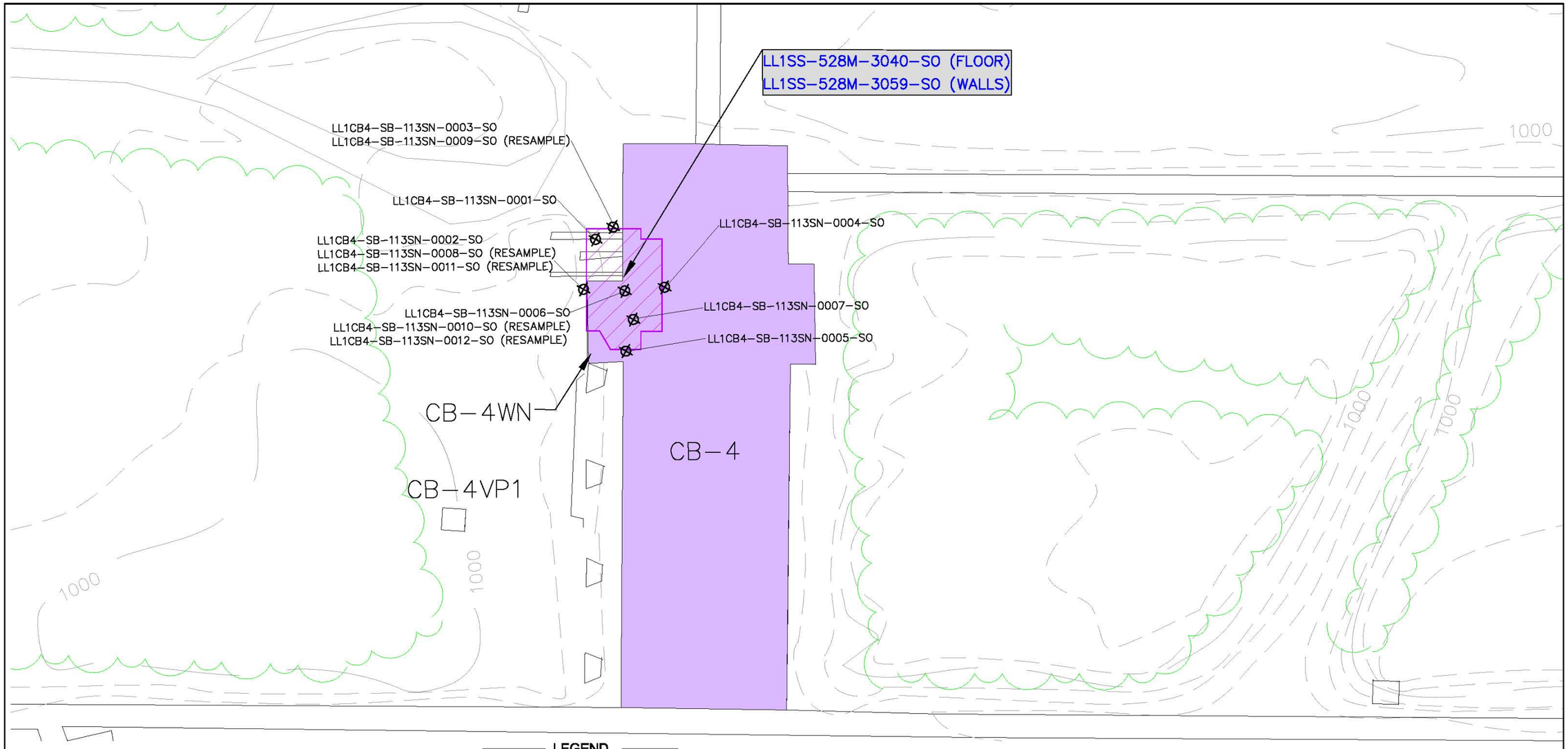
4.4.1 Sample Collection

The field screening was conducted in accordance with the *Facility-Wide Sampling and Analysis Plan* for the RVAAP (SAIC, 2001) and the approved Work Plan (URS, 2008 and 2009b). Field screening samples were collected from surficial earth fill or soil for analysis of TNT. In each

Table 4-1
Excavation and Backfill Summary for Load Line 1
Ravenna Army Ammunition Plant
Ravenna, Ohio

Building		Total Excavated[1] (Cubic Yards, CY)	Total Backfilled (Tons)
Load Line 1	CB-4 / -4WN	175.09	834.17
	CB-4A /-4AWS	184.17	897.74
	Total	**359.26**	**1731.91**

(1) Size and depth of excavations shown in field sketches in Appendix D. Appendix D also includes GPS coordinates of the excavated areas.



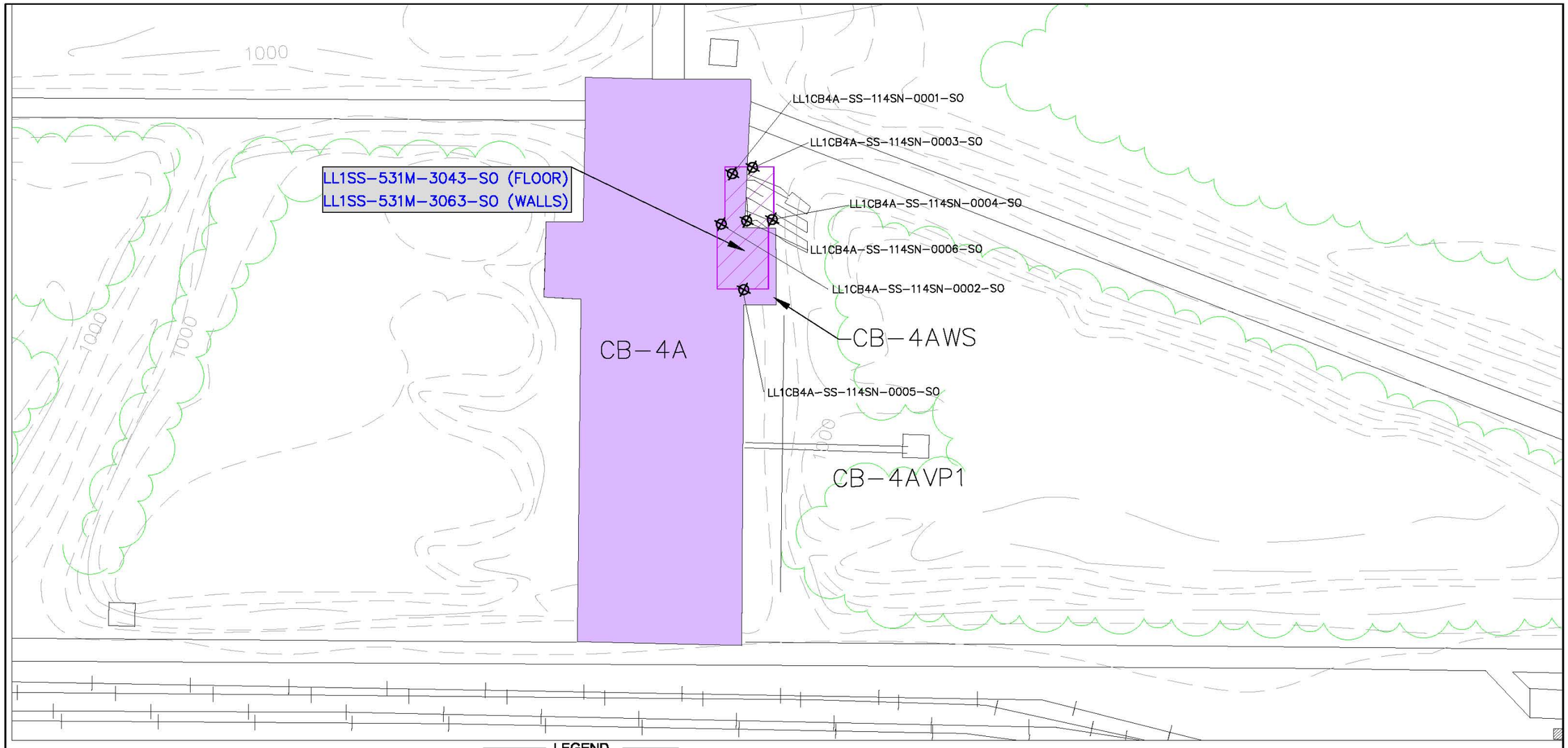
URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
EXCAVATION AREA
BUILDING CB-4WN
LOAD LINE 1

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:	PAGE No:
JSC	BP	13812319	10/25/10	4-1	4-6

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Excavation Sampling Load Line 1\Ravenna-Figure 4-1 LL1 Excavation Area - Building CB4.dwg User: jessica_cotton Jan 03, 2011 - 2:24pm



LEGEND

- BUILDING FOOTPRINT
- ASPHALT ROAD
- WALKWAYS
- GRAVEL ROAD
- RAILROAD TRACKS
- CONTOUR (2 FT. INTERVAL)
- CONTOUR (10 FT. INTERVAL)
- TREE OR TREELINE
- STEAM STANCHION
- EXCAVATION AREA
- ADDITIONAL OUTBUILDINGS
- VACUUM BAG HOUSE
- PRIMARY MI SAMPLE
- FIELD SCREENING SAMPLE

US Army Corps of Engineers®

0 10 20 40
SCALE 1" ~ 40'

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
EXCAVATION AREA
BUILDING CB-4AWS
LOAD LINE 1

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:	PAGE No:
JSC	BP	13812319	10/25/10	4-2	4-7

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Excavation Sampling Load Line 1\Ravenna-Figure 4-2 LL1 Excavation Area - Building CB4A.dwg User: jessica_cotton Dec 20, 2010 - 1:07pm

excavation a minimum of five samples was collected. One sample was collected from the floor of the excavation and the remaining four samples were collected from each side wall. Samples were also collected in any visually contaminated area. The samples were collected using a small-diameter (7/8" inside diameter) stainless steel step probe and placed in new, sealable plastic bags. Soil screening samples were collected from September 20 through 22, 2010. Field sampling forms are included in Appendix D.

Field screening instruments, including the spectrophotometer and balance, were calibrated daily before analysis. Field screening QC procedures included analyzing a laboratory control sample (LCS), a method blank extraction sample, and a field duplicate. The QC was performed at a frequency of one per 20 primary samples.

4.4.2 Sample Analysis

Ensys® test kits from Strategic Diagnostics, Inc. were used to determine the TNT concentrations in the collected samples. The concentration of TNT in each sample was determined by evaluating how much color (as measured by a spectrophotometer) was developed. Analysis was in accordance with the procedures in Appendix B of the Quality Assurance Project Plan (QAPP) Addendum within the approved Work Plan (URS, 2008). The range of the Ensys® test kit for TNT is between 1 and 30 mg/kg, with a relative standard deviation of 8%. The least detectable concentration is 0.7 mg/kg TNT. For TNT sample concentrations greater than 30 mg/kg the sample extract must be diluted with acetone and reanalyzed until the concentration is within the working range of the method. The dilution factor is then used in the calculation of the result. Appropriate quality control measures were maintained during the analyses, including calibration check standards, duplicate analyses, and method blanks.

The temporary field screening laboratory was equipped with materials to conduct the field screening operations on an as-needed basis to accommodate the sampling schedule. The work areas were covered with plastic to avoid contamination of testing process surface areas. The acetone used for the soil test extraction was stored in a storage cabinet (suitable for storing flammable materials) when not in use. The expended acetone/soil/water mix was stored in an approved 5-gallon container with containment in Building 1036. The extraction mix was consolidated into an approved 55-gallon waste fluid drum on an as-needed basis. The drum and all containers were appropriately labeled and staged for disposal.

Analyses were conducted from September 20 through 22, 2010. Field screening calculations and results are included in Appendix F.

4.4.3 Summary of Field Screening Results

The TNT CUG initially provided for this project is that listed in the IROD (Shaw, 2007). The level was established based on a National Guard Trainee scenario. The CUG established in the IROD for TNT is 1,646 mg/kg.

The statistical analysis of the correlation samples collected during the screening effort at Load Lines 2, 3, and 4 indicated a significant low bias in the screening samples relative to the fixed lab concentrations. Therefore, there was some potential for a false negative (i.e., determining the CUG was met when in fact it was exceeded) if the field screening result was measured between approximately 878 mg/kg and the TNT IROD CUG of 1,646 mg/kg. Therefore, an adjusted CUG of 878 mg/kg was adopted for this investigation. Any area where a TNT screening result was above 878 mg/kg was further excavated by removing an additional foot of soil. Table 4-2 summarizes the field screening detections

4.4.3.1 CB-4WN Excavation Area

Field screening exceedances of the adjusted TNT CUG of 878 mg/kg were observed at the west wall, north wall, and floor excavation locations. TNT was detected at concentrations of 13,647 mg/kg (sample LL1CB4-SS-113SN-0002-SO) along the western wall of the excavation, 16,198 mg/kg (sample LL1CB4-SS-113SN-0003-SO) along the northern wall of the excavation, and 3,356 mg/kg (sample LL1CB4-SS-113SN-0007-SO) from the floor of the excavation. The west wall, north wall, and the floor of the excavation were excavated an additional 12 inches and re-sampled. The TNT result for the north wall sample (sample LL1CB4-SS-113SN-0009-SO) was below the CUG. The western wall (sample LL1CB4-SS-113SN-0008-SO) and floor samples (sample LL1CB4-SS-113SN-0010-SO) contained TNT concentrations above the CUG, therefore, an additional 12 inches of soil were excavated from each location and re-sampled. The TNT results for both re-samples were below the CUG.

4.4.3.2 CB-4AWS Excavation Area

An exceedance of the adjusted TNT CUG of 878 mg/kg was observed under a pipe entering the northern wall of the excavation. TNT was detected at a concentration of 119,381 mg/kg (sample LL1CB4A-SS-114SN-0001-SO). The wall was excavated an additional 12 inches to the north and re-sampled (sample LL1CB4A-SS-114SN-0003-SO) with a detected TNT concentration of 328 mg/kg.

4.5 CONFIRMATORY SAMPLING

4.5.1 Sample Collection

The ISM sampling was conducted in accordance with the *Facility-Wide Sampling and Analysis Plan* for the RVAAP (SAIC, 2001) and the approved Work Plan (URS, 2008 and 2009b). The ISM sampling was completed after the field screening sampling, and samples were collected on September 21 and 22, 2010. Figures 4-1 and 4-2 provide the primary sample identifiers at each building footprint excavation. Table 4-3 summarizes the ISM sampling locations at the excavation areas. The ISM samples were collected from surficial earth fill or soil. Thirty subsamples were collected at each ISM location to provide a representative, repeatable approximation of the average concentration of a particular constituent within a designated area.

Table 4-2
Field Screening Results – Detections Only
Ravenna Army Ammunition Plant
Ravenna, Ohio

Sample ID	TNT, mg/kg (Adjusted Cleanup Goal: 878 mg/kg)
Load Line 1	
Building CB-4WN:	
LL1CB4-SS-113SN-0001-SO DIL 1	77
LL1CB4-SS-113SN-0001-SO DUP	91
LL1CB4-SS-113SN-0002-SO DIL 4	**13,647**
LL1CB4-SS-113SN-0003-SO DIL 4	**16,198**
LL1CB4-SS-113SN-0004-SO	15
LL1CB4-SS-113SN-0005-SO DIL 1	106
LL1CB4-SS-113SN-0006-SO DIL 2	**2,328**
LL1CB4-SS-113SN-0007-SO DIL 2	**3,356**
LL1CB4-SS-113SN-0008-SO DIL 3	**4,427**
LL1CB4-SS-113SN-0009-SO DIL 1	49
LL1CB4-SS-113SN-0010-SO DIL 2	**1,226**
LL1CB4-SS-113SN-0010-SO-DUP	709
LL1CB4-SS-113SN-0011-SO DIL 1	418
LL1CB4-SS-113SN-0012-SO DIL 1	163
LL1CB4-SS-113SN-0013-SO DIL 1	99
Building CB-4AWS:	
LL1CB4A-SS-114SN-0001-SO DIL 4	**119,381**
LL1CB4A-SS-114SN-0002-SO DIL 1	22
LL1CB4A-SS-114SN-0003-SO DIL 1	328
LL1CB4A-SS-114SN-0005-SO DIL 1	463
LL1CB4A-SS-114SN-0006-SO DIL 1	774
LL1CB4A-SS-114SN-0007-SO DIL 1	157
LL1CB4A-SS-114SN-0008-SO	17
LL1CB4A-SS-114SN-0008-SO DUP	15

Bold indicates cleanup goal exceedance.
ND: Nondetect result. The detection limit for TNT is 0.7 mg/kg.

Table 4-3
ISM Excavation Sampling Summary for Load Line 1
Ravenna Army Ammunition Plant
Ravenna, Ohio

Description					Sample ID	Analyses Required			
Sample Type	Building	Date	Time	Building Utilization and Sample Location		EXPL	MET	SVOCs	PCBs
Load Line 1	CB-4WN	9/21/2010	1100	Washout Annex for CB-4, Floor	LL1SS-528M-3040-SO	X	X	X	X
	CB-4WN	9/21/2010	1105	Washout Annex for CB-4,Walls	LL1SS-528M-3059-SO	X	X	X	X
QA Sample	CB-4WN	9/21/2010	1105	Washout Annex for CB-4,Walls	LL1SS-528M-3060-QA	X	X	X	X
Field ISM Duplicate	CB-4WN	9/21/2010	1105	Washout Annex for CB-4,Walls	LL1SS-528M-3061-SO	X	X	X	X
Blind Duplicate	CB-4WN	9/21/2010	1120	Washout Annex for CB-4,Walls	LL1SS-528M-3062-SO	X	X	X	X
	CB-4AWS	9/22/2010	830	Washout Annex for CB-4A, Floor	LL1SS-531M-3043-SO	X	X	X	X
	CB-4AWS	9/22/2010	832	Washout Annex for CB-4A, Walls	LL1SS-531M-3063-SO	X	X	X	X
MS	CB-4AWS	9/22/2010	832	Washout Annex for CB-4A, Walls	LL1SS-531M-3063-MS	X	X	X	X
MSD	CB-4AWS	9/22/2010	832	Washout Annex for CB-4A, Walls	LL1SS-531M-3063-MSD	X	X	X	X

Primary ISM Sample
Quality Assurance
Field ISM Duplicate
Blind Duplicate
MS/MSDs

In each excavation, two ISM samples were collected. One ISM sample was collected from 1 foot into the excavation floor; the second sample was collected from 1 foot into the four side walls.

The sample aliquots were collected using a small-diameter (7/8" inside diameter) stainless steel step probe. The individual aliquots were obtained by pushing the step probe sampler from 0 – 12" or until refusal. The sub-slab materials encountered were, in many cases, represented by a large percentage of large cobbles of rock and bedrock. These cobbles variably affected the sampling efforts by restricting the depth of sampling and recovery. At locations where refusal was encountered at less than 1.0 foot, at least five separate attempts were made to achieve the full sample depth. In all cases, multiple attempts were taken to collect each aliquot to depth and for recovery as needed. The entire volume of all aliquots was aggregated into a single field sample by placing the samples in a plastic-lined bucket. The entire sample was placed in a sealable plastic bag, secured, labeled, and then double bagged to increase the probability the sample would arrive at the lab intact. The sample was delivered to the analytical laboratory where the laboratory provided ISM sample preparation, consisting of air-drying, sieving, and grinding.

Three types of duplicate samples were collected for QC purposes: an ISM duplicate, a Quality Assurance (QA) laboratory sample, and a blind duplicate. The ISM and QA duplicates were two separate samples that were comprised of 30 subsample increments from the same locations as the primary ISM sample. The blind duplicate was a separate sample comprised of 30 subsample increments from different locations within the same sampling area as the primary ISM sample. The blind duplicate was collected after collecting the primary, ISM duplicate, and QA laboratory samples. All duplicate samples were collected at a frequency of one per ten primary samples.

Matrix spike and matrix spike duplicate sample analyses were also requested from the laboratory at a frequency of one per 20 primary samples. Field equipment rinsates for soil samples were collected at a frequency of one per week of ISM sampling.

Soil samples designated for QA/QC are also noted on Table 4-3.

Field sampling collection forms documenting each ISM sample collected are included in Appendix D. Appendix G contains a copy of the Chain of Custody and freight bill for the sampling event.

4.5.2 Sample Analysis

Analytical support for the ISM sampling effort was assigned to Microbac Laboratories, Inc. (Microbac) of Marietta, Ohio. The QA laboratory, contracted through the Louisville USACE, was CT Laboratories of Baraboo, Wisconsin. All ISM samples were analyzed for all the chemicals listed in the IROD.

4.5.3 ISM Sample Data Verification

Data verification of the ISM analytical data was conducted in accordance with Part II of the *Facility-Wide Sampling and Analysis Plan*, i.e., the Quality Assurance Project Plan (QAPP) (SAIC, 2001), the addendum to the QAPP in the approved Work Plan (URS, 2008), and the *Louisville Chemistry Guideline*, *Version 5* (LCG5) (USACE, 2002). The verification was conducted in two stages using both an automated data review application and a manual review process. The Automated Data Review (ADR) software application was obtained from Laboratory Data Consultants, Inc. upon authorization from USACE and was used for the first stage of data verification. The ADR software evaluated the analytical data provided in laboratory electronic deliverable files by comparing project-specific method quality objectives for the following elements and applying data qualifiers as appropriate:

- Cooler temperature,
- Holding times (extraction and analysis),
- Units of measure and detection limits,
- Analyte lists,
- Method blank, trip blank, and equipment blank results,
- Laboratory data qualifiers,
- Laboratory Control Sample (LCS) results,
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) results,
- Lab duplicate sample results,
- Field duplicate sample results,
- Surrogate recoveries (where applicable),
- Initial Calibrations, and
- Initial and Continuing Calibration Verification standards.

Subsequent to the automated review, URS chemists performed the second stage of data verification: confirming that data qualifiers were applied appropriately and manually evaluating information not checked by ADR. The information reviewed in this second stage included:

- Chain-of-Custody and sample login documents,
- Any nonconformances or analytical problems noted in the report narratives,
- Concentration of spikes relative to the parent sample concentrations,
- Concentration of duplicate samples relative to the sample reporting limits,

- Initial and Continuing Calibration Blank results,
- Method Reporting Limit (MRL) standard recoveries,
- Second column confirmation analyses, and
- Sample dilutions.

Based on the ADR and manual reviews, some sample results were qualified as estimated due to minor exceedances of QC criteria (primarily duplicate precision limits). These results are flagged "J" (estimated) and are considered useable for meeting project objectives. No QC nonconformances were severe enough to warrant the qualification of associated results as unuseable.

4.5.3.1 Accuracy and Precision

The method quality objectives for accuracy and precision of laboratory analytical data are specified in the Facility-Wide QAPP and LCG5. Analytical accuracy is expressed as the percent recovery of an analyte that has been added to a blank sample or environmental sample at a known concentration before analysis. Accuracy was determined through the use of MS and LCS analyses. The percent recovery for each spiked analyte was calculated to establish the accuracy of the analysis performed compared to the method quality objectives. Analytical precision was determined through the comparison of MS/MSD pair or positive laboratory duplicate pair results. The relative percent difference (RPD) between the two results was calculated to establish the precision of the analysis performed compared to the method quality objectives. No excursions of recoveries and RPDs outside of the QC control limits were observed. Overall, acceptable levels of analytical accuracy and precision were achieved.

Aggregate sample collection, preparation, and analytical precision was assessed through the analysis of two types of field duplicates. An ISM Duplicate was collected from locations as close as possible to the same increment locations used to collect the primary sample, thereby assessing the precision of individual increment collection plus sample preparation, extraction/digestion, and analysis. A Blind Duplicate was collected from the same area (i.e., excavation walls) as the primary sample, but using 30 new increment locations, thereby assessing the precision of the ISM sampling protocol as applied to a given area, along with sample preparation, extraction/digestion, and analysis. Aggregate precision was determined as the RPD (a) between the primary sample and the Field ISM Duplicate and (b) between the primary/ISM Duplicate average and the Blind Duplicate.

A summary of the field duplicate results and project-specific precision is presented in Table 4-4 by parameter group and analyte. The table lists detected chemicals only, and RPDs are shown only when both concentrations are greater than five times the reporting limit, as required by the Facility-Wide QAPP. When one or more concentration is less than five times the reporting limit, the relative difference (the absolute difference divided by the reporting limit) is shown. Acceptable precision, according to the Facility-Wide QAPP, is demonstrated by an RPD of 50% or less, or a relative difference of 100% or less.

Table 4-4
Assessment of Duplicate Samples - CB-4WN (Walls)
Ravenna Army Ammunition Plant
Ravenna, Ohio

	Building	CB-4WN (Walls)			Average of Primary & MI Dup	RPDs (for conc >5x RL)		Relative Diff. (Conc <5xRL)	
	Sample ID	LL1SS-528M-3059-SO	LL1SS-528M-3061-SO	LL1SS-528M-3062-SO		Primary & MI Duplicate	Avg & Blind Dup	Primary & MI Duplicate	Avg & Blind Dup
	Date Collected	06/22/10	06/22/10	06/22/10					
Parameter	Reporting Limit	(Primary)	(MI Dup)	(Blind Dup)					
Explosives, mg/kg:									
2,4,6-Trinitrotoluene	0.25	**51.7 J**	**17.2 J**	**16.7 J**	**34.5 J**	100%	69%		
PAHs, µg/kg:									
Benzo(a)anthracene	165	658	615	581	637			26%	34%
Benzo(a)pyrene	165	594	574	552	584			12%	19%
Benzo(b)fluoranthene	165	532	571	567	552			24%	9%
Dibenz(a,h)anthracene	165	96.6 J	82.5 U	93.3 J	68.9 J			9%	36%
					Average:	NA	NA	18%	25%
PCBs, µg/kg:									
Aroclor-1254	16.5	**566 J**	**3010 J**	**2410 J**	**1788 J**	137%	30%		
Metals, mg/kg:									
Aluminum	20	**4,600**	**4,770**	**4,520**	**4,685**	3.6%	3.6%		
Antimony	0.5	0.354 J	0.592	0.384 J	0.47 J			47.6%	18%
Arsenic	0.3	**7.24**	**9.77**	**8.23**	**8.51**	30%	3.3%		
Barium	0.5	**42.8**	**44.9**	**36.1**	**43.9**	4.8%	19%		
Cadmium	0.1	0.0988	0.125	0.161	0.112			26.2%	49%
Chromium, Total	0.25	**19.2**	**17**	**15.8**	**18.1**	12%	14%		
Lead	0.2	**35.2**	**56.4**	**49.5**	**45.8**	46%	8%		
Manganese	0.5	**348**	**393**	**317**	**371**	12%	15.6%		
					Average:	18%	11%	36.9%	33%

Note: Concentrations >5x RL are **bolded**. RPD is applicable only if both concentrations are >5x RL.

U = The analyte was analyzed for, but was not detected. Value shown is the sample reporting limit.
J = Estimated concentration because the result was below the sample reporting limit or quality control criteria were not met.
NA = Not applicable.

RPD exceeds 50%.

The field duplicate tables illustrate that precision for the majority of analytes met the project criteria. Chemicals with exceedances are noted as follows:

Chemical	Number of Duplicate Pairs Analyzed	Number of Duplicate Pairs Exceeding Criteria	
		ISM Duplicates	Blind Duplicates
2,4,6-Trinitrotoluene	1	1	1
Aroclor-1254	1	1	0

4.5.3.2 Completeness, Representativeness, and Comparability

Completeness is a measure of the amount of valid (i.e., not rejected) data obtained from a measurement system compared to the amount expected to be obtained under ideal conditions. The overall project completeness goal identified in the Facility-Wide QAPP is 90% for each parameter group. Since no analytical results were rejected, the percentage of valid results for the soil analyses ranged was 100%, thus meeting the project goal.

Representativeness expresses the degree to which data accurately and precisely represent actual environmental conditions. Representativeness is a qualitative parameter that depends greatly upon the proper design of the sampling program and proper laboratory protocol. It is evaluated using holding time criteria, which reflect the length of time after sample collection that a sample or extract remains representative of environmental conditions, and by analysis of laboratory method blanks, trip blanks, and equipment blanks, which are used to identify sources of contamination not associated with environmental conditions. The aggregate sampling and analytical precision determined by the field duplicate results is also an indicator of data representativeness. Holding times were not exceeded for any soil analyses, the blanks associated with project samples were free of contamination, and overall field duplicate precision was acceptable. The weight of evidence leads to the conclusion that representativeness was adequate, sufficient, and acceptable (as opposed to inadequate or unsatisfactory).

Comparability of the project data with historical data sets was satisfied by ensuring that the Facility-Wide QAPP and the project-specific QAPP addendum were followed, proper sampling techniques were used, and appropriate analytical procedures were followed.

The data collected from the excavation areas at Load Line 1 can be trusted to make remediation decisions.

4.5.3.3 Sensitivity

Except where affected by sample dilutions, the laboratory detection limits were consistent with those stated in Appendix A of the project-specific QAPP. For all chemicals, the reporting limits were below the CUGs.

4.5.4 ISM Sample Data Validation

MEC^x performed data validation for both the primary laboratory (Microbac Laboratories, Inc.) and the QA laboratory (CT Laboratories). The QA sample analyzed by CT was validated at Level III (does not include review of the raw data), 10% of the primary samples analyzed by Microbac were validated at Level IV (includes a review of the raw, data, including verification of compound identification and quantitiation), and the remaining samples analyzed by Microbac were assessed by ADR. The purpose of the validation is to independently determine the useability and bias of the analytical data. Both the Data Validation Report (DVR) and the Chemical Quality Assurance Report (CQAR) are provided in Appendix H.

No significant concerns were identified by MEC^x for the Microbac data set; no data were rejected. Several concerns were identified for the CT data set. Some data were rejected for poor MS/MSD or LCS recoveries. The rejected compounds, however, were not constituents of concern. MEC^x compared primary and QA sample results from 22 pairs of data points. Of those, five pairs of positive detections (representing 22.7% of the data) exceeded the control limits for precision. MEC^x concluded that since only one split sample was collected, there was insufficient data collected for the outliers to be statistically significant. The data set as a whole was therefore considered useable. No additional qualification of the data based on the independent data validation was necessary.

4.5.5 Summary of ISM Results

Four primary ISM samples, one ISM Duplicate, and one Blind Duplicate were collected from the 0-1 foot interval (into the walls and excavation floor) and analyzed by Microbac. Table 4-5 summarizes the analytical results by sampling location.

Explosives: TNT was detected in all six ISM samples at concentrations ranging from 16.7 mg/kg to 121 mg/kg. The maximum concentration was found in the excavation floor sample collected from CB-4WN. RDX was only detected in the two samples collected from CB-4WS, with a minimum concentration of 4.88 mg/kg in the wall sample and a maximum of 14.5 mg/kg in the excavation floor sample.

PAHs: PAHs were detected in all six ISM samples at concentrations ranging from a minimum of 84 µg/kg (benzo(a)anthracene in the excavation floor sample from CB-4WN) to a maximum of 658 µg/kg (benzo(a)anthracene in the wall sample from CB-4WN).

PCBs: Aroclor 1254 was detected in all six ISM samples at concentrations ranging from 566 µg/kg to 4580 µg/kg. The highest concentration was detected in the sample collected from the excavation floor at CB-4WS. No other Aroclors were detected in the samples.

Metals: Aluminum, arsenic, barium, cadmium, chromium (total), lead, and manganese were detected in all six ISM samples. The maximum concentration of arsenic, 9.77 mg/kg, was detected in the ISM Duplicate excavation wall sample collected at CB-4WN; and the maximum concentration of lead, 71.6 mg/kg, was detected in the excavation floor sample from CB-4WS. Antimony was detected in five of the six ISM samples, with a maximum concentration 0.592

Table 4-5
Analytical Data Summary and Comparison to Cleanup Goals
Ravenna Army Ammunition Plant
Ravenna, Ohio

		Building	CB-4WN, Floor	CB-4WN, Walls	CB-4WN, Walls	CB-4WN, Walls	CB-4AWS, Floor	CB-4AWS, Walls
		Sample ID	LL1SS-528M-3040-SO	LL1SS-528M-3059-SO	LL1SS-528M-3061-SO	LL1SS-528M-3062-SO	LL1SS-531M-3043-SO	LL1SS-531M-3063-SO
		Date Collected	09/21/10	09/21/10 (Primary)	09/21/10 (MI Dup)	09/21/10 (Blind Dup)	09/22/10	09/22/10
Parameter	**Units**	**CUG[1]**						
Explosives:								
2,4,6-Trinitrotoluene (TNT)	mg/kg	1,646	**121**	**51.7 J**	**17.2 J**	**16.7 J**	**37.8**	**18.9**
RDX	mg/kg	838	0.0992 U	0.0988 U	0.0994 U	0.0995 U	**14.5**	**4.88 J**
PAHs:								
Benzo(a)anthracene	ug/kg	105,000	**84 J**	**658**	**615**	**581**	**283**	**146 J**
Benzo(a)pyrene	ug/kg	10,000	83.2 U	**594**	**574**	**552**	**244**	**125 J**
Benzo(b)fluoranthene	ug/kg	105,000	83.2 U	**532**	**571**	**567**	**232**	**119 J**
Dibenz(a,h)anthracene	ug/kg	10,000	83.2 U	**96.6 J**	82.5 U	**93.3 J**	87 U	85 U
PCBs:								
Aroclor-1016	ug/kg	NA	8.6 U	8.14 U	8.32 U	8.66 U	8.51 U	7.79 U
Aroclor-1221	ug/kg	NA	8.6 U	8.14 U	8.32 U	8.66 U	8.51 U	7.79 U
Aroclor-1232	ug/kg	NA	8.6 U	8.14 U	8.32 U	8.66 U	8.51 U	7.79 U
Aroclor-1242	ug/kg	NA	8.6 U	8.14 U	8.32 U	8.66 U	8.51 U	7.79 U
Aroclor-1248	ug/kg	NA	8.6 U	8.14 U	8.32 U	8.66 U	8.51 U	7.79 U
Aroclor-1254	ug/kg	35,000	**2530**	**566 J**	**3010 J**	**2410 J**	**4580**	**2200**
Aroclor-1260	ug/kg	NA	8.6 U	8.14 U	8.32 U	8.66 U	8.51 U	7.79 U
Metals:								
Aluminum	mg/kg	34,942	**1,900**	**4,600**	**4,770**	**4,520**	**3,230**	**2,510**
Antimony	mg/kg	2,458	0.251 U	**0.354 J**	**0.592**	**0.384 J**	**0.331 J**	**0.291 J**
Arsenic	mg/kg	31	**4.8**	**7.24**	**9.77**	**8.23**	**8.27**	**7.83**
Barium	mg/kg	3,483	**14.6**	**42.8**	**44.9**	**36.1**	**35.9**	**22.7**
Cadmium	mg/kg	109	**0.134**	**0.0988**	**0.125**	**0.161**	**0.14**	**0.0634 J**
Chromium, Trivalent[2]	mg/kg	120,000	**19.7**	**19.2**	**17**	**15.8**	**17.7**	**15.1**
Chromium, Hexavalent	mg/kg	16	0.499 U	0.249 U	0.0997 U	0.252 U	0.251 U	0.487 U
Lead	mg/kg	1,995	**28.5**	**35.2**	**56.4**	**49.5**	**71.6**	**53.7**
Manganese	mg/kg	1,800	**194**	**348**	**393**	**317**	**460**	**352**

U = The analyte was analyzed for, but was not detected. Value shown is the sample reporting limit.

J = Estimated concentration because the result was below the sample reporting limit or quality control criteria were not met.

Bold = Detected concentration

(1) Interim Record of Decision Cleanup Goal for a National Guard Trainee (Shaw 2007).

(2) Concentrations for trivalent chromium are the total chromium results reported by the laboratory since no hexavalent chromium was detected. The value shown in the "CUG" column is the May 2010 USEPA Regional Screening Level (RSL).

mg/kg in the ISM Duplicate excavation wall sample collected at CB-4WN. Hexavalent chromium was not detected in any samples.

4.6 LOAD LINE 1 SOIL STOCKPILE MAINTENANCE AND REMOVAL

Stockpile locations were inspected daily or after ½ inches of rainfall during the excavation activity to ensure their integrity was maintained. Repairs to the plastic or securing system were made immediately if necessary. The cover was secured to prevent any damage to the plastic or wind erosion of the material. Soil berms were placed around the perimeter of the stockpile to prevent storm-water runoff and run-on.

Waste characterization was dictated by the requirements of the disposal facility and was based on waste characterization data from the Load Line 2 and 3 stockpiles. The Load Line 3 and Load Line 2 stockpiles were sampled for waste characterization on June 16, 2010, and June 24, 2010, respectively. Samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) SVOCs, TCLP metals, explosives, and total PCBs. Waste characterization data are included in Appendix B.

A total of 513 tons of contaminated soil were removed and disposed at the Central Waste Landfill in Alliance, Ohio. The CB-4 stockpile was removed on September 23, 2010, and the CB-4A stockpile was removed on September 27, 2010. The soil stockpiles were loaded directly into off-road dump trucks for transport and disposal to the Central Waste Landfill. The stockpile areas were graded and stabilized by applying an OHARNG approved open area seed mix.

Truckloads and landfill weights for each stockpile are provided in Table 4-6. Waste manifests and weight tickets are included in Appendix I.

4.7 DECONTAMINATION

Decontamination of field equipment associated with either the field screening or confirmatory sampling was conducted in accordance with the FWSAP (SAIC, 2001). Equipment was decontaminated after completion of sampling activities at each ISM or field screening location. A temporary decontamination area was constructed to facilitate decontamination of the push probes and other associated equipment and personnel. The location and layout of the field decontamination area was determined by the URS Technical Project Manager and the Site Safety and Health Officer. An additional decontamination area was located in Building 1036 and was used to decontaminate soil sampling equipment.

Excavation and transportation equipment were decontaminated in a designated area at the load line adjacent to the excavation area. The decontamination consisted of a dry scrape with collection of the scrapings and a steam cleaner washing of the portions of the equipment directly exposed to the contaminated soils. Decontamination fluids were collected for disposal with the liquid Investigation-Derived Waste (IDW).

Table 4-6
Soil Disposal Summary for Load Line 1
Ravenna Army Ammunition Plant
Ravenna, Ohio

Load No.	Disposal Date	Time In	Time out	Type of Waste	Source	Date of Generation	Transporter	Trailer No.	Disposal Facility	Manifest Document No.	Weight (Tons)
1	9/23/2010	730	741	Non Haz	LL1-CB4	9/20/2010	Patrick	246	Central Waste	166	20.53
2	9/23/2010	740	758	Non Haz	LL1-CB4	9/20/2010	Patrick	219	Central Waste	167	28.08
3	9/23/2010	800	808	Non Haz	LL1-CB4	9/20/2010	Patrick	243	Central Waste	168	26.54
4	9/23/2010	803	819	Non Haz	LL1-CB4	9/20/2010	Patrick	244	Central Waste	169	21.69
5	9/23/2010	933	945	Non Haz	LL1-CB4	9/20/2010	Patrick	246	Central Waste	170	25
6	9/23/2010	935	1003	Non Haz	LL1-CB4	9/20/2010	Patrick	219	Central Waste	171	26.91
7	9/23/2010	946	1018	Non Haz	LL1-CB4	9/20/2010	Patrick	243	Central Waste	172	29.66
8	9/23/2010	1133	1143	Non Haz	LL1-CB4	9/20/2010	Patrick	246	Central Waste	173	26.05
9	9/23/2010	1130	1147	Non Haz	LL1-CB4	9/20/2010	Patrick	219	Central Waste	174	26.53
10	9/23/2010	1145	1205	Non Haz	LL1-CB4	9/20/2010	Patrick	243	Central Waste	175	19.03
11	9/27/2010	714	726	Non Haz	LL1-CB4A	9/21/2010	Patrick	246	Central Waste	177	26.27
12	9/27/2010	718	738	Non Haz	LL1-CB4A	9/21/2010	Patrick	219	Central Waste	178	27.64
13	9/27/2010	722	749	Non Haz	LL1-CB4A	9/21/2010	Patrick	243	Central Waste	179	32.93
14	9/27/2010	753	802	Non Haz	LL1-CB4A	9/21/2010	Patrick	236	Central Waste	180	26.79
15	9/27/2010	756	818	Non Haz	LL1-CB4A	9/21/2010	Patrick	244	Central Waste	181	30.79
16	9/27/2010	912	921	Non Haz	LL1-CB4A	9/21/2010	Patrick	246	Central Waste	182	32.62
17	9/27/2010	917	941	Non Haz	LL1-CB4A	9/21/2010	Patrick	219	Central Waste	183	32.1
18	9/27/2010	933	1001	Non Haz	LL1-CB4A	9/21/2010	Patrick	243	Central Waste	184	29.45
19	9/27/2010	957	1018	Non Haz	LL1-CB4A	9/21/2010	Patrick	236	Central Waste	185	24.59

CB-4 Stockpile Total	250.02
CB-4A Stockpile Total	263.18
Total	**513.20**

4.8 SITE RESTORATION

Following soil removal activities, URS restored the two excavated areas and adjoining footprints CB-4, CB-4A, CB-4VP1, and CB-4AVP1 with approved clean backfill from Patrick Excavating. Approximately 1,732 tons of soil was backfilled into the excavations and adjoining footprints. Building footprints CA-6, CA-6A, CB-10VP1, CB-10VP2, CB-10VP3, CA-28, and CA-28A were also restored with 128 tons of soil. The areas were restored to original grade and were stabilized September 27, 2010, with permanent open area seed from Ohio Prairie Nursery.

Only noninvasive species were used for soil stabilization efforts and the type of seed used for the various areas was in accordance with the requirements in the URS Work Plan, meeting Ohio National Guard specifications. For nonvegetative cover, URS placed straw in unprotected areas. Structural soil stabilization included land grading to provide erosion and runoff control.

4.9 DEMOBILIZATION

Demobilization activities included inspection and repair of straw bales/silt fences and soil berms surrounding the former excavation and stockpile areas. The construction equipment, field equipment and supplies were decontaminated and taken off site. The decontamination station in Building 1036 was cleaned and disassembled.

4.10 WASTE MANAGEMENT AND DISPOSAL

All IDW was segregated, handled, labeled, characterized, managed, and disposed in accordance with federal, state, and local rules, regulations, and laws, and Section 7.0 of the FWSAP. The waste was temporarily stored within Bldg. 1036 and disposed of on September 27, 2010.

The IDW was segregated by type of medium and was containerized as follows:

- Water used to decontaminate sampling equipment and personal protective equipment was containerized in DOT-approved, 55-gallon steel drums and staged at the temporary waste accumulation area pending sample and waste characterization analysis.

- Decontamination and extraction fluids including acid, methanol, and acetone were containerized in DOT-approved, 55-gallon steel drums and staged at the temporary waste accumulation area pending sample and waste characterization analysis.

All shipments of IDW off site were coordinated through the RVAAP Environmental Coordinator. Disposition was based on the results of the laboratory analyses for the bulk

quantity in accordance with all federal, state and local rules, laws and regulations. Labeling of all IDW containers was in accordance with Section 7.2 of the FWSAP.

Disposal of waste, trash, and other materials off the project site was in accordance with all applicable federal, state, and local rules, regulations, and laws and Section 7.0 of the FWSAP.

4.11 PERFORMANCE STANDARDS

The analytical data collected during ISM soil sampling were evaluated by comparison to the soil CUGs listed in the IROD (Shaw, 2007), established based on a National Guard Trainee scenario, for those chemicals considered SRCs for Load Lines 1 through 4. Table 4-5 lists the CUGs, as well as the concentrations of all analytes in the confirmation samples.

The ISM samples were analyzed for both total chromium and hexavalent chromium. Hexavalent chromium was not detected in any samples; therefore, the total chromium result for each sample was considered representative of trivalent chromium. Since the IROD does not specify a CUG for trivalent chromium, the RSL for trivalent chromium (USEPA, 2010) was used for comparison purposes.

Table 4-5 shows that all ISM sample chemical concentrations are below their corresponding CUGs.

4.12 EVENT CHRONOLOGY

The following is the chronology of events during the remediation activities at Load Line 1.

Date	Event
September 20, 2010	Silt fence installations at CB-4WN and CB-4AWS. Soil stockpile pad constructed at CB-4 and CB-4A. CB-4 excavation begins.
September 21, 2010	Continue CB-4WN excavation (175 CY). Excavation backfilled. Excavation at CB-4AWS. Metal pipe with insulation discovered under concrete foundation.
September 22, 2010	Continue CB-4AWS excavation (184 CY). Excavation backfilled.
September 23, 2010	CB-4WN stockpile transported and disposed off site. CB-4AWS pipe insulation collected and analyzed for possible asbestos. Cleaned and removed equipment from Building 1036.

Date	Event
September 27, 2010	CB-4AWS stockpile transported and disposed off site. Final grading and seeding of excavation areas and footprints CB-4, CB-4A, CB-4VP1, CB-4AVP1, CA-6, CA-6A, CB-10VP1, CB-10VP2, CB-10VP3, CA-28, and CA-28A. Heavy equipment decontaminated.
September 28, 2010	Equipment taken off site.

4.13 INSPECTIONS

Daily inspections were performed in active work areas to ensure proper performance of run-on and run-off controls. A minimum of weekly and as-needed inspections was made of inactive, nonvegetated, disturbed areas to ensure that the berms and sediment fences were functioning properly. Inspections were made within 24-hours after any storm event greater than ½ inch of rain per 24-hour period and on a daily basis during extensive periods of rainfall. The following inspection and maintenance practices were used to maintain E&S controls:

- Silt fences were inspected for depth of sediment, for tears, to see if fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.

- Temporary and permanent seeding was inspected for bare spots, washouts, and healthy growth.

- The stabilized construction entrance was inspected for sediment tracked on the road, for clean gravel, and to make sure the culvert beneath the entrance is working, and that all traffic uses the stabilized entrance when leaving the site.

- Paved streets along the load line haul route were inspected and maintained as required to remove any mud, dirt, rock or other materials originating from the work areas.

Maintenance and inspection forms used are included in Appendix J. The inspection report was made after each inspection. A copy of the report form was completed by the field superintendent or his qualified designee. Completed forms were maintained on site during the entire construction effort.

A final inspection was conducted on September 27, 2010. The two remediated excavation areas and former stockpile locations were inspected to determine if all Work Plan requirements had been met. The inspection was conducted by the RVAAP Environmental Coordinator and representatives from Ohio EPA and USACE. The URS Field Team leaders also participated. No outstanding or unresolved issues were observed except that vegetation had not yet established after seeding.

The confirmatory ISM sampling conducted at two excavated building footprints at Load Line 1 has confirmed that the excavated areas have been remediated. The ISM sample concentrations for all chemicals with CUGs established in the IROD were below the CUGs. Therefore, the soils below the removed building slabs at Load Line 1 are not a concern for human health based on the future land use of the load lines as a vehicle maneuver area for National Guard Training. The excavated and adjoining areas as well as other high potential buildings were restored to original grade and were stabilized with permanent open area seed.

SAIC. 2001. Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna army Ammunition Plant, Ravenna, Ohio. Prepared for the U.S. Army Corps of Engineers, Louisville District. March 2001.

SAIC. 2008. Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio. Draft. Prepared for the U.S. Army Corps of Engineers, Louisville District. September 2008.

Shaw. 2004. Shaw Environmental, Inc. Final Phase II Remedial Investigation Report for Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio. July 2004.

Shaw. 2007. Shaw E&I. Interim Record of Decision for the Remediation of Soils at Load Lines 1 through 4 at the Ravenna Army ammunition Plant, Ravenna, Ohio. January 2007.

URS. 2008. URS Group, Inc. Final of the Work Plan for the Sampling of Soils Below Floor Slabs at LLs-2,3,4 and Excavation and Transportation of Contaminated Soils to Load Line 4 (Buildings G-1, G-1A, and G-3). Prepared for the U.S. Army Corps of Engineers, Louisville District. Final. May 29, 2008.

URS. 2009a. URS Group, Inc. Final Sampling and Screening Analysis of Soils Below Floor Slabs at RVAAP-09 Load Line 2, RVAAP-10 Load Line 3, and RVAAP-11 Load Line 4. Prepared for the U.S. Army Corps of Engineers, Louisville District. Final. July 15, 2009.

URS. 2009b. URS Group, Inc. Final Work Plan Addendum #1 for the Sampling of Soils Below Floor Slabs and Remediation at RVAAP-08 Load Line 1 and Other Building Locations. Prepared for the U.S. Army Corps of Engineers, Louisville District. Final. August 3, 2009.

URS. 2010a. Storm Water Pollution Prevention Plan for the Remediation of Sub-Slab Soils at Load Line 1 (RVAAP-08), Load Line 2 (RVAAP-09), and Load Line 3 (RVAAP-10). March 2010.

URS. 2010b. Final Sampling and Analysis of Soils Below Floor Slabs at RVAAP-08 Load Line 1 and Other Building Locations. Prepared for the U.S. Army Corps of Engineers, Louisville District. Final. September 17, 2010.

US Army. 2008. Letter from Thomas E. Lederle (BRACD) to Bonnie Buthker (Ohio EPA). January 7, 2008.

USACE. 2002. United States Army Corps of Engineers. Louisville Chemistry Guideline. Version 5. Prepared by the Environmental Engineering Branch, Louisville District. June 2002.

USEPA. 2010. United States Environmental Protection Agency. Regional Screening Levels for Chemical Contaminants at Superfund Sites. Accessed July 2010. Available at: http://www.epa.gov/region09/superfund/prg/rsl-table.html. Most recent update, May 2010.

APPENDIX A

NOI Approval Letter

OhioEPA
State of Ohio Environmental Protection Agency

STREET ADDRESS:
Lazarus Government Center
50 W. Town St., Suite 700
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184
www.epa.state.oh.us

MAILING ADDRESS:
P.O. Box 1049
Columbus, OH 43216-1049

URS GROUP INC
JO ANN BARTSCH
1375 EUCLID AVE
CLEVELAND OH 44115

3/24/2010

RE: Approval for coverage under Ohio EPA General Permit OHC000003
STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY.

Dear Applicant:

The Ohio Environmental Protection Agency has received a Notice of Intent (NOI) □for coverage under the above referenced general permit for:

Facility Name: RAVENNA ARMY AMMUNITION PLANT LOAD LINES 1,2,3
Facility Street / Location: 8451 SR 5
County: PORTAGE, TRUMBULL
City(ies) and Township(s): RAVENNA ;
Ohio EPA Facility Permit Number: 3GC04849*AG

This site/facility is approved for coverage under the above referenced Ohio EPA construction general permit (CGP). Please use your Ohio EPA facility permit number in all future correspondences. Please familiarize yourself with your permit. The permit contains requirements and prohibitions with which you must comply. Coverage remains in effect until a renewal general permit is issued and Ohio EPA has contacted you in writing instructing you to request continuing permit coverage.

Be aware that if more than one operator, as defined in the permit, will be engaged at a site, each operator shall seek coverage under the general permit. One operator shall submit an NOI and the additional operator(s) shall submit a Co-permittee NOI. Co-Permittees are covered under the same facility permit number. There is no fee associated with the Co-permittee NOI form.

Please be aware that this letter only authorizes discharges in accordance with the above referenced Storm Water Construction General Permit. The placement of fill into regulated waters of the state may require a 401 Water Quality Certification and/or Isolated Wetlands Permit from Ohio EPA. For further information on the 401/Isolated Wetlands Program please contact Mr. Jeff Boyles at: (614)644-2012 or at: Jeffrey.Boyles@epa.state.oh.us . Also a Permit-To-Install (PTI) is required for the construction of sanitary or industrial wastewater collection, conveyance, storage, treatment, or disposal facility; unless a specific exemption by rule exists. For more information on the PTI Program please contact the appropriate Division of Surface Water district office (the district within which the project is to be constructed) staff. Failure to obtain the required permits in advance is a violation of Ohio Revise Code 6111 and potentially subjects you to enforcement and civil penalities.

You may obtain additional information, copies of general permits and current forms/instructions from our web site at: **http://www.epa.ohio.gov/dsw/storm/stormform.aspx**

If you have any further questions, you should contact one of the following:

OHC000003 (Statewide CGP)
Mike Joseph (614) 752-0782 michael.joseph@epa.state.oh.us

OHCD00001 (Big Darby CGP) and OHCO00001 (Olentangy Permit)
Jason Fyffe (614) 728-1793 jason.fyffe@epa.state.oh.us

Or by calling (614) 644-2001 and asking to speak with a member of the Storm Water Unit

Sincerely,

Chris Korleski
Director

CC: D BOGOEVSKI

APPENDIX B

Backfill Source and Waste Characterization Data

Table B-1
Summary of Detected Chemicals - Backfill Soil
Ravenna Army Ammunition Plant
Ravenna, Ohio

Analyte	Units	Cleanup Goal[(1)]	BF001 03/10/2010	BF002 03/10/2010
Volatile Organics:				
Acetone	ug/kg	6,100,000	**5.23 J**	6.67 U
Methylene chloride	ug/kg	11,000	**3.01 J**	**4.09 J**
Pesticides:				
4,4'-DDE	ug/kg	1,400	0.312 U	**1.76**
4,4'-DDT	ug/kg	1,700	0.312 U	**0.744 J**
Dieldrin	ug/kg	30	0.312 U	**11**
Propellants:				
Nitrocellulose	mg/kg	NA	2.47 U	**3.56 J**
Metals:				
Aluminum	mg/kg	17,700	**2,990**	**9,450**
Antimony	mg/kg	175	**0.236**	**0.348**
Arsenic	mg/kg	15.4	**8.87**	**8.61**
Barium	mg/kg	351	**133**	**65.7**
Beryllium	mg/kg	16	**0.187**	**0.48**
Cadmium	mg/kg	10.9	**0.825**	**0.848**
Calcium	mg/kg	NA	**871**	**1,510**
Chromium	mg/kg	12,000	**25.8**	**20.3**
Cobalt	mg/kg	10.4	**4.9**	**5.4**
Copper	mg/kg	25,368	**10.9**	**12.3**
Iron	mg/kg	184,370	**12,300**	**18,500**
Lead	mg/kg	400	**8.27**	**19.9**
Magnesium	mg/kg	NA	**1,010**	**1,630**
Manganese	mg/kg	1,450	**1,950**	**574**
Mercury	mg/kg	172	**0.0133 J**	**0.0490 J**
Nickel	mg/kg	12,639	**13.5**	**13.9**
Potassium	mg/kg	NA	**334**	**623**
Selenium	mg/kg	39	**0.161 J**	**0.503**
Sodium	mg/kg	NA	**17.1 J**	**31.1**
Thallium	mg/kg	47.7	**0.125**	**0.16**
Vanadium	mg/kg	2,304	**7.61**	**18.4**
Zinc	mg/kg	187,269	**42.5**	**52.9**

NA= CUG not available nor needed for this chemical.

U = The analyte was analyzed for, but was not detected. Value shown is the sample reporting limit.

J = Estimated concentration because the result was below the sample reporting limit or quality control criteria were not met.

(1) Cleanup Goals from Table 4-2 of Load Line 1 Short Report (URS, 2010b). CUG for acetone is USEPA RSL, based on HQ of 0.1, residential exposure.

+ Indicates analyte and sample where the CUG is exceeded.

Table B-2
Summary of Detected Chemicals - LL2 and LL3 Stockpile Soil
Ravenna Army Ammunition Plant
Ravenna, Ohio

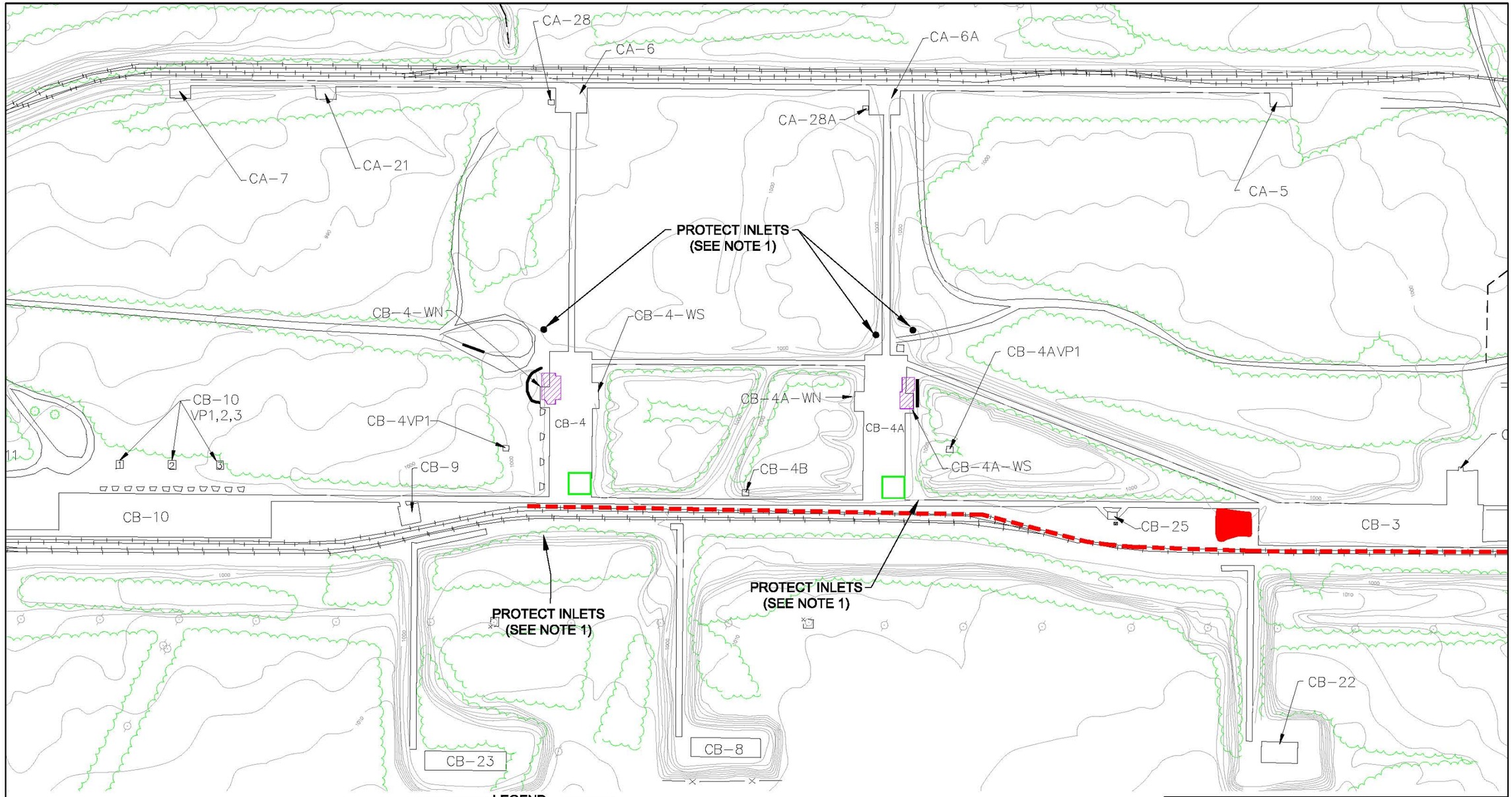
Analyte	Units	LL2 Stockpile 06/24/2010	LL3 Stockpile 06/16/2010
PCBs:			
Aroclor 1254	µg/kg	**98.1**	**753 J**
Explosives:			
2.4.6-Trinitrotoluene	mg/kg	**50.9**	**20.5**
2-Amino-4,6-dinitrotoluene	mg/kg	**0.80**	**1.15**
4-Amino-2,6-dinitrotoluene	mg/kg	**0.94**	**2.19**
TCLP SVOCs:			
None Detected			
TCLP Metals:			
Barium	mg/L	**0.563**	**0.347**
Cadmium	mg/L	**0.0067**	**0.0060**
Other Characteristics:			
Corrosivity (pH, Solid)	S.U.	**9.67**	**8.72**
Ignitability (Flashpoint)	Deg F	**> 77.0**	**> 76.0**

U = The analyte was analyzed for, but was not detected. Value shown is the sample reporting limit.

J = Estimated concentration because the result was below the sample reporting limit or quality control criteria were not met.

APPENDIX C

SWP3 Field Revisions



LEGEND

- BUILDING FOOTPRINT AND WALKWAY
- ASPHALT ROAD
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- CONTOUR (2 FT. INTERVAL)
- CONTOUR (10 FT. INTERVAL)
- TREE OR TREELINE
- STEAM STANCHION
- OVERHEAD STEAM LINE
- AREA OF SOIL REMEDIATION
- SILT FENCE/STRAW BALES BARRIER
- VEHICLE DECONTAMINATION STATION
- STORM WATER FLOW DIRECTION
- HAUL ROUTES
- SOIL STOCKPILE AREA

0 37.5 75 150
SCALE 1" ~ 150'

US Army Corps of Engineers®

NOTE:
1. INLETS TO BE PROTECTED WITH STRAW BALES

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
SWPPP FIELD REVISIONS
LOAD LINE 1

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
JSC	BP	13812319	10/25/10	C-1

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Remediation of Sub-slab Soils\Ravenna-Figure C-1 SWPPP Revisions LL1.dwg User: jessica_cotton Oct 29, 2010 - 1:28pm

APPENDIX D

Field Sampling Forms and
Excavation Field Information

APPENDIX D-1

Field Sampling Forms

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0001-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form							

Yes - No

Sample Collection: 1330 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field — Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level:		Ft
Temperature:		°C
Sp. Conductance:		uMHO
pH:		unit
Dissolved Oxygen:		Mg / L
Redox Potential:		mV
Turbidity:		N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample from CB4 clay pipe from northern portion of excavation. Sand with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: Brenda Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: J Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0002-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1439 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOS
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample from CB4 western side wall of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jen Shepard Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0003-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1446 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field
Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg/l
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 northern side wall of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0004-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1551 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field — Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg/L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 ~~western~~ eastern side wall of excavation. Sandy clay with gravel.

JS 11-1

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard **Date:** 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0005-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1556 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 southern side wall of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0006-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: ~~1505~~ 1605 hrs

Sample Depth: 0-1 FT (below surface)

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Decon: Dedicated - Each Day - Each Location

Location: Plotted on Map - Staked in Field
Estimated - Measured - GPS Surveyed

Field Parameters (at time of sample)		Analytical Parameters				Other Parameters			
PID / FID Readings:		VOC				Corrosivity			
Background:	0.0 ppm	SVOC				Reactivity Sulfide/Cyanide			
Sample:	0.0 ppm	Explosives	X			Ignitability			
Water Level:	FT	Metals							
Temperature:	°C	Perchlorate				QA Samples			
Sp. Conductance:	uMHO	PCBs				MS/MSD	Yes / No		NA
pH:	units	Nitrate / Nitrite				Duplicate ID			NA
Dissolved Oxygen:	Mg / L	TPH DRO / HRO				Equipment Rinse ID			NA
Redox Potential:	mV	Propellants				Trip Blank ID			NA
Turbidity:	N.T.U	Pesticides							

Sample Description

Screening sample from the CB4 floor of excavation. Moist, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: J Shepard Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0007-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/20/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1608 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg/L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample from stained soil from floor of CB4 excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: Jen Sheppard Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0008-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	**Well Purging Form** Yes - No							

Sample Collection: 0930 hrs

Sample Type: Composite - MI - Grab
If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field
Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 western side wall of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B. Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0009-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0938 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level:		FT
Temperature:		°C
Sp. Conductance:		uMHOs
pH:		unit
Dissolved Oxygen:		Mg / L
Redox Potential:		mV
Turbidity:		N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 northern side wall of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard

Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0010-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0835 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHO
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 from floor of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0011-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1035 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level:		FT
Temperature:		°C
Sp. Conductance:		uMHOs
pH:		units
Dissolved Oxygen:		Mg / L
Redox Potential:		mV
Turbidity:		N.T.U.

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4 western side wall of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard

Date: 11/1/10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0012-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1038 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / l
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample from CB4 floor of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard

Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4-SS-113SN-0013-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1100 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOS
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample from floor of excavation. Sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard

Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-528M-3040-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1100 hrs

Sample Depth: 0-1 FT (below surface)

Sample Type: Composite - MI - Grab If

MI. # of increments taken: 30

Decon: Dedicated - Each Day - Each Location

Location: Plotted on Map - Staked in Field

Estimated - Measured - GPS Surveyed

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level:		FT
Temperature:		°C
Sp. Conductance:		uMHOS
pH:		units
Dissolved Oxygen:		Mg / L
Redox Potential:		mV
Turbidity:		N.T.U

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
QA Sample ID		NA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4WN Base

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jen Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-528M-3059-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1105 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No NA
Duplicate ID	Field Dup LL1SS-528M-3061-SO Blind Dup LL1SS-528M-3062-SO
Equipment Rinse ID	NA
QA Sample ID	LL1SS-528M-3060-QA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4WN Walls

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: BPratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-528M-3060-QA — RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1105 hrs

Sample Type: Composite - MI - Grab
If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field
Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No NA
Duplicate ID	Field Dup LL1SS-528M-3061-SO Blind Dup LL1SS-528M-3062-SO
Equipment Rinse ID	NA
QA Sample ID	LL1SS-528M-3060-QA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4WN Walls

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: BPratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard

Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-528M-3061-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1105 hrs

Sample Type: Composite - MI - Grab - If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHO
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No NA
Duplicate ID	Field Dup LL1SS-528M-3061-SO Blind Dup LL1SS-528M-3062-SO
Equipment Rinse ID	NA
QA Sample ID	LL1SS-528M-3060-QA

Sample Description

Moist, brown sand mixed with lean clay.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4WN Walls

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: Jen Sha

Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-528M-3062-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1120 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level:		FT
Temperature:		°C
Sp. Conductance:		uMHOs
pH:		units
Dissolved Oxygen:		Mg / L
Redox Potential:		mV
Turbidity:		N.T.U

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No NA
Duplicate ID	Field Dup LL1SS-528M-3061-SO Blind Dup LL1SS-528M-3062-SO
Equipment Rinse ID	NA
QA Sample ID	LL1SS-528M-3060-QA

Sample Description

Moist, brown gravely sand mixed with lean clay.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4WN Walls

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0001-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1305 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)		Analytical Parameters				Other Parameters			
PID / FID Readings:		VOC				Corrosivity			
Background:	0.0 ppm	SVOC				Reactivity Sulfide/Cyanide			
Sample:	0.0 ppm	Explosives	X			Ignitability			
Water Level:	Ft	Metals							
Temperature:	°C	Perchlorate				QA Samples			
Sp. Conductance:	uMHOS	PCBs				MS/MSD	Yes / No		NA
pH:	units	Nitrate / Nitrite				Duplicate ID			NA
Dissolved Oxygen:	Mg/L	TPH DRO / HRO				Equipment Rinse ID			NA
Redox Potential:	mV	Propellants				Trip Blank ID			NA
Turbidity:	N.T.U	Pesticides							

Sample Description

Screening sample at CB4A, red stained soil from pipe. Red sand with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jen Shepd

Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0002-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1510 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOS
pH:	units
Dissolved Oxygen:	Mg/L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4A west wall of excavation. Brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0003-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1513 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOS
pH:	units
Dissolved Oxygen:	Mg/L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample from CB4A north wall of excavation. Brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard **Date:** 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0004-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1515 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / l
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4A east wall of excavation. Light brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard

Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0005-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1520 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4A south wall of excavation. Light brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: Jen Sheppard

Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0006-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/21/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1524 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	
PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHO
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters			
VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters			
Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples		
MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample at CB4A floor of excavation. Light brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0007-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/22/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0830 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample of CB4A MI floor sample. Moist brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: BPratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: Jennifer Sheppard Date: 11-1-10

Field Sampling Report

Location ID: LL1CB4A-SS-114SN-0008-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/22/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0832 hrs

Sample Type: Composite - MI - Grab

If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field

Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC			
Explosives	X		
Metals			
Perchlorate			
PCBs			
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Screening sample of CB4A MI wall sample. Brown, sandy clay with gravel.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: J Sheppard

Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-531M-3043-SO

RVAAP Excavation Sample, Ravenna, OH

Date: 9/22/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0830 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOS
pH:	units
Dissolved Oxygen:	Mg/L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID		NA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4A Base

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: Jennifer Shepard Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-531M-3063-SO — RVAAP Excavation Sample, Ravenna, OH

Date: 9/22/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0832 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOS
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No LL1SS-531M-3063-MS LL1SS-531M-3063-MSD
Duplicate ID	NA
Equipment Rinse ID	LL1SS-531M-3063-ER
Trip Blank ID	NA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4A Walls

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Shepard (Please Print)

Signature: J Shepard

Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-531M-3063-MS

RVAAP Excavation Sample, Ravenna, OH

Date: 9/22/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0832 hrs

Sample Type: Composite - MI - Grab
If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field
Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	FT
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No LL1SS-531M-3063-MS LL1SS-531M-3063-MSD
Duplicate ID	NA
Equipment Rinse ID	LL1SS-531M-3063-ER
Trip Blank ID	NA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4A Walls

Soil sample description should include:
Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: J Sheppard

Date: 11-1-10

Field Sampling Report

Location ID: LL1SS-531M-3063-MSD

RVAAP Excavation Sample, Ravenna, OH

Date: 9/22/2010

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
					Push Probe	X	Plastic Liner	
Type/Construction					Mattocks		JMC	
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 0832 hrs

Sample Type: Composite - MI - Grab If MI, # of increments taken: 30

Location: Plotted on Map - Staked in Field Estimated - Measured - GPS Surveyed

Sample Depth: 0-1 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:	
Background:	0.0 ppm
Sample:	0.0 ppm
Water Level:	Ft
Temperature:	°C
Sp. Conductance:	uMHOs
pH:	units
Dissolved Oxygen:	Mg / L
Redox Potential:	mV
Turbidity:	N.T.U.

Analytical Parameters

VOC			
SVOC	X		
Explosives	X		
Metals	X		
Perchlorate			
PCBs	X		
Nitrate / Nitrite			
TPH DRO / HRO			
Propellants			
Pesticides			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No LL1SS-531M-3063-MS LL1SS-531M-3063-MSD
Duplicate ID	NA
Equipment Rinse ID	LL1SS-531M-3063-ER
Trip Blank ID	NA

Sample Description

Moist, brown gravely sand.

Recovery: Varies 1 to 12 inches

Refusal: Varies 1 to 12 inches

Building Footprint ID: CB4A Walls

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID:

Name:

Agency/Company:

Address:

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: Brenda Pratt (Please Print)

Signature: B Pratt

Reviewed by: Jennifer Sheppard (Please Print)

Signature: Jennifer Sheppard Date: 11-1-10

APPENDIX D-2

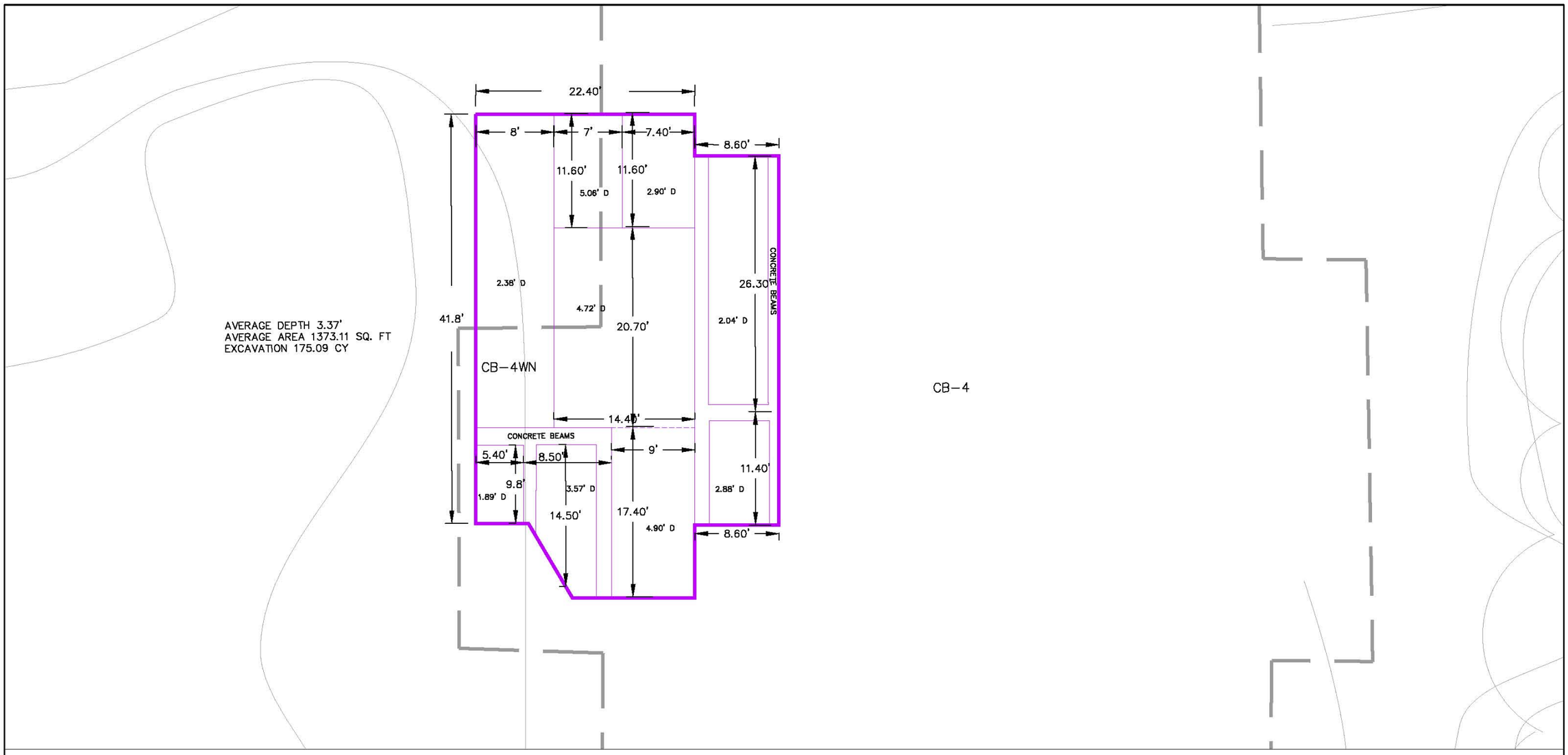
GPS Coordinates of Excavation Corners

Appendix D-2
GPS Coordinates of Excavation Corners
Ravenna Army Ammunition Plant
Ravenna, Ohio

Load Line 1 Building	Latitude	Longitude	Northing	Easting
CB-4WN	41.2035	-81.0170	563385.491	2376559.779
	41.2036	-81.0169	563397.592	2376576.182
	41.2036	-81.0168	563405.391	2376599.309
	41.2035	-81.0168	563383.071	2376605.225
	41.2035	-81.0169	563373.659	2376568.518
	41.2035	-81.0170	563373.256	2376563.812
CB-4AWS	41.2022	-81.0159	562894.0280	2376874.4950
	41.2021	-81.0160	562869.3260	2376830.2630
	41.2022	-81.0160	562893.5370	2376822.7460
	41.2022	-81.0160	562902.1210	2376841.6310
	41.2022	-81.0159	562910.7050	2376866.4020

APPENDIX D-3

Excavation Field Sketches



LEGEND

- HISTORICAL BUILDING FOOTPRINT
- ASPHALT ROAD
- WALKWAYS
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- CONTOUR (2 FT. INTERVAL)
- CONTOUR (10 FT. INTERVAL)
- TREE OR TREELINE
- STEAM STANCHION
- EXCAVATION AREA
- ADDITIONAL OUTBUILDINGS

CY = CUBIC YARDS

SQ FT = SQUARE FEET

D = DEPTH

US Army Corps of Engineers®

0 2.5 5 10

SCALE 1" ~ 10'

URS

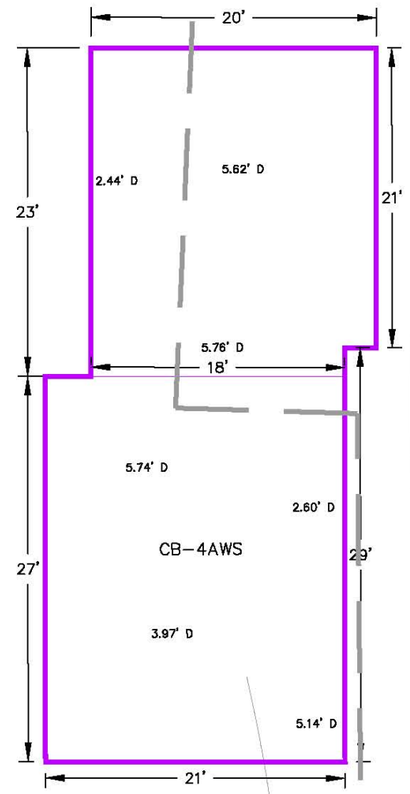
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
FIELD SKETCH OF EXCAVATION AREA
BUILDING CB-4WN
LOAD LINE 1

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
JSC	BP	13812319	11/01/10	D-1

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Remediation of Sub-slab Soils\Ravenna-Figure D-1 LL1 FIELD SKETCH - Excavation Area - Building CB4.dwg User: jessica_cotton Nov 01, 2010 - 12:13pm

AVERAGE DEPTH 4.47'
AVERAGE AREA 1022.62 SQ. FT
EXCAVATION 184.17 CY



CB-4A

LEGEND

- HISTORICAL BUILDING FOOTPRINT
- ASPHALT ROAD
- WALKWAYS
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- CONTOUR (2 FT. INTERVAL)
- CONTOUR (10 FT. INTERVAL)
- TREE OR TREELINE
- STEAM STANCHION
- EXCAVATION AREA
- ADDITIONAL OUTBUILDINGS

CY = CUBIC YARDS

SQ FT = SQUARE FEET

D = DEPTH

US Army Corps of Engineers®

0 2.5 5 10
SCALE 1" ~ 10'

URS

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

REMEDIATION OF SUB-SLAB SOILS
FIELD SKETCH OF EXCAVATION AREA
BUILDING CB-4AWS
LOAD LINE 1

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
JSC	BP	13812319	10/2510	D-2

K:\Projects\R\Ravenna AAP\13812319\DWGs\Figures\Excavation Sampling\Remediation of Sub-slab Soils\Ravenna-Figure D-2 LL1 FIELD SKETCH - Excavation Area - Building CB4A.dwg User: jessica_cotton Nov 01, 2010 - 12:16pm

APPENDIX E

Laboratory Bulk Asbestos Analysis Results

URS

URS Corporation
5 Industrial Way
Salem, NH 03079
Tel: 603.893.0616
Fax: 603.893.6240

Ms. Jo Ann Bartsch
URS Corporation
1375 Euclid Avenue, Suite 600
Cleveland, OH 44115-1808

URS Project #	: 13812-319-50000
Laboratory Batch #	: 33872
Date Samples Received	: 9/24/2010
Date Samples Analyzed	: 9/24/2010
Date of Final Report	: 9/24/2010

SAMPLE IDENTIFICATION:

Three bulk samples from the Ravenna project; submitted by Michelle Wolf.

These bulk samples were delivered to URS Corporation, Salem, New Hampshire for asbestos content determination.

ANALYTICAL METHOD:

Analytical procedures were performed in accordance with the U.S. Environmental Protection Agency (EPA) Recommended Method for the Determination of Asbestos in Bulk Samples by Polarized Light Microscopy and Dispersion Staining (PLM/DS)(EPA-600/M4-82-020, EPA-600/ R-93-116) and the New York Department of Health Environmental Laboratory Approval Program (NYDOH-ELAP 198.1) with the exception of resinously bound materials (please refer to the comments at the end of this report). This report relates only to those samples actually analyzed, and may not be indicative of other similar appearing materials existing at this, or other sites. Quantification of asbestos content was determined by Calibrated Visual Estimation.

The EPA requires that friable samples with analytical results of 10% or less asbestos, by visual estimation, be treated as asbestos-containing material unless these quantities are verified using the point counting method. The point counting method is a systematic technique for estimating concentration, also using PLM. The point counting method, however, does not increase the analyst's ability to detect fibers. If you would like any of your friable samples with an asbestos content of less than 10% to be point counted, please contact our office. Point counting is not required for those samples in which no asbestos is detected during analysis by PLM.

In any given material, fibers with a small diameter (<0.25µm) may not be detected by the PLM method. Floor tile and other resinously bound material may yield a false negative if the asbestos fibers are too small to be resolved using PLM. Additional analytical methods may be required. URS recommends using Transmission Electron Microscopy (TEM) for a more definitive analysis.

New York state regulations require that all friable samples in which asbestos is detected be point counted (using the NYDOH-ELAP stratified point counting method). New York state regulations also require TEM confirmation of NOB (Non Organically Bound) samples found to have No Asbestos Detected by PLM. These regulations apply only to samples taken within the State of New York.

URS will retain all samples for a minimum of three months. Further analysis or return of samples must be requested within this three month period to guarantee their availability. This report may not be reproduced except in full, without the written approval of the URS, Salem Asbestos Laboratory.

Use of the NVLAP and AIHA Logo in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology or the American Industrial Hygiene Association.

This report is considered preliminary until signed by both the Laboratory Supervisor and Laboratory Director.

If you have any questions regarding this report, please do not hesitate to contact us.

Douglas R. Lawson, Ph.D, CIH
Laboratory Director

Jamie L. Noel
Laboratory Supervisor

NVLAP Lab ID#: 101433-0
NYDOH-ELAP #: 11020
Control Document 1000 10/6/2008

Rev. 2

URS

Laboratory Bulk Asbestos Analysis Results

Client/ Project Title : Ravenna
Project Number : 13812-319-50000
Laboratory Batch : 33872

Date Received : 9/24/2010
Date Reported : 9/24/2010
Analyst : Kristina E. Scaviola

			Asbestos Type(s) Detected				Non-Asbestos Materials				
Lab ID #	Client ID #/ Description	Color	% Chrysotile	% Amosite	% Crocidolite	% Other	% Cellulose	% Fiber Glass/ Mineral Wool	% Other Fibrous Material (OFM)	% Non-Fibrous Material	**Comments** Analysis Methods Per EPA-600/M4-82-020, EPA-600/R-93-116, & NYDOH-ELAP 198.1 NAD - No Asbestos Detected
001	RVAAP-IN-01A, Insulation	Blk/Brn					10	5	70	15	NAD; OFM = Synthetics
002	RVAAP-IN-01B, Insulation	Blk/Brn					10	5	70	15	NAD; OFM = Synthetics
003	RVAAP-IN-01C, Insulation	Blk/Brn					10	5	70	15	NAD; OFM = Synthetics

URS	URS CORPORATION ASBESTOS BULK CHAIN OF CUSTODY	6/05	Rev. 0	1 of 1
		IH-22.1		

PROJECT NAME: Ravenna	BATCH NUMBER: 33872
PROJECT NUMBER: 13812319.50000	REPORT TO: Michelle Wolff and Jo Ann Bartsch
PROJECT MANAGER: Jo Ann Bartsch	DATE COLLECTED: 9/23/10
SAMPLER: Michelle Wolff	TURNAROUND TIME: 24 Hour 48 Hour Standard
LICENSE AND EXPIRATION DATE: Ohio Asbestos Hazard Evaluation Specialist ES33606, 03/11/11	

SAMPLE ID	SAMPLE DESCRIPTION	SAMPLE LOCATION	COMMENTS
RVAAP-IN-01A	INSULATION	STOCKPILE	Analysis all layers; positive stop after one sample
RVAAP-IN -01B	INSULATION	STOCKPILE	
RVAAP-IN -01C	INSULATION	STOCKPILE	

RELINQUISHED BY (SIGNATURE)	TIME	DATE	RECEIVED BY (SIGNATURE)	TIME	DATE
[signature]	1:00pm	9.23.10	[signature]	9241 10	
RELINQUISHED BY (SIGNATURE)	TIME	DATE	RECEIVED BY (SIGNATURE)	TIME	DATE

5 Industrial Way
Salem, NH 03079
603.893.0616

APPENDIX F

Field Screening Results and
Laboratory Calculations

APPENDIX F

Table F-1 in this Appendix presents the calculation of TNT concentrations measured from field screening samples collected during the remediation activities at Load Line 1.

The Table utilizes the following acronyms:

Sample ID	The sample identifier
DIL	Within the sample ID, indicates the sample required dilution
DF	Dilution Factor
DUP	Within the sample ID, indicates this sample was a duplicate
$Abs_{initial}$	The absorbance measured prior to color development
Abs_{sample}	The absorbance measured after color development
TNT	Trinitrotoluene
ppm	Part per million, equivalent to mg/kg
ND	Nondetect

The TNT concentration is calculated using the following formula:

$$TNT(ppm) = Abs_{sample} - (Abs_{initial} \times 4)/0.0323$$

If TNT is not detected in a sample, the addition of the developer solution will not change the color of the sample, therefore, the calculation will be a negative result. In a sample with a very high TNT concentration (i.e., LL1CB4-SS-113SN-0008) the initial extract (i.e., before any dilutions) develops a dark red color before the addition of the developer solutions. Thus there will be little difference between the sample absorbance and the initial absorbance, resulting in a negative number. However, the initial absorbance of the sample extract alone may be above the limits of the test, therefore, the sample extract must be diluted to achieve accurate results.

Table F-1
TNT Field Screening Results and Laboratory Calculations
Ravenna Army Ammunition Plant
Ravenna, Ohio

Sample ID	Date Collected	Time Collected	Date Tested	DF	$Abs_{"initial"}$	$Abs_{"sample"}$	Result	**TNT Conc. (ppm)** (Cleanup Level: 878 ppm)	Comments
LL1CB4-SS-113SN-0001-SO	9/20/2010	1330	9/20/2010	10	0.196	1.042	79.88	80	Building CB4 pipe sample
LL1CB4-SS-113SN-0001-SO DIL 1	9/20/2010	1330	9/20/2010	20	0.097	0.513	77.40	77	Building CB4 pipe sample
LL1CB4-SS-113SN-0001-SO DUP	9/20/2010	1330	9/20/2010	20	0.078	0.459	91.02	91	Building CB4 pipe sample
LL1CB4-SS-113SN-0002-SO	9/20/2010	1439	9/20/2010	10	0.094	2.647	703.10	703	West Wall
LL1CB4-SS-113SN-0002-SO DIL 1	9/20/2010	1439	9/20/2010	100	0.015	2.976	9027.86	**9,028**	West Wall
LL1CB4-SS-113SN-0002-SO DIL 2	9/20/2010	1439	9/20/2010	200	0.006	2.001	12241.49	**12,241**	West Wall
LL1CB4-SS-113SN-0002-SO DIL 3	9/20/2010	1439	9/20/2010	400	0.004	1.029	12544.89	**12,545**	West Wall
LL1CB4-SS-113SN-0002-SO DIL 4	9/20/2010	1439	9/20/2010	800	0.001	0.555	13647.06	**13,647**	West Wall
LL1CB4-SS-113SN-0003-SO	9/20/2010	1446	9/20/2010	50	0.100	3.164	4278.64	**4,279**	North Wall
LL1CB4-SS-113SN-0003-SO DIL 1	9/20/2010	1446	9/20/2010	100	0.048	3.399	9928.79	**9,929**	North Wall
LL1CB4-SS-113SN-0003-SO DIL 2	9/20/2010	1446	9/20/2010	200	0.023	2.863	17157.89	**17,158**	North Wall
LL1CB4-SS-113SN-0003-SO DIL 3	9/20/2010	1446	9/20/2010	400	0.015	2.252	27145.51	**27,146**	North Wall
LL1CB4-SS-113SN-0003-SO DIL 4	9/20/2010	1446	9/20/2010	800	0.007	0.682	16198.14	**16,198**	North Wall
LL1CB4-SS-113SN-0004-SO	9/20/2010	1551	9/20/2010	1	0.005	0.518	15.42	15	East Wall
LL1CB4-SS-113SN-0005-SO	9/20/2010	1556	9/20/2010	1	0.058	2.733	77.43	77	South Wall
LL1CB4-SS-113SN-0005-SO DIL 1	9/20/2010	1556	9/20/2010	10	0.017	0.409	105.57	106	South Wall
LL1CB4-SS-113SN-0006-SO	9/20/2010	1605	9/20/2010	10	0.081	2.883	792.26	792	Floor
LL1CB4-SS-113SN-0006-SO DIL 1	9/20/2010	1605	9/20/2010	20	0.043	1.765	986.38	**986**	Floor
LL1CB4-SS-113SN-0006-SO DIL 2	9/20/2010	1605	9/20/2010	200	0.013	0.428	2328.17	**2,328**	Floor
LL1CB4-SS-113SN-0007-SO	9/20/2010	1608	9/20/2010	50	0.232	2.833	2948.92	**2,949**	Stained floor sample
LL1CB4-SS-113SN-0007-SO DIL 1	9/20/2010	1608	9/20/2010	100	0.036	2.134	6160.99	**6,161**	Stained floor sample
LL1CB4-SS-113SN-0007-SO DIL 2	9/20/2010	1608	9/20/2010	200	0.023	0.634	3356.04	**3,356**	Stained floor sample
LL1CB4-SS-113SN-0008-SO	9/21/2010	930	9/21/2010	1	0.717	2.698	-5.26	ND	West wall resample
LL1CB4-SS-113SN-0008-SO DIL 1	9/21/2010	930	9/21/2010	50	0.023	2.481	3698.14	**3,698**	West wall resample
LL1CB4-SS-113SN-0008-SO DIL 2	9/21/2010	930	9/21/2010	100	0.013	1.582	4736.84	**4,737**	West wall resample
LL1CB4-SS-113SN-0008-SO DIL 3	9/21/2010	930	9/21/2010	200	0.009	0.751	4427.24	**4,427**	West wall resample
LL1CB4-SS-113SN-0009-SO	9/21/2010	938	9/21/2010	1	0.066	1.817	48.08	48	North Wall resample
LL1CB4-SS-113SN-0009-SO DIL 1	9/21/2010	938	9/21/2010	5	0.019	0.392	48.92	49	North Wall resample
LL1CB4-SS-113SN-0010-SO	9/21/2010	835	9/21/2010	1	0.201	2.375	48.64	49	Floor resample
LL1CB4-SS-113SN-0010-SO DIL 1	9/21/2010	835	9/21/2010	50	0.001	0.746	1148.61	**1,149**	Floor resample
LL1CB4-SS-113SN-0010-SO DIL 2	9/21/2010	835	9/21/2010	100	0.001	0.400	1226.01	**1,226**	Floor resample
LL1CB4-SS-113SN-0010-SO-DUP	9/21/2010	835	9/21/2010	50	0.012	0.506	708.98	709	Floor resample
LL1CB4-SS-113SN-0011-SO	9/21/2010	1035	9/21/2010	1	0.191	2.703	60.03	60	West wall resample 2
LL1CB4-SS-113SN-0011-SO DIL 1	9/21/2010	1035	9/21/2010	50	0.007	0.298	417.96	418	West wall resample 2
LL1CB4-SS-113SN-0012-SO	9/21/2010	1038	9/21/2010	1	0.097	3.009	81.15	81	Floor resample 2
LL1CB4-SS-113SN-0012-SO DIL 1	9/21/2010	1038	9/21/2010	50	0.004	0.121	162.54	163	Floor resample 2
LL1CB4-SS-113SN-0013-SO	9/21/2010	1100	9/21/2010	1	0.040	2.280	65.63	66	Floor sample
LL1CB4-SS-113SN-0013-SO DIL 1	9/21/2010	1100	9/21/2010	10	0.013	0.373	99.38	99	Floor sample
LL1CB4A-SS-114SN-0001-SO	9/21/2010	1305	9/21/2010	500	0.022	2.965	44535.60	**44,536**	red soil, extract black in color
LL1CB4A-SS-114SN-0001-SO DIL 1	9/21/2010	1305	9/21/2010	1000	0.008	2.615	79969.04	**79,969**	red soil from pipe, north wall
LL1CB4A-SS-114SN-0001-SO DIL 2	9/21/2010	1305	9/21/2010	2000	0.006	1.766	107863.78	**107,864**	red soil from pipe, north wall
LL1CB4A-SS-114SN-0001-SO DIL 3	9/21/2010	1305	9/21/2010	4000	0.002	0.975	119752.32	**119,752**	red soil from pipe, north wall
LL1CB4A-SS-114SN-0001-SO DIL 4	9/21/2010	1305	9/21/2010	8000	0.000	0.482	119380.80	**119,381**	red soil from pipe, north wall
LL1CB4A-SS-114SN-0002-SO	9/21/2010	1510	9/21/2010	1	0.023	0.785	21.46	21	West wall sample
LL1CB4A-SS-114SN-0002-SO DIL 1	9/21/2010	1510	9/21/2010	2	0.015	0.412	21.80	22	West wall sample
LL1CB4A-SS-114SN-0003-SO	9/21/2010	1513	9/21/2010	1	0.078	2.866	79.07	79	North wall sample
LL1CB4A-SS-114SN-0003-SO DIL 1	9/21/2010	1513	9/21/2010	50	0.008	0.244	328.17	328	North wall sample
LL1CB4A-SS-114SN-0004-SO	9/21/2010	1515	9/21/2010	1	0.023	0.061	-0.96	ND	East wall sample
LL1CB4A-SS-114SN-0005-SO	9/21/2010	1520	9/21/2010	1	0.168	2.674	61.98	62	South wall sample
LL1CB4A-SS-114SN-0005-SO DIL 1	9/21/2010	1520	9/21/2010	50	0.005	0.319	462.85	463	South wall sample
LL1CB4A-SS-114SN-0006-SO	9/21/2010	1524	9/21/2010	1	0.310	2.712	45.57	46	Floor sample
LL1CB4A-SS-114SN-0006-SO DIL 1	9/21/2010	1524	9/21/2010	50	0.011	0.544	773.99	774	Floor sample
LL1CB4A-SS-114SN-0007-SO	9/22/2010	830	9/22/2010	1	0.228	2.797	58.36	58	Floor sample
LL1CB4A-SS-114SN-0007-SO DIL 1	9/22/2010	830	9/22/2010	10	0.024	0.603	156.97	157	Floor sample
LL1CB4A-SS-114SN-0008-SO	9/22/2010	832	9/22/2010	1	0.033	0.695	17.43	17	Wall sample
LL1CB4A-SS-114SN-0008-SO DUP	9/22/2010	832	9/22/2010	1	0.024	0.569	14.64	15	Wall sample

APPENDIX G

Chains of Custody/Freight Bills

COC No. A 20427

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: URS

Project Contact: P. Schuler

Contact Phone #: 216-622-2400

Turn Around Requirements: Norm

Location: RVAAP

Project ID: 13812319.50000

Sampler (print): D. Petrina / B. Pratt

Signature: B. Pratt

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

Sample I.D. No.	MI comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Explosives	Metals	SVOCs	PCBs	Hex. Chromium	TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
LL155-528M-3040-SO	X		9-21-10	1100	Soil	1		X	X	X	X	X		
LL155-528M-3059-SO	X		↓	1105	↓	1		X	X	X	X	X		
LL155-528M-3061-SO	X			1105		1		X	X	X	X	X		
LL155-528M-3062-SO	X			1120		1		X	X	X	X	X		
LL155-531M-3043-SO	X		9-22-10	0830		1		X	X	X	X	X		
LL155-531M-3063-SO	X			0832		1		X	X	X	X	X		
-MS	X			0832		1		X	X	X	X	X		
-MSD	X			0832	↓	1		X	X	X	X	X		
LL155-531M-3063-ER		X	↓	0800	Aqueous	7		X	X	X	X			

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
B Pratt	9-22-10	1900					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

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

FedEx Express **US Airbill**

FedEx Tracking Number 8668 4642 3490

Form ID No. 0200 — **Sender's Copy**

1 From *Please print and press hard.*

Date 9-22-10 Sender's FedEx Account Number SENDER'S FEDEX ACCOUNT NUMBER ONLY

Sender's Name Brenda Pratt Phone (216) 622-2400

Company URS Corp

Address 1375 Euclid Ave 600 Dept/Floor/Suite/Room

City Cleveland State OH ZIP 44115

2 Your Internal Billing Reference First 24 characters will appear on invoice. 13812319. Sample 0

3 To

Recipient's Name Sample Receiving Phone (740) 373-4071

Company Microbac

Recipient's Address 158 Starlite Dr Dept/Floor/Suite/Room

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City Marietta State OH ZIP 45750

4a Express Package Service *Packages up to 150 lbs.*

- [x] FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations.* Saturday Delivery NOT available.
- [ ] FedEx 2Day — Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

FedEx Envelope rate not available. Minimum charge: One-pound rate. * To most locations.

4b Express Freight Service *Packages over 150 lbs.*

- [ ] FedEx 1Day Freight* — Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx 2Day Freight — Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- [ ] FedEx 3Day Freight — Third business day.** Saturday Delivery NOT available.

* Call for Confirmation: ** To most locations.

5 Packaging

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.
- [ ] FedEx Box
- [ ] FedEx Tube
- [x] Other

* Declared value limit $500.

6 Special Handling Include FedEx address in Section 3.

- [ ] **SATURDAY Delivery NOT Available for** FedEx Standard Overnight, FedEx First Overnight, FedEx Express Saver, or FedEx 3Day Freight.
- [ ] **HOLD Weekday at FedEx Location NOT Available for** FedEx First Overnight.
- [ ] **HOLD Saturday at FedEx Location Available ONLY for** FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration.
- [ ] Yes — Shipper's Declaration not required.
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment *Bill to:* Enter FedEx Acct. No. or Credit Card No. below.

- [ ] Sender — Acct. No. in Section 1 will be billed.
- [x] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

FedEx Acct. No. or Credit Card No. 157805967 Exp. Date

Total Packages	Total Weight	Total Declared Value†
2	9	$ .00

†Our liability is limited to $100 unless you declare a higher value. See back for details. By using this Airbill you agree to the service conditions on the back of this Airbill and in the current FedEx Service Guide, including terms that limit our liability.

8 Residential Delivery Signature Options If you require a signature, check Direct or Indirect.

- [ ] No Signature Required — Package may be left without obtaining a signature for delivery.
- [ ] Direct Signature — Someone at recipient's address may sign for delivery. *Fee applies.*
- [ ] Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. *Fee applies.*

520

Rev. Date 10/06•Part #158281•©1994–2006 FedEx•PRINTED IN U.S.A. SRY

Schedule a pickup at fedex.com
Simplify your shipping. Manage your account. Access all the tools you need.

RETAIN THIS COPY FOR YOUR RECORDS.

APPENDIX H

Data Validation and
Chemical Quality Assurance Reports

U.S. Army Corps of Engineers
Louisville District

Ravenna Army Ammunition Plant
Load Line 1 Confirmation Sampling, September 2010
Ravenna, Ohio

Data Validation Report
Sample Delivery Group:
L10090608

July 2011

Prepared for:
U.S. Army Corps of Engineers
Louisville District
Contract No. W912QR-08-D-0001
Delivery Order 0026

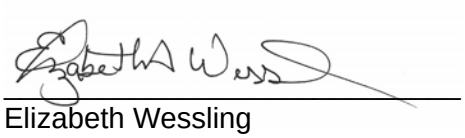
Prepared by:
MEC^X, LP
12269 East Vassar Drive
Aurora, Colorado 80014

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

MEC^X, LP (MEC^X) has completed the Data Validation Report for Sample Delivery Group L10090608 from the Ravenna Army Ammunition Plant Load Line 1 Confirmation Sampling, September 2010 in Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted to determine the usability and bias of the analytical data.

Significant concerns and the resolution are as follows:

None



Elizabeth Wessling
Senior Environmental Chemist
MEC^X Independent Technical Review Team Leader

Patti Meeks, Ph.D.
Senior Environmental Chemist
MEC^X Independent Technical Review Team Member

Executive Summary

The overall objective of the project described in this document was to determine if contaminants are present in the soils beneath the former building slabs at Load Line 1.

The following analyses were performed for all primary samples by Microbac Laboratories, Inc. (Microbac) in Marietta, Ohio:

- United States Environmental Protection Agency (USEPA) SW-846 Method 6010B and 6020 for eight metals
- USEPA SW-846 Method 8270C for four semivolatile compounds (SVOCs)
- USEPA SW-846 Method 8082 for polychlorinated biphenyls (PCBs)
- USEPA SW-846 Method 8330B for two explosive compounds
- USEPA SW-846 Method 7196A for hexavalent chromium

No data were rejected. All data is usable for its intended purposes as qualified by MEC^{X}. Specific concerns regarding the data are noted below:

- None

Acronyms and Abbreviations

ADR	Automated Data Review
CCB	Continuing Calibration Blank
CCC	Calibration Check Compounds
CCV	Continuing Calibration Verification
DoD	Department of Defense
EDD	Electronic Data Deliverable
FWQAPP	Facility-Wide Quality Assurance Project Plan
ICSA	Interference Check Sample A
ICSAB	Interference Check Sample AB
ICV	Initial Calibration Verification
ICP	Inductively Coupled Plasma
LCG	Louisville Chemistry Guidance
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MRL	Method Reporting Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MDL	Method Detection Limit
PCB	Polychlorinated Biphenyl
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SDG	Sample Delivery Group
SPCC	System Performance Check Compound
SVOC	Semivolatile Organic Compounds
USACE	United State Army Corps of Engineers
USEPA	United State Environmental Protection Agency

TABLE OF CONTENTS

Tables

Appendices

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The overall objective of the project described in this document was to determine if contaminants are present in the soils beneath the former building slabs at Load Line 1.

The following analyses were performed for all primary samples by Microbac Laboratories, Inc. (Microbac) in Marietta, Ohio:

- United States Environmental Protection Agency (USEPA) SW-846 Method 6010B and 6020 for eight metals
- USEPA SW-846 Method 8270C for four semivolatile compounds (SVOCs)
- USEPA SW-846 Method 8082 for polychlorinated biphenyls (PCBs)
- USEPA SW-846 Method 8330B for two explosive compounds
- USEPA SW-846 Method 7196A for hexavalent chromium

This report describes findings of data validation performed by MEC^X, LP (MEC^X) on the site samples reported in sample delivery group (SDG) L10090608 from Microbac.

1.2 PREVIOUS ACTIVITIES AND DATA

The following summary was adapted from the Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio (FWQAPP) prepared by Science Applications International Corporation (SAIC), March 2001.

Located in northeastern Ohio on approximately 21,000 acres, Ravenna Army Ammunitions Plant (RVAAP) was established in 1940 to load, store, and demilitarize conventional artillery ammunition, bombs, mines, fuses and boosters, primers and percussion elements. Originally RVAAP operated as two separate units, the Portage Ordnance Depot and the Ravenna Ordnance Plant. During World War II, a contractor operated the Ravenna Ordnance Depot and the government operated the Portage Ordnance Depot. Ordnance production and storage for World War II continued until August 1945, at which time the facility was renamed as the Ravenna Arsenal, and the government assumed control of all operations. From 1951 to 1999, the entire facility was operated by contractors. Ordnance production at the facility was phased out and sent to Plum Brook Ordnance Works in Sandusky, Ohio and Keystone Ordnance Works in Meadville, Pennsylvania. All production at the facility had ceased by 1957 and the plant was placed on standby. In 1961, the plant was operational for seven months, processing and performing explosive melt-out of bombs. After deactivation late in 1961, the facility was renamed RVAAP. From mid-1968 until 1971, the plant was reactivated to load, assemble, and pack munitions on three load lines and two component lines. Operations ceased at Load Lines 1, 2, 3, and 4 in 1971; however, the Lines were reactivated to perform demilitarization operations for several months in 1973 and 1974. In 1992, RVAAP was again placed on “Inactive” status. Salvage and demolition operations started in 1998 and administrative control of the facility was transferred to the Ohio Army National Guard in 1999.

Since 1978, approximately 20 environmental condition investigations have been performed at RVAAP. Only a portion of these investigations are discussed below.

In 1989, the USEPA contracted Jacobs Engineering to perform a Resource Conservation and Recovery Act Facility Assessment. Thirty-one solid areas of concern were identified during the assessment, 13 of which were recommended for no further action. In 1996 the United States Army Corps of Engineers (USACE) performed a facility-wide preliminary assessment and conducted Phase I remedial investigations at 11 areas of concern, including Load Line 1. Salvage and demolition operations were performed in 1998. Monitoring wells were installed in 1999 and a Phase II remedial investigation was performed at Load Line 1 by the USACE in 2000.

Operations at the Load Lines consisted of melting and loading energetic compounds into large caliber shells. Water to wash down the lines and the building was collected in concrete sumps and discharged to a drainage ditch or settling pond. Demolition of the buildings began in 2001 and soil and dry sediments outside the footprints of the buildings were removed by Shaw Engineering in 2003 and. Soil samples collected by Shaw in 2003 found that the soils below the building slabs and foundations of Load Line 1 were more contaminated than Load Lines 2-4. At the time, the slabs and foundations were left intact in order to prevent water infiltration to the contaminated soils below. Floor slabs were subsequently removed and the soil samples described in this report were collected from beneath the floor slabs at Load Line 1.

2. DESCRIPTION OF WORK PERFORMED

This section describes the data verification and data validation procedures used during the evaluation of the site samples reported in SDG L10090608 from Microbac.

2.1 DATA VALIDATION PROCESS

A total of four primary, one field duplicate, and one blind field duplicate multi-incremental soil samples and one equipment rinsate sample were collected in association with the field effort. Level IV validation was performed on 10% of the total number of primary samples collected. The primary sample with an associated QA sample was chosen for Level IV validation.

Table 1. Validated sample identification table

Sample	SDG	Collected	Val Level	Analytical Methods
LL1SS-528M-3059-SO	L100906083	9/21/2010	IV	6010B, 6020, 7196A, 8082, 8270C SIM

Table 2. Field duplicate and blind field duplicate identification table

Parent Sample	Duplicate Sample	Blind Duplicate
LL1SS-528M-3059-SO	LL1SS-528M-3061-SO	LL1SS-528M-3062-SO

Data validators assessed results based on the FWQAPP, Quality Assurance Project Plan Addendum for the Sampling of Soils Below Floor Slabs at LLS-2, 3, 4, and Excavation and Transportation of Contaminated Soils to Load Line 4 (QAPP Addendum) prepared by URS 2008, Louisville Chemistry Guideline Version 5 (LCG), Shell for Analytical Chemistry Requirements (Shell), Department of Defense Quality Systems Manual for Environmental Laboratories Version 3 (DoD QSM), the specific EPA methods, the National Functional Guidelines for Organic Data Review (1994), and the National Functional Guidelines for Inorganic Data Review (1994). The following were reviewed for Level IV validation:

- Sample management (collection techniques, sample containers, preservation, handling, transport, chain-of-custody, holding times),
- Calibration data summary forms (initial and continuing),
- Method blank sample results,
- Laboratory control sample (LCS) or LCS/LCS duplicate (LCS/LCSD) recoveries and/or precision,
- Surrogate recoveries (if applicable),
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries and precision,
- Field QA/QC sample results,
- Other QC indicators as applicable,
- Gas Chromatography/Mass Spectrometry (GC/MS) tuning, if a GC/MS is used,
- Internal standards performance,
- Sample results verification,
- Target compound identification,
- Raw data.

All validated samples were initially assessed using Automated Data Review (ADR) and the ADR Library provided by P. Schuler of URS. The ADR library was subsequently modified by MEC^X based upon direction from the USACE Louisville Chemist to resolve conflicts between the various documents and QC criteria.

2.2 DATA VALIDATION QUALIFIERS

Data qualifiers, as defined below, were applied following the FWQAPP, DoD QSM and the LCG:

U Nondetected at the limit of detection
The analyte was analyzed for but not definitively detected.

J Estimated
The identification of the analyte is acceptable but the quality assurance criteria indicate that the quantitative values may be outside the normal expected range of precision. Additionally used to identify detects reported below the reporting limit.

N Identity Presumptive and Tentative
There is presumptive evidence that the analyte is present but it has not been confirmed. There is an indication that the reported analyte is present; however, all quality control requirements necessary for confirmation were not met.

R Rejected
Data are considered to be rejected and shall not be used for environmental decisions.

2.3 DATA VALIDATION FLAGGING CODES

The qualification codes in the following table may have been used to flag the data described in this document: Sample qualifications are summarized in Appendix B. All qualifications and associated qualification codes have been entered into the electronic data deliverables (EDD) received from the laboratories.

Table 3. Qualification code reference table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect.
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient was noncompliant.
R	Calibration RRF was noncompliant.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
Q	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	Not applicable	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable.	ICP Serial Dilution %D were not within control

Qualifier	Organics	Inorganics
		limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tuning was noncompliant
T	Presumed contamination as indicated by the trip blank results.	Not applicable.
+	False positive – reported compound was not present.	False positive – reported compound was not present.
-	False negative – compound was present but not reported.	False negative – compound was present but not reported.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).

3. DATA ACQUISITION ACTIVITIES

3.1 SAMPLE COLLECTION

Multi-incremental soil samples were collected in September 2010. The samples were submitted under chain of custody to the primary laboratory, Microbac.

Unless otherwise noted below, the chains of custody were appropriately signed by both field and/or laboratory personnel with all samples and analyses accounted for, cooler custody seals intact, and within the temperature limits of 4±2°C. All documentation regarding sample handling as presented in the case narratives, chains of custody, correspondence, and sample condition upon receipt forms was evaluated with the following remaining deficiencies. No further requests were made to the primary contractor or the laboratories, and no data were qualified.

SDG	Issue
L10090608	One cooler associated with the samples was received below the temperature limit at 1°C; however, the samples were not noted to be frozen or damaged.
L10060266	The laboratory reported the samples with the prefix LLISS instead of LL1SS.

3.2 SAMPLE ANALYSIS

Microbac, the primary laboratory, analyzed a total of four primary, one field duplicate, and one blind field duplicate soil samples, and one equipment rinsate by USEPA SW-846 Methods 6010B and 6020 for eight metals, USEPA SW-846 Method 8270C for four SVOCs, USEPA SW-846 Method 8082 for PCBs, USEPA SW-846 Method 8330B for two explosives, and USEPA Method 7196A for hexavalent chromium.

3.3 DATA COMPLETENESS

Data completeness for the project described in this report was found to be generally acceptable as no deliverables were missing.

3.4 METHOD REQUIREMENTS

All method preservation requirements were met.

3.5 HOLDING TIME REQUIREMENTS

The soil extraction and analytical holding times for the analyses as defined in FWQAPP Table 4-1 and LCG Appendix D are as follows:

Analysis	Analytical Method	Preparation Method	Extraction Holding Time	Analysis Holding Time
Metals	6010B/6020	3051A	N/A	180 days
SVOCs	8270C	3545	14 days	40 days
PCBs	8082	3550B	14 days	40 days
Explosives	8330B	8330B	14 days	40 days
Hexavalent chromium	7196A	3060A	30 days	7 days

All extraction and analytical holding times were met.

3.6 DETECTION LIMIT REQUIREMENTS

Reporting limits for nondetected contaminants of concern were compared to the clean up goals listed in Table 6 of the Record of Decision. Reporting limits for the remaining nonanalytes were compared to the criteria listed in Tables 3.3 through 3.9 of the FWQAPP and Appendix A of the QAPP Addendum. No results exceeded the criteria.

4. DATA QUALITY EVALUATION

This section summarizes the data quality of validated samples for each analytical method evaluated.

4.1 EXPLOSIVES

Four primary, one field duplicate, and one blind field duplicate soil samples, and one equipment rinsate sample were analyzed by Microbac for RDX and 2,4,6-trinitrotoluene by USEPA SW-846 Method 8330B.

- MDL studies were not evaluated as part of this project.
- Calibration
    - Initial calibration linear regression r values were ≥0.990.
    - The second source initial calibration verification standard (ICV) recoveries for both the primary and confirmation calibrations were within the control limits listed in LCG Table 5 of 85-115%.
    - The continuing calibration verification (CCV) standard %Ds were within the control limits listed in LCG Table 5 of ≤15%.
    - The MRL standard recoveries were within the control limit listed in LCG Table 5 of ±30%.
    - No MDL check was analyzed; however, as detects were reported in the site sample for both analytes, no qualifications were required.
- Blanks: There were no target compound detects above the control limits listed in LCG Table 5, of one-half the reporting limit for target compounds.
- Blank Spikes and Laboratory Control Samples: Recoveries were within the control limits listed in LCG Appendix C. LCS/LCSD %RPDs were within the control limit listed in FWQAPP Table 3-1 of ≤35%.
- Surrogate Recovery: Surrogate results were not assessed for samples analyzed at dilutions of 10× or greater, as they were considered to be diluted out. The remaining surrogate recoveries were within the control limits listed in LCG Table 5 of 50-150%.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were not performed on a validated sample. ADR-reviewed sample LL1SS-531M-3063-SO was the parent sample for MS/MSD analyses performed. The recoveries were not assessed as the native analyte concentrations were greater than 4× the spiked amounts.

- Compound Identification: Compound identification was verified for the sample validated at a Level IV. Review of the sample chromatogram, retention times, and spectra indicated no problems with target compound identification.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  In order to report 2,4,6-trinitrotoluene within the linear range of the calibration, the validated sample, LL1SS-528M-3059-SO was analyzed at a 20× dilution; therefore, the undiluted result for 2,4,6-trinitrotoluene was rejected, "R," in favor of the diluted result. The laboratory confirmed the 2,4,6-trinitrotoluene detect on a second column. The LCG requires that, in the absence of interference, the higher of the two values be reported. As an interfering peak eluted just prior to 2,4,6-trinitrotoluene on the confirmation column, the lower result from the primary column was accepted and the result from the confirmation column was rejected, "R." These rejected analytes were coded with a "D" qualification code as duplicate data. As the only confirmation analysis was performed at a 20× dilution, RDX was diluted out and considered by the laboratory to be unconfirmed. As the RDX retention time in the primary column analysis was acceptable with no indication of interference, it was the reviewer's professional opinion that RDX should be reported from the undiluted primary column analysis. The revised result was coded with a "$" qualification code.

  In order to assess the field duplicate and blind field duplicate results, the reviewer checked the chromatograms for the ADR-reviewed samples and found the interfering peak affected the quantitation of 2,4,6-trinitrotoluene for all soil samples in SDG L10090608. Therefore the reviewer rejected, "R," all confirmation column results for 2,4,6-trinitrotoluene in the soil samples. Additionally, the reviewer rejected, "R," all RDX results reported above the linear range of the calibration, as denoted by the laboratory "I" qualification code. These rejected results were coded with a "D" qualification code as duplicate data. Additionally, as the only confirmation analyses were performed at dilution, RDX in samples LL1SS-528M-3040-SO and LL1SS-3062-SO was diluted out and considered by the laboratory to be unconfirmed. As the RDX retention times in the primary column analyses were acceptable and without notable interference, it was the reviewer's professional opinion that RDX should be reported from the undiluted primary column analyses. The revised results were coded with a "$" qualification code.

- Target compound confirmation was performed for detects in the validated sample. Intercolumn %Ds were within the control limit listed in LCG Table 5 of ≤ 40%.

- System Performance: Review of the raw data indicated no problems with system performance.

- There were no manual integrations performed for data reviewed at Level IV.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    - Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected and analyzed for explosives. There were no detects above the MDL in the equipment rinsate sample.

    - Field Duplicates: One field duplicate and one blind field duplicate pair were collected and analyzed for explosive compounds. Except as noted below, RPDs were within the control limits. The control limit listed in FWQAPP Table 3-1 is ≤50%. The RPD is applicable only when the sample results are ≥5× the reporting limit. For results less than the reporting limit, a control limit of ± the reporting limit is used. See Appendix A for comparisons of all samples and analytes.

Table 4. Explosives field duplicate comparisons

Primary Sample	Duplicate Sample	Analyte	RPD
LL1SS-528M3059-SO	LL1SS-528M-3061-SO	2,4,6-trinitrotoluene	N/A

N/A indicates the ±reporting limit control limit was applied.

Table 5. Explosives blind field duplicate comparisons

Primary Sample	Blind Duplicate	Analyte	RPD
LL1SS-528M3059-SO	LL1SS-528M-3062-SO	2,4,6-trinitrotoluene	N/A

N/A indicates the ±reporting limit control limit was applied.

4.2 POLYCHLORINATED BIPHENYLS (PCBS)

Four primary, one field duplicate, and one blind field duplicate soil samples, and one equipment rinsate sample were analyzed by Microbac for Aroclors-1016, -1221, -1232, -1242, -1248, 1254, -1260 by USEPA SW-846 Method 8082.

- MDL studies were not evaluated as part of this project.

- Calibration: Calibration criteria were met.

    - Initial calibration %RSDs were ≤20%.

    - The second source initial calibration verification standard (ICV) was within the control limits listed in LCG Table 3 of 85-115%.

    - The continuing calibration verification (CCV) standard %Ds affecting retained sample data were within the control limits listed in LCG Table 3 of ≤15%.

    - The MRL standard recoveries affecting retained sample data were within the control limits listed in LCG Table 3 of 70-130%.

- MDL checks standards were analyzed in association with the samples in this SDG. No summary results were provided; however, all analytes were noted to be detected.

- Blanks: The method blanks had no target compound detects above the control limits listed in LCG Table 3, of one-half the reporting limit for target compounds.

- Blank Spikes and Laboratory Control Samples: LCS recoveries were within the control limits listed in LCG Appendix C of 53-143% and 71-134%, respectively, for Aroclor 1016 and Aroclor 1260, with the exception of one LCSD recovery on column A marginally below the QC limits at 69.3%. As the LCS recovery and the RPD were acceptable, no qualifications were assigned.

- Surrogate Recovery: The surrogate recoveries for the retained sample data were within the control limits listed in LCG Table 3 of 50-150%.

- Matrix Spike/Matrix Spike Duplicate: Due to insufficient sample volume, MS/MSD analyses were not performed on the samples of these SDGs. Evaluation of method accuracy and precision was based on the LCS/LCSD results.

- Compound Identification: Compound identification was verified for the sample validated at Level IV. Review of the sample chromatograms, standards, and retention times indicated no problems with target compound identification.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  The sample was analyzed on two analytical columns for target compound confirmation; however, the laboratory did not provide summary information for intercolumn %Ds. The reviewer calculated the intercolumn %D for Aroclor 1254 detected in the sample validated at Level IV. The %D was ≤40%.

  In accordance with LCG, the laboratory reported the higher of the two values unless there was an indication of chromatographic interference in the higher concentration result. For the sample validated at Level IV, the confirmation column chromatogram exhibited significantly more matrix interference with unresolved baseline area than the original chromatogram; therefore, it was the reviewer's professional opinion that the original lower concentration result was the more valid result. The confirmation result was rejected, "R," and coded with a "D" qualification code as duplicate data.

  In order to assess the field duplicate and blind field duplicate results, the reviewer checked the chromatograms for the ADR reviewed samples and found the confirmation column chromatograms exhibited significantly more matrix interference. It was the reviewer's professional opinion that the original lower concentration result was the more valid result. The confirmation result was rejected, "R," and coded with a "D" qualification

code as duplicate data. Additionally, results reported above the linear range of the calibration, denoted by the laboratory with an "I" qualification code were also rejected, "R." These results were coded with a "D" qualification code as duplicate data.

- System Performance: Review of the raw data indicated no problems with system performance.

- Manual integrations were performed for some Aroclor peaks in the sample validated at Level IV. The manual integrations were deemed acceptable by the reviewer.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    o Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected and analyzed for PCBs. There were no detects above the MDL in the equipment rinsate sample.

    o Field Duplicates: One field duplicate and one blind field duplicate pair were collected and analyzed for PCBs. As noted below, none of the RPDs were within the control limits. The control limit listed in FWQAPP Table 3-1 is ≤50%. The parent sample did not require dilution; however, both the field duplicate and blind field duplicate were analyzed at 10× dilutions. The RPD is applicable only when the sample results are ≥5× the reporting limit. For results less than the reporting limit, a control limit of ± the reporting limit is used. See Appendix A for comparisons of all samples and analytes.

Table 6. PCB field duplicate comparisons

Primary Sample	Blind Duplicate	Analyte	RPD
LL1SS-528M-3059-SO	LL1SS-528M-3061-SO	Aroclor 1254	112%

N/A indicates the ±reporting limit control limit was applied.

Table 7. PCB blind field duplicate comparisons

Primary Sample	Blind Duplicate	Analyte	RPD
LL1SS-528M-3059-SO	LL1SS-528M-3062-SO	Aroclor 1254	98%

N/A indicates the ±reporting limit control limit was applied.

4.3 SEMIVOLATILE ORGANIC COMPOUNDS (SVOCS)

Four primary soil samples, one field duplicate, one one blind field duplicate, and one equipment rinsate sample were analyzed by Microbac for benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene by USEPA Method 8270C.

- MDL studies were not evaluated as part of this project.

- GC/MS Tuning: The DFTPP tunes met the method abundance criteria. The samples were analyzed within 12 hours of the DFTPP injection time.

- Calibration: Calibration criteria affecting sample results were met.

    - Initial calibration average RRFs and ICV and CCV RRFs were within method control limits of ≥0.050 for system performance check compounds (SPCCs). All initial calibration %RSDs were within the method control limits listed in the LCG Table 2, of ≤30% for calibration check compounds (CCCs) and ≤15% for remaining compounds, or linear regression r values ≥0.995.

    - All second source initial calibration verification standard recoveries were within the control limits listed in the LCG Table 2 of 70-130%.

    - The continuing calibration %Ds affecting sample data were within the method control limits of ≤20% listed in the LCG Table 2.

    - MRL standard recoveries affecting sample data were within the control limits of 70-130% listed in the LCG Table 2.

    - MDL checks are required once per quarter per instrument as per LCG Table 5. The quarterly MDL check standard result was not provided.

- Blanks: The method blanks had no target compound detects above the control limits listed in the LCG Table 2 of one-half the reporting limit for target compounds, and no common laboratory contaminants above the reporting limit.

- Blank Spikes and Laboratory Control Samples: The LCS recoveries were within the control limits listed in the FWQAPP Table 3-1 of 45-135%.

- Surrogate Recovery: Surrogate recoveries for the validated sample were within the control limits of 50-150% listed in the LCG Table 2.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were LL1SS-528M-3063-SO. Recoveries and RPDs were within the control limits listed in the FWQAPP Table 3-1 of 45-135% and ≤35%, respectively.

- Internal Standards Performance: The internal standard area counts and retention times were within the LCG Table 2 control limits established by the midpoint initial calibration standard: ±30 seconds for retention times and -50% / +100% for internal standard areas.

- Compound Identification: Compound identification was verified for the sample validated at Level IV. Review of the sample chromatogram, retention times, and spectra indicated no problems with target compound identification.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limits were supported by the

low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J," by the laboratory.

- System Performance: Review of the raw data indicated no problems with system performance.

- Manual Integration: Some routine manual integrations were performed for the sample and calibration and QC data associated with the sample data. All manual integrations reviewed at Level IV were deemed appropriate by the reviewer.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    - Field Blanks and Equipment Rinsates: There was no field blank sample associated with the validated sample in this SDG. One equipment rinsate sample was collected and analyzed for SVOCs. There were no detects above the MDL in the equipment rinsate sample.

    - Field Duplicate Samples: One field duplicate and one blind field duplicate pair were collected and analyzed for SVOCs. RPDs were within the control limits. The control limit listed in FWQAPP Table 3-1 is ≤50%. The RPD is applicable only when the sample results are ≥5× the reporting limit. For results less than the reporting limit, a control limit of ± the reporting limit was used. See Appendix A for comparisons of all samples and analytes.

4.4 METALS

Four primary, one field duplicate, and one blind field duplicate soil samples, and one equipment rinsate sample were analyzed by Microbac for aluminum, antimony, arsenic, barium, cadmium, chromium, lead, and manganese by USEPA Methods 6010B and 6020.

- MDL studies were not evaluated as part of this project.

- Calibration: Calibration criteria were met.

    - Initial calibration: Linear regression r values were within the control limit listed in the LCG Tables 7 and 9 of ≥0.995.

    - The %RSDs for the ICV and continuing calibration verification (CCV) standards were within the control limit listed in the LCG Table 7 of <5%. The ICV and CCV recoveries were within the control limits listed in LCG Table 7 of 90-110%.

    - Both cadmium MRL recoveries were below the control limit at 60% and 58%; therefore, cadmium detected in the sample validated at Level IV was qualified as estimated with a potential negative bias, "J-." The qualified result was coded with

a "C" qualification code. The remaining MRL recoveries were within the control limits listed in the LCG Tables 7 and 9 of 70-130%. Samples with results that were greater than 10× the reporting limit were not qualified for MRL recovery outliers as it was the reviewer's professional opinion that at those concentrations, the CCV recoveries were more indicative of the instrument performance relative to the sample.

During the raw data review of the cadmium MRL recoveries, the reviewer noted that the cadmium MRL results were below the MDL listed in the data package. MEC^X contacted the laboratory and was informed that the MRL check solution used for the analysis was for aqueous samples and, therefore, had a lower MDL. As the MRL standard confirmed the ability of the instrument to detect cadmium to low concentrations, no additional qualifications were required.

- MDL Verification: MDL check samples were analyzed and all target analytes were detected.

- Blanks: The method blanks and CCBs had no applicable detects above the control limit listed in the LCG Tables 7 and 9 of one-half the MRL.

- Interference Check Samples: ICP and ICPMS interference check sample A (ICSA) and AB (ICSAB) recoveries were within the control limits listed in QAPP Table 7 of 80-120%. No target analytes were detected or reported in the ICSA.

- Blank Spikes and Laboratory Control Samples: Recoveries were within the control limits listed in LCG Appendix C of 80-120%.

- Laboratory Duplicates: Laboratory duplicate analyses were performed on ADR-reviewed sample LL1SS531M-3063-SO. The RPDs were within the control limits listed in the FWQAPP Table 3-1 of ≤25% for soil. The duplicate criterion was only applied when the original sample result was nominally ≥5× the reporting limit. In cases where the original sample result was <5× the reporting limit, the reasonable control limit of ± the reporting limit was applied.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on ADR-reviewed sample LL1SS531M-3063-SO. The recoveries were within the control limits listed in FWQAPP Table 3-1 of 75-125%. Matrix spike control limits were not applied when the native sample concentration exceeded the spiked amount by a factor of four or more.

- Serial Dilution: Serial dilution analyses were performed on ADR-reviewed sample LL1SS-528M-3040-SO for the 6010 analytes and on validated sample LL1SS-528M-3059-SO for the 6020 analytes. The aluminum %D exceeded the control limit at 19.9%; therefore, aluminum detected in the sample validated at Level IV was qualified as estimated with a potential negative bias, "J-." The qualified result was coded with an

"A" qualification code. The remaining %Ds were within the control limit listed in LCG Table 7 of ≤10%. The serial dilution control limit is only applicable when the original sample concentration is minimally ≥50× the MDL for ICP analytes.

- Internal Standards: Internal standard recoveries associated with the sample validated at Level IV were acceptable.

- Sample Result Verification: For Level IV validation, calculations were verified and the sample results reported on the sample result summary were verified against the raw data. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  Arsenic, cadmium, and lead in LL1SS-528M-3059-SO were reported from a 5× dilutions due to matrix interference.

- Manual Integrations: Not applicable to these analyses.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  o Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected and analyzed for metals. There were no detects above the MDL in the equipment rinsate sample.

  o Field Duplicate Samples: One field duplicate and one blind field duplicate pair were analyzed for metals. Except as noted in the table below, RPDs were within the control limits. The control limit listed in FWQAPP Table 3-1 is ≤50%. The RPD is applicable only when the sample results are ≥5× the reporting limit. For results less than the reporting limit, a control limit of ± the reporting limit is used. See Appendix A for comparisons of all samples and analytes.

Table 8. Metals field duplicate comparison

Primary Sample	Duplicate Sample	Analyte	RPD
LL1SS-528M-3059-SO	LL1SS-528M-3061-SO	Arsenic	N/A

N/A indicates that the ±reporting limit control limit was used.

4.5 GENERAL CHEMISTRY - HEXAVALENT CHROMIUM

Four primary, one field duplicate, and one blind field duplicate soil sample were analyzed by Microbac for hexavalent chromium by USEPA Method 7196A. As QC criteria are not addressed in the FWQAPP or the LCG, hexavalent chromium control limits were taken from the DoD QSM.

- MDL studies were not evaluated as part of this project.

- Calibration: Except as noted below, calibration criteria were met.
    - Initial calibration: The hexavalent chromium linear regression r values were within the control limit listed in the DoD QSM Table B-8 of ≥0.995.
    - The hexavalent chromium ICV and CCV recoveries were within the control limits listed in DoD QSM Tables B-8 of 90-110%.
    - Hexavalent chromium MRL recoveries were within the control limits listed in the LCG Table 7 (for metals) of 70-130%.
    - MDL Verification: MDL verification standards were not analyzed.
- Blanks: The method blank and CCBs had no applicable detects above the control limit listed in the DoD QSM Table B-8 of one-half the MRL.
- Blank Spikes and Laboratory Control Samples: Hexavalent chromium recoveries were within the laboratory-established control limits of 90-110%.
- Laboratory Duplicates: A hexavalent chromium laboratory duplicate analysis was performed on ADR-reviewed sample LL1SS-531M-3063-SO. Hexavalent chromium was not detected in either the sample of the duplicate.
- Matrix Spike/Matrix Spike Duplicate: A hexavalent chromium matrix spike was performed on ADR-reviewed sample LL1SS-531M-3063-SO. The recovery was below the control limit at 82.9%; therefore, nondetected hexavalent chromium in the sample validated at Level IV was qualified as estimated, "UJ." The qualified result was coded with a "Q" qualification code. The control limits, 85-115%, used to assess the matrix spike result were listed in the DoD QSM Table B-8.
- Sample Result Verification: For Level IV validation, calculations were verified and the sample result reported on the sample result summary was verified against the raw data. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."
- Manual Integrations: Manual integrations are not applicable to the instrument used for this analysis.
- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:
    - Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected; however, it was not analyzed for hexavalent chromium.

- Field Duplicate Samples: One field duplicate and one blind field duplicate pair were analyzed for hexavalent chromium. RPDs were within the control limits. The control limit listed in FWQAPP Table 3-1 is ≤50%. The RPD is applicable only when the sample results are ≥5× the reporting limit. For results less than the reporting limit, a control limit of ± the reporting limit is used. See Appendix A for comparisons of all samples and analytes.

5. DATA DEFICIENCIES

5.1 REJECTED DATA

As noted in Table 9 below, no data were rejected. In instances where a data point had multiple results, the reviewer chose the most technically sound result to report and rejected the remaining data points. These rejected data points do not affect data quality or usability and are not included in Table 9.

5.1.1 Data Qualification Summary

Table 9, below, lists the number of analytes qualified for quality control outliers. A summary of the qualifications applied to the data can be found in Appendix A.

5.2 DATA USABILITY

As the data validated in this report are not inclusive of the entire field effort, no field completeness value was calculated. As noted in Table 9 below, no data were rejected; therefore, all data is usable for its intended purposes as qualified by MEC^X.

The analytical completeness goal for the project that was established in the FWQAPP was 90% for each method. Data with reporting limits that exceeded the established criteria and data estimated for quality control outliers or for detects between the MDL and the RL were included in Table 9 for informational purposes only. Contaminants of concern that exceeded the criteria are noted in Section 6.2. The following table summarizes the calculated completeness for the project. Please note that the laboratory reported one extra analyte, silver, in one sample.

Table 9. Analytical completeness for the primary data

			Number of Results					Percent Complete
Analysis	**Samples Analyzed**	**Analytes per Sample**	**Total**	**Rejected**	**MDLs /RLs Exceeding Criteria**	**Estimated for QC Outliers**	**Estimated for Detects <RL**	
Explosives	7	2	14	0	0/0	1	3	100%
PCBs	7	7	49	0	0/0	0	0	100%
SVOCs	7	4	21	0	0/0	0	6	100%
Metals	7	8	57	0	0/0	7	5	100%
Hexavalent Chromium	6	1	6	0	0/0	0	0	100%
		Totals	**147**	**0**	**0/0**	**8**	**14**	**100%**

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 PRIMARY AND FIELD DUPLICATE SAMPLE COMPARISON SUMMARY

Primary and field duplicate sample comparisons were considered to be in good agreement. Five results, or about 11% of the field duplicate and blind field duplicate pair results, were above the FWQAPP RPD control limit of 50%, or +/- the reporting limit for results ≤5× the reporting limit. For the three primary/field duplicate analytes with results exceeding the control limit, the field duplicate/blind field duplicate results were in good agreement.

The field duplicate and blind field duplicate samples were not validated at Level IV; therefore, before the results could be compared to the primary sample results, the reviewer validated the explosive and PCB data to determine which results (primary column or confirmation column) to report.

Table 10. Primary/field duplicate sample comparison summary

Method	Number of Analytes	Primary/Field Duplicate Pairs	Total Analytes	Results within control limits	Results exceeding control limits
Explosives	2	1	2	1	1
PCBs	7	1	7	6	1
SVOCs	4	1	4	4	0
Metals	8	1	8	7	1
Hexavalent chromium	1	1	1	1	0
Totals			**22**	**19**	**3**

Table 11. Primary/blind field duplicate sample comparison summary

Method	Number of Analytes	Primary/Field Duplicate Pairs	Total Analytes	Results within control limits	Results exceeding control limits
Explosives	2	1	2	1	1
PCBs	7	1	7	6	1
SVOCs	4	1	4	4	0
Metals	8	1	8	8	0
Hexavalent chromium	1	1	1	1	0
Totals			**22**	**20**	**2**

6.2 SPECIFIC DATA CONCERNS

- None

6.3 RECOMMENDATIONS

- None

7. REFERENCES

Contract Laboratory Program National Functional Guidelines for Organic Data Review. United States Environmental Protection Agency Contract Laboratory Program (CLP). February 1994.

Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. United States Environmental Protection Agency. February 1994.

Department of Defense Quality Systems Manual for Environmental Laboratories, Version 3. DoD Data Quality Workgroup. January 2006.

Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. SAIC. March 2001.

Final Work Plan Addendum #1 for the Sampling of Soils Below Floor Slabs at RVAAP-08 Load Line 1 and Other Building Locations – Ravenna Army Ammunition Plant. URS Group, Inc. July 2009.

Louisville Chemistry Guideline, Version 5, Environmental Engineering Branch, United States Army Corps of Engineers, Louisville District. June 2002.

Quality Assurance Project Plan for Environmental Investigations at the Ravenna Army Ammunition Plant. SAIC. March 2001.

Quality Assurance Project Plan Addendum for the Sampling of Soils Below Floor Slabs at LLs-2, 3, 4, and Excavation and Transportation of Contaminated Soils to Load Lines 4. URS. April 2008.

Shell for Analytical Chemistry Requirements. United State Army Corps of Engineers. February 2001.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Revision 6. United States Environmental Protection Agency. February 2007.

APPENDIX A

Qualified Sample Result Forms

Qualification Code Reference Table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect.
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient was noncompliant.
R	Calibration RRF was noncompliant.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
Q	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	Not applicable	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable	ICP Serial Dilution %D were not within control limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tuning was noncompliant
T	Presumed contamination as indicated by the trip blank results.	Not applicable
+	False positive – reported compound was not present.	False positive – reported compound was not present.
-	False negative – compound was present but not reported.	False negative – compound was present but not reported.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).

Validated Sample Result Forms: 81532

Analysis Method 6010C

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Aluminum	7429-90-5	8170	0.12	0.04	mg/kg	B		
Antimony	7440-36-0	0.45	0.27	0.081	mg/kg	B	R	Q
Arsenic	7440-38-2	7.6	0.45	0.13	mg/kg		J-	A
Barium	7440-39-3	56.5	0.027	0.0081	mg/kg	B	J-	A
Beryllium	7440-41-7	0.35	0.012	0.004	mg/kg			
Cadmium	7440-43-9	0.22	0.021	0.0061	mg/kg	Y	J	E, A
Calcium	7440-70-2	12700	0.5	0.061	mg/kg	B	J-	A
Chromium	7440-47-3	132	0.064	0.019	mg/kg	M	J-	A
Cobalt	7440-48-4	5.3	0.049	0.015	mg/kg		J	Q, *III, A
Copper	7440-50-8	15.4	0.2	0.061	mg/kg	M	J-	Q, A
Iron	7439-89-6	17400	1	0.3	mg/kg	M,B	J-	A
Lead	7439-92-1	25.5	0.14	0.04	mg/kg		J-	Q, A
Magnesium	7439-95-4	2200	0.4	0.12	mg/kg	B	J-	A
Manganese	7439-96-5	411	0.05	0.016	mg/kg		J-	A
Nickel	7440-02-0	12.6	0.062	0.018	mg/kg		J-	A
Selenium	7782-49-2	0.44	0.42	0.071	mg/kg			
Silver	7440-22-4	0.022	0.057	0.017	mg/kg	J	J	
Thallium	7440-28-0	0.77	0.14	0.04	mg/kg	M	J-	Q
Vanadium	7440-62-2	12.9	0.034	0.011	mg/kg	B	J-	A
Zinc	7440-66-6	62.8	0.12	0.04	mg/kg	M	J-	Q, A

Analysis Method 6010C-NaK

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Potassium	7440-09-7	1100	36	11	mg/kg		J-	A
Sodium	7440-23-5	77.7	13	4	mg/kg			

Analysis Method 7196A

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Hexavalent Chromium	18540-29-9	6.5	6.5	1.9	mg/kg	UM	UJ	C, Q

Analysis Method 7471A

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Mercury	7439-97-6	0.026	0.008	0.0024	mg/kg		J+	A

Analysis Method 8082

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Aroclor 1016	12674-11-2	200	200	40	ug/kg	U	UJ	C
Aroclor 1221	11104-28-2	200	200	80	ug/kg	U	UJ	C
Aroclor 1232	11141-16-5	200	200	110	ug/kg	U	UJ	C
Aroclor 1242	53469-21-9	200	200	120	ug/kg	U	UJ	C
Aroclor 1248	12672-29-6	200	200	120	ug/kg	U	UJ	C
Aroclor 1254	11097-69-1	1900	200	92	ug/kg		J	C, Q
Aroclor 1260	11096-82-5	200	200	48	ug/kg	U	UJ	C
Aroclor 1262	37324-23-5	200	200	84	ug/kg	U	UJ	C
Aroclor 1268	11100-14-4	200	200	110	ug/kg	U	UJ	C

Analysis Method 8270C

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
1,2,4-Trichlorobenzene	120-82-1	400	400	21	ug/kg	U	UJ	C
1,2-Dichlorobenzene	95-50-1	400	400	24	ug/kg	U	UJ	C
1,3-Dichlorobenzene	541-73-1	400	400	20	ug/kg	U	UJ	C
1,4-Dichlorobenzene	106-46-7	400	400	19	ug/kg	U	UJ	C
2,4,5-Trichlorophenol	95-95-4	500	500	130	ug/kg	UM	UJ	C, S
2,4,6-Trichlorophenol	88-06-2	500	500	130	ug/kg	UM	UJ	C, Q, S
2,4-Dichlorophenol	120-83-2	500	500	120	ug/kg	U	UJ	C, S
2,4-Dimethylphenol	105-67-9	400	400	100	ug/kg	U	UJ	C, S
2,4-Dinitrophenol	51-28-5	2000	2000	700	ug/kg	UM	R	Q
2,4-Dinitrotoluene	121-14-2	400	400	24	ug/kg	U	UJ	C
2,6-Dinitrotoluene	606-20-2	400	400	24	ug/kg	U	UJ	C
2-Chloronaphthalene	91-58-7	400	400	23	ug/kg	U	UJ	C
2-Chlorophenol	95-57-8	500	500	340	ug/kg	U	UJ	C, S
2-Methyl-4,6-dinitrophenol	534-52-1	1000	1000	270	ug/kg	UM	R	Q
2-Methylnaphthalene	91-57-6	400	400	25	ug/kg	U	UJ	C
2-Methylphenol	95-48-7	1000	1000	420	ug/kg	U	UJ	C, S
2-Nitroaniline	88-74-4	400	400	23	ug/kg	U	UJ	C
2-Nitrophenol	88-75-5	500	500	280	ug/kg	U	UJ	C, S
3,3'-Dichlorobenzidine	91-94-1	500	500	150	ug/kg	U	UJ	C
3-Nitroaniline	99-09-2	1000	1000	22	ug/kg	U	UJ	C
4-Bromophenyl phenyl ether	101-55-3	400	400	25	ug/kg	U	UJ	C
4-Chloro-3-methylphenol	59-50-7	500	500	380	ug/kg	U	UJ	C, S
4-Chloroaniline	106-47-8	400	400	39	ug/kg	U	UJ	C, L, Q
4-Chlorophenyl phenyl ether	7005-72-3	400	400	26	ug/kg	U	UJ	C
4-Methylphenol	1319-77-3	2000	2000	660	ug/kg	U	UJ	C, S
4-Nitroaniline	100-01-6	1000	1000	30	ug/kg	U	UJ	C
4-Nitrophenol	100-02-7	1000	1000	400	ug/kg	U	UJ	C, S
Acenaphthene	83-32-9	71	400	24	ug/kg	J	J	C

Analysis Method 8270C

Acenaphthylene	208-96-8	400	400	24	ug/kg	U	UJ	C
Acetophenone	98-86-2	400	400	76	ug/kg	U	UJ	C
Anthracene	120-12-7	210	400	24	ug/kg	J	J	C
Benzidine	92-87-5	2000	2000	960	ug/kg	UM	R	L, Q
Benzo(a)anthracene	56-55-3	640	400	25	ug/kg			
Benzo(a)pyrene	50-32-8	600	400	23	ug/kg			
Benzo(b)fluoranthene	205-99-2	900	400	25	ug/kg			
Benzo(g,h,i)perylene	191-24-2	350	400	22	ug/kg	J	J	C
Benzo(k)fluoranthene	207-08-9	290	400	25	ug/kg	J	J	C
Benzoic acid	65-85-0	990	990	290	ug/kg	U	UJ	C, Q, S
Benzyl alcohol	100-51-6	1000	1000	84	ug/kg	U	UJ	C, *III
Bis(2-chloroethoxy)methane	111-91-1	400	400	23	ug/kg	U	UJ	C
Bis(2-chloroethyl) ether	111-44-4	400	400	25	ug/kg	U	UJ	C
Bis(2-chloroisopropyl) ether	108-60-1	400	400	30	ug/kg	U	UJ	C
Bis(2-ethylhexyl) phthalate	117-81-7	1000	1000	88	ug/kg	U	UJ	C
Butylbenzyl phthalate	85-68-7	400	400	74	ug/kg	U	UJ	C
Carbazole	86-74-8	180	400	28	ug/kg	J	J	C
Chrysene	218-01-9	610	400	25	ug/kg			
Dibenzo(a,h)anthracene	53-70-3	400	400	22	ug/kg	U	UJ	C
Dibenzofuran	132-64-9	43	400	24	ug/kg	J	J	C
Diethyl phthalate	84-66-2	400	400	65	ug/kg	U	UJ	C
Dimethyl phthalate	131-11-3	400	400	64	ug/kg	U	UJ	C
Di-n-butyl phthalate	84-74-2	130	400	80	ug/kg	J	J	C
Di-n-octyl phthalate	117-84-0	400	400	59	ug/kg	U	UJ	C
Fluoranthene	206-44-0	1600	400	26	ug/kg	M		
Fluorene	86-73-7	79	400	25	ug/kg	J	J	C
Hexachlorobenzene	118-74-1	400	400	28	ug/kg	U	UJ	C
Hexachlorobutadiene	87-68-3	400	400	63	ug/kg	U	UJ	C
Hexachlorocyclopentadiene	77-47-4	400	400	52	ug/kg	UM	UJ	C, Q
Hexachloroethane	67-72-1	400	400	33	ug/kg	U	UJ	C
Indeno(1,2,3-cd)pyrene	193-39-5	350	400	23	ug/kg	J	J	C
Isophorone	78-59-1	400	400	50	ug/kg	U	UJ	C

Analysis Method 8270C

Naphthalene	91-20-3	23	400	21	ug/kg	J	J	C
Nitrobenzene	98-95-3	400	400	59	ug/kg	U	UJ	C
N-Nitroso-di-n-propylamine	621-64-7	400	400	71	ug/kg	U	UJ	C
N-Nitrosodiphenylamine	86-30-6	810	810	50	ug/kg	U	UJ	C
N-Nitrosopyrrolidine	930-55-2	400	400	56	ug/kg	U	UJ	C
Pentachlorophenol	87-86-5	1000	1000	240	ug/kg	UM	R	Q
Phenanthrene	85-01-8	870	400	26	ug/kg			
Phenol	108-95-2	500	500	160	ug/kg	U	UJ	C, S
Pyrene	129-00-0	1100	400	26	ug/kg			

Analysis Method 8330B

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name: 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
1,3,5-Trinitrobenzene	99-35-4	0.41	0.44	0.13	mg/kg	J	J	C
1,3-Dinitrobenzene	99-65-0	0.44	0.44	0.08	mg/kg	U	UJ	C
2,4,6-Trinitrotoluene	118-96-7	26	4.4	0.9	mg/kg	M	J	C, Q
2,4-Dinitrotoluene	121-14-2	0.44	0.44	0.2	mg/kg	U	UJ	C
2,6-Dinitrotoluene	606-20-2	0.5	0.5	0.07	mg/kg	U	UJ	C
2-Amino-4,6-dinitrotoluene	35572-78-2	0.3	0.44	0.05	mg/kg	J	J	C
2-Nitrotoluene	88-72-2	0.44	0.44	0.09	mg/kg	U	UJ	C
3-Nitrotoluene	99-08-1	0.44	0.44	0.07	mg/kg	U	UJ	C
4-Amino-2,6-dinitrotoluene	19406-51-0	0.44	0.44	0.07	mg/kg	UM	R	Q
4-Nitrotoluene	99-99-0	0.5	0.5	0.07	mg/kg	U	UJ	C
HMX	2691-41-0	0.44	0.44	0.12	mg/kg	U	UJ	C
Nitrobenzene	98-95-3	0.44	0.44	0.04	mg/kg	U	UJ	C
Nitroglycerin	55-63-0	15	15	5	mg/kg	U	UJ	C
PETN	78-11-5	1.5	1.5	0.5	mg/kg	U	UJ	C
RDX	121-82-4	0.44	0.44	0.16	mg/kg	U	UJ	C
Tetryl	479-45-8	0.44	0.44	0.09	mg/kg	U	UJ	C

Validated Sample Result Forms: L10090608

Analysis Method 6010B

Sample Name LLIS-528M-3059-SO **AnalysisType:** RES

Lab Sample Name: L10090608-02 **Validation Level:** IV

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Aluminum	7429-90-5	4600	15.1	7.57	mg/kg		J-	A
Barium	7440-39-3	42.8	0.378	0.0757	mg/kg			
Cadmium	7440-43-9	0.0988	0.0757	0.0378	mg/kg		J-	C
Chromium	7440-47-3	19.2	0.189	0.0908	mg/kg			
Manganese	7439-96-5	348	0.378	0.189	mg/kg			

Analysis Method 6020

Sample Name LLIS-528M-3059-SO **AnalysisType:** DL

Lab Sample Name: L10090608-02 **Validation Level:** IV

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Antimony	7440-36-0	0.354	0.502	0.251	mg/kg	J	J	
Arsenic	7440-38-2	7.24	1.46	0.728	mg/kg			
Lead	7439-92-1	35.2	0.971	0.485	mg/kg			

Analysis Method 8082

Sample Name LLIS-528M-3059-SO **AnalysisType:** RES

Lab Sample Name: L10090608-02 **Validation Level:** IV

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Aroclor-1016	12674-11-2	8.14	16.3	8.14	ug/kg	U	U	
Aroclor-1221	11104-28-2	8.14	16.3	8.14	ug/kg	U	U	
Aroclor-1232	11141-16-5	8.14	16.3	8.14	ug/kg	U	U	
Aroclor-1242	53469-21-9	8.14	16.3	8.14	ug/kg	U	U	
Aroclor-1248	12672-29-6	8.14	16.3	8.14	ug/kg	U	U	
Aroclor-1254	11097-69-1	511	16.3	8.14	ug/kg			
Aroclor-1254	11097-69-1	566	16.3	8.14	ug/kg		R	D
Aroclor-1260	11096-82-5	8.14	16.3	8.14	ug/kg	U	U	

Analysis Method 8270C

Sample Name LLIS-528M-3059-SO **AnalysisType:** RES

Lab Sample Name: L10090608-02 **Validation Level:** IV

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Benzo(a)anthracene	56-55-3	658	171	85.4	ug/kg			
Benzo(a)pyrene	50-32-8	594	171	85.4	ug/kg			
Benzo(b)fluoranthene	205-99-2	532	171	85.4	ug/kg			
Dibenzo(a,h)Anthracene	53-70-3	96.6	171	85.4	ug/kg	J	J	

Analysis Method 8330

Sample Name LLIS-528M-3059-SO **AnalysisType:** DL

Lab Sample Name: L10090608-02 **Validation Level:** IV

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
2,4,6-Trinitrotoluene	118-96-7	50	4.94	1.98	mg/kg			
2,4,6-Trinitrotoluene	118-96-7	51.7	4.94	1.98	mg/kg		R	D
2,4,6-Trinitrotoluene	118-96-7	52	0.247	0.0988	mg/kg	I	R	D
RDX	121-82-4	0.0988	0.247	0.0988	mg/kg	U	J	$, result changed from ND at the MDL

Analysis Method SM3500Cr-D 7196A

Sample Name LLIS-528M-3059-SO **AnalysisType:** RES

Lab Sample Name: L10090608-02 **Validation Level:** IV

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Chromium, Hexavalent, Leachable	7440-47-3	0.249	0.499	0.249	mg/kg	U	U	

APPENDIX B

Sample Qualification Summary

Sample	AnalyteName	Result	RL	MDL	Units	Qualifier	Code	Val Level
LLIS-528M-3040-SO	RDX	0.365	0.248	0.0992	mg/kg		$, result changed from ND	ADR
LLIS-528M-3040-SO	Aluminum	1900	14.8	7.42	mg/kg	J-	A	ADR
LLIS-528M-3059-SO	RDX	0.108	0.247	0.0988	mg/kg	J	$, result changed from ND	IV
LLIS-528M-3059-SO	Aluminum	4600	15.1	7.57	mg/kg	J-	A	IV
LLIS-528M-3059-SO	Cadmium	0.0988	0.076	0.0378	mg/kg	J-	C	IV
LLIS-528M-3061-SO	Aluminum	4770	13.9	6.96	mg/kg	J-	A	ADR
LLIS-528M-3062-SO	RDX	0.141	0.249	0.0995	mg/kg	J	$, result changed from ND	ADR
LLIS-528M-3062-SO	Aluminum	4520	14.8	7.38	mg/kg	J-	A	ADR
LLIS-531M-3043-SO	Aluminum	3230	14.8	7.4	mg/kg	J-	A	ADR
LLIS-531M-3063-SO	2,4,6-Trinitrotoluene	18.9	4.94	1.98	mg/kg	J-	Q	ADR
LLIS-531M-3063-SO	Aluminum	2510	14.6	7.28	mg/kg	J-	A	ADR

APPENDIX C

Primary/Field Duplicate Sample Comparisons

SampleID	Analyte	Result	RL	Units	Qualifier	Field Duplicate	Result	RL	Units	Qualifier	RPD	w/in RL
LLIS-528M-3059-SO	Antimony	0.354	0.502	mg/kg	J	LLIS-528M-3061-SO	0.592	0.495	mg/kg		N/A	Yes
LLIS-528M-3059-SO	Arsenic	7.24	1.46	mg/kg		LLIS-528M-3061-SO	9.77	1.49	mg/kg		N/A	No
LLIS-528M-3059-SO	Lead	35.2	0.971	mg/kg		LLIS-528M-3061-SO	56.4	0.994	mg/kg		46.3	N/A
LLIS-528M-3059-SO	Aluminum	4600	15.1	mg/kg	J-	LLIS-528M-3061-SO	4770	13.9	mg/kg	J+	3.6	N/A
LLIS-528M-3059-SO	Barium	42.8	0.378	mg/kg		LLIS-528M-3061-SO	44.9	0.348	mg/kg		4.8	N/A
LLIS-528M-3059-SO	Cadmium	0.0988	0.0757	mg/kg	J-	LLIS-528M-3061-SO	0.125	0.0696	mg/kg		N/A	Yes
LLIS-528M-3059-SO	Chromium	19.2	0.189	mg/kg		LLIS-528M-3061-SO	17	0.174	mg/kg		12.2	N/A
LLIS-528M-3059-SO	Manganese	348	0.378	mg/kg		LLIS-528M-3061-SO	393	0.348	mg/kg		12.1	N/A
LLIS-528M-3059-SO	Hexavalent Chromium	0.249	0.499	mg/kg	U	LLIS-528M-3061-SO	0.0997	0.199	mg/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1016	8.14	16.3	ug/kg	U	LLIS-528M-3061-SO	8.32	16.6	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1221	8.14	16.3	ug/kg	U	LLIS-528M-3061-SO	8.32	16.6	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1232	8.14	16.3	ug/kg	U	LLIS-528M-3061-SO	8.32	16.6	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1242	8.14	16.3	ug/kg	U	LLIS-528M-3061-SO	8.32	16.6	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1248	8.14	16.3	ug/kg	U	LLIS-528M-3061-SO	8.32	16.6	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1254	511	16.3	ug/kg		LLIS-528M-3061-SO	1820	166	ug/kg		112.3	N/A
LLIS-528M-3059-SO	Aroclor-1260	8.14	16.3	ug/kg	U	LLIS-528M-3061-SO	8.32	16.6	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	2,4,6-Trinitrotoluene	50	4.94	mg/kg		LLIS-528M-3061-SO	17.2	4.97	mg/kg		N/A	No
LLIS-528M-3059-SO	RDX	0.108	0.247	mg/kg	J	LLIS-528M-3061-SO	0.0994	0.249	mg/kg	U	N/A	Yes
LLIS-528M-3059-SO	Benzo(a)anthracene	658	171	ug/kg		LLIS-528M-3061-SO	615	165	ug/kg		N/A	Yes
LLIS-528M-3059-SO	Benzo(a)pyrene	594	171	ug/kg		LLIS-528M-3061-SO	574	165	ug/kg		N/A	Yes
LLIS-528M-3059-SO	Benzo(b)fluoranthene	532	171	ug/kg		LLIS-528M-3061-SO	571	165	ug/kg		N/A	Yes
LLIS-528M-3059-SO	Dibenzo(a,h)Anthracene	96.6	171	ug/kg	J	LLIS-528M-3061-SO	82.5	165	ug/kg	U	N/A	Yes

ClientSampleID	Analyte	Result	RL	Units	Qualifier	Blind Duplicate	Result	RL	Units	Qualifier	RPD	w/in RL
LLIS-528M-3059-SO	Antimony	0.354	0.502	mg/kg	J	LLIS-528M-3062-SO	0.384	0.49	mg/kg	J	N/A	Yes
LLIS-528M-3059-SO	Arsenic	7.24	1.46	mg/kg		LLIS-528M-3062-SO	8.23	1.49	mg/kg		N/A	Yes
LLIS-528M-3059-SO	Lead	35.2	0.971	mg/kg		LLIS-528M-3062-SO	49.5	0.992	mg/kg		33.8	N/A
LLIS-528M-3059-SO	Aluminum	4600	15.1	mg/kg	J-	LLIS-528M-3062-SO	4520	14.8	mg/kg	J+	1.8	N/A
LLIS-528M-3059-SO	Barium	42.8	0.378	mg/kg		LLIS-528M-3062-SO	36.1	0.369	mg/kg		17.0	N/A
LLIS-528M-3059-SO	Cadmium	0.0988	0.0757	mg/kg	J-	LLIS-528M-3062-SO	0.161	0.0738	mg/kg		N/A	Yes
LLIS-528M-3059-SO	Chromium	19.2	0.189	mg/kg		LLIS-528M-3062-SO	15.8	0.185	mg/kg		19.4	N/A
LLIS-528M-3059-SO	Manganese	348	0.378	mg/kg		LLIS-528M-3062-SO	317	0.369	mg/kg		9.3	N/A
LLIS-528M-3059-SO	Hexavalent Chromium	0.249	0.499	mg/kg	U	LLIS-528M-3062-SO	0.252	0.503	mg/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1016	8.14	16.3	ug/kg	U	LLIS-528M-3062-SO	8.66	17.3	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1221	8.14	16.3	ug/kg	U	LLIS-528M-3062-SO	8.66	17.3	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1232	8.14	16.3	ug/kg	U	LLIS-528M-3062-SO	8.66	17.3	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1242	8.14	16.3	ug/kg	U	LLIS-528M-3062-SO	8.66	17.3	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1248	8.14	16.3	ug/kg	U	LLIS-528M-3062-SO	8.66	17.3	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1254	511	16.3	ug/kg		LLIS-528M-3062-SO	1490	173	ug/kg		97.9	N/A
LLIS-528M-3059-SO	Aroclor-1260	8.14	16.3	ug/kg	U	LLIS-528M-3062-SO	8.66	17.3	ug/kg	U	N/A	Yes
LLIS-528M-3059-SO	2,4,6-Trinitrotoluene	50	4.94	mg/kg		LLIS-528M-3062-SO	16.7	4.98	mg/kg		N/A	No
LLIS-528M-3059-SO	RDX	0.108	0.247	mg/kg	J	LLIS-528M-3062-SO	0.141	0.249	mg/kg	J	N/A	Yes
LLIS-528M-3059-SO	Benzo(a)anthracene	658	171	ug/kg		LLIS-528M-3062-SO	581	162	ug/kg		N/A	Yes
LLIS-528M-3059-SO	Benzo(a)pyrene	594	171	ug/kg		LLIS-528M-3062-SO	552	162	ug/kg		N/A	Yes
LLIS-528M-3059-SO	Benzo(b)fluoranthene	532	171	ug/kg		LLIS-528M-3062-SO	567	162	ug/kg		N/A	Yes
LLIS-528M-3059-SO	Dibenzo(a,h)Anthracene	96.6	171	ug/kg	J	LLIS-528M-3062-SO	93.3	162	ug/kg	J	N/A	Yes

APPENDIX D

Validator Checklists

POLY CHLORINATED BIPHENYLS (PCB/AROCLORS) CHECKLIST

Project Name: Ravenna WI cont.

Laboratory: Microbac

Batch Number(s): 344067

Sample Delivery Group: 210090608

	Yes	No
1. Holding Time:		
(a) Were samples extracted within holding time?	[✓]	[ ]
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of five standards? (6)	[✓]	[ ]
• Did Aroclors 1016 and 1260 meet the RSD ≤ 20% or the r ≥ 0.99?	[✓]	[ ]
• Was manual integration "M" performed? If the answer is "Yes", check for supporting documents.	[✓]	[ ]
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		
• Was MDL Check performed?	[ ]	[✓]
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[✓]	[ ]
• Was the QC/MRL between 70-130% R	[✓]	[ ]
5. Initial Calibration Verification (ICV):		
Is the mid level (2nd source) recovery within 85 - 115%?	[✓]	[ ]

	Yes	No
6. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 12 hours?	[✓]	[ ]
• Was Drift or D ≤ 15% from the initial calibration with a maximum %D < 20% for a specific compound?	[✓]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[✓]	[ ]
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed?	[✓]	[ ]
• Were identified Aroclors confirmed on a second GC column?	[✓]	[ ]
• Were individual Aroclor standards used to determine the pattern of the peaks? (Individual Aroclors are 1221, 1232, 1242, 1248, and 1254. Both Aroclor 1016, and 1260 can be used from the mixed calibration standards.)	[✓]	[ ]
• Was RPD of target analyte conformation ≤ 40?	[✓]	[ ]
8. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits?	[ ]	[✓]
all ↑ Were the RPDs within control limits?	[✓]	[ ]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits?	[✓]	[ ]

9. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: L Calvin Date: 12-2-2010

Name: Lynn Calvin

SEMIVOLATILE ORGANIC ANALYSIS CHECKLIST

Project Name: Ravenna LL1 Cont.

Laboratory: Microbac

Batch Number(s): 344065

Sample Delivery Group: L100906008

	Yes	No
1. Sample Holding Time:		
(a) Were samples extracted within holding time?	[✓]	[ ]
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. Instrument Tuning:		
Was the DFTPP tune performed at the beginning of each 12-hour period during which samples were analyzed?	[✓]	[ ]
3. Ion Mass Assignments:		
Was mass assignment based on m/z 198?	[✓]	[ ]
4. Ion Abundance:		
Indicate if DFTPP ions abundance relative to m/z 198 base peak met the ions abundance criteria:		
m/z — Acceptance Criteria		
51 — 30.0 - 60.0 %	[✓]	[ ]
68 — < 2% of mass 69	[✓]	[ ]
70 — < 2% of mass 69	[✓]	[ ]
127 — 40-60%	[✓]	[ ]
197 — < 1%	[✓]	[ ]
198 — 100%, Base peak	[✓]	[ ]
199 — 5-9%	[✓]	[ ]
275 — 10 - 30%	[✓]	[ ]
365 — > 1%	[✓]	[ ]
441 — present but < mass 443	[✓]	[ ]
442 — > 40%	[✓]	[ ]
443 — 17-23% of mass 442	[✓]	[ ]

	Yes	No
5.0 Initial Calibration:		
• Did the initial calibration consist of five or more standards?	5-stds [ ] (4) more [✓]	[ ] [ ]
If the calibration curve consists of 5-standards, check validity of the calibration model.		
Was the linear model applied?	[✓]	[ ]
• Did the followings System Performance Check Compounds (SPCC) meet the minimum mean response factor (RF)?		
N-nitroso-di-n-propylamine RF 0.05	[✓]	[ ]
Hexachlorocyclopentadiene 0.05 (NTCs)	[✓]	[ ]
2,4-dinitrophenol 0.05	[✓]	[ ]
4-nitrophenol 0.05	[✓]	[ ]
• Did the RSD meet the criteria ≤ 30% for the followings each individual Calibration Check Compound (CCC)?		
Base/Neutral Fraction:		
Acenaphthene NTC	N/A [ ]	[ ]
1,4-Dichlorobenzene NTC	[ ]	[ ]
Hexachlorobutadiene	[ ]	[ ]
Diphenylamine	[ ]	[ ]
Di-n-octylphthalate	[ ]	[ ]
Fluoranthene	[ ]	[ ]
Benzo(a)pyrene	[✓]	[ ]
Acid Fraction:		
4-Chloro-3-methylphenol NTC	N/A [ ]	[ ]
2,4-Dichlorophenol	[ ]	[ ]
2-Nitrophenol	[ ]	[ ]
Phenol	[ ]	[ ]
Pentachlorophenol	[ ]	[ ]
2,4,6-Trichlorophenol	[ ]	[ ]
• Are the RSDs for the remaining target analytes ≤ 15%?	[✓]	[ ]
• If the answer is "No", are the mean RSDs ≤ 15% or r ≥ 0.99 with a mean RSD ≤ 15% with a maximum RSD ≤ 30%?	[✓] [✓]	[ ] [ ]

	Yes	No
• Was manual integration "M" performed?	[✓]	[ ]
If the answer is "Yes", check for supporting documents.		
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "No", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		

6. QCMDL:

• Was MDL Check performed?	[ ]	[✓]

7. QCMRL:

• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours?	[✓]	[ ]
• Was the QC/MRL between 70-130% R	[ ]	[✓]
one ↓ vec. dibenz(ah)anthracene @ 53.3/ J/@ in sample		
• For the non-contaminants of concern was the QC/MRL between 50-150% (Sporadic Marginal Failure)?	[✓]	[ ]

8. Initial Calibration Verification (ICV):

• Is the mid level (2nd source) recovery within 70-130% for contaminants of concern ?	[✓]	[ ]
• Is the mid level (2nd source) recovery within 50-150% for non-contaminants of concern (Sporadic Marginal Failure)?	[✓]	[ ]

9. Continuing Calibration Verification (CCV):

• Was CCV conducted every 12 hours?	[✓]	[ ]
• Did any of SPCC meet the minimum RF values?	[✓]	[ ]

		Yes	No
N-nitroso-di-n-propylamine	0.05	[✓]	[ ]
Hexachlorocyclopentadiene	0.05	[✓]	[ ]
2,4-dinitrophenol	0.05	[✓]	[ ]
4-nitrophenol	0.05	[✓]	[ ]

- Did the CCC meet the minimum requirements (D ≤ 20%) for the followings?

Base/Neutral Fraction:

Acenaphthene	(NPCs)	[✓]	[ ]
1,4-Dichlorobenzene		[✓]	[ ]
Hexachlorobutadiene		[✓]	[ ]
Diphenylamine		[✓]	[ ]
Di-n-octylphthalate		[✓]	[ ]
Fluoranthene		[✓]	[ ]
Benzo(a)pyrene		[✓]	[ ]

Acid Fraction:

4-Chloro-3-methylphenol	(NPCs)	[✓]	[ ]
2,4-Dichlorophenol		[✓]	[ ]
2-Nitrophenol		[✓]	[ ]
Phenol		[✓]	[ ]
Pentachlorophenol		[✓]	[ ]
2,4,6-Trichlorophenol		[✓]	[ ]

- Primary Evaluation: Was Drift or D ≤ 20% calculated from the initial calibration? [✓] [ ]
- Alternative Evaluation: Maximum allowable Drift/D for each target analyte is ≤ 30%. [✓] [ ]

10. Sample Analysis:

- Was the RRT of an identified component within ± 0.06 RRT units of the RRT of the standard component? [✓] [ ]
- Did the abundance of ions in the sample spectra agree within 30% of the major ions (> 10% of the base ion) in the standard spectra? (exc. J value for dilute calib anthracene) [✓] [ ]
- Were the internal standard areas within the QC limits (from -50% to +200%)? [✓] [ ]

11. Sample Quality Control:

	Yes	No
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits?	[✓]	[ ]
Were the RPD within control limits?	[✓]	[ ]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits? 2↓ in MB but w/in limits in validated sample	[✓]	[ ]

12. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: M Calvin Date: 11.30.2010

Name: Lynn S. Calvin

NITROAROMATICS & NITRAMINE DATA ANALYSIS (EXPLOSIVE RESIDUES) CHECKLIST

Project Name: Ravenna LLI Confirmation

Laboratory: Microbac

Batch Number(s): _____

Sample Delivery Group: L1009060 8

	Yes	No
1. Holding Time: Were samples analyzed within holding time?	[N]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of five standards?	[N]	[ ]
• Did the RSD meet the criteria ≤ 20% for each individual Calibration Compound or r ≥ 0.99?	[N]	[ ]
• Was manual integration "M" performed? If the answer is "Yes", check for supporting documents.	[ ]	[N]
• Was the manual integration necessary?	[ ]	[N]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		
• Was MDL Check performed?	[ ]	[N]
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[N]	[ ]
• Was the percentage "D" for QC/MRL ≤ 30%?	[N]	[ ]
5. Initial Calibration Verification (ICV):	[N]	[ ]

	Yes	No
• Was the ICV made of a 2nd source?	[X]	[ ]
• Was the mid level (2nd source) recovery within 85 - 115%?		
6. Continuing Calibration Verification (CCV): {Daily calibration}		
• Was midpoint calibration standard conducted at the beginning of the day?	[X]	[ ]
• Was midpoint calibration standard conducted every ten samples or every twelve hours?	[X]	[ ]
• Was midpoint calibration standard conducted after the last sample of the day?	[X]	[ ]
• Did the CCV meet the minimum requirements (D ≤ 15% with a maximum D ≤ 20% for a specific compound if the mean D ≤ 15%)?	[X]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[X]	[ ]
• Were all identified hits, above the initial calibration curve, diluted and reanalyzed?	[X]	[ ]
• Were all identified hits confirmed on a second column?	[ ]	[X]
• Was RPD of target analyte confirmation ≤ 40?	[X]	[ ]
• Was there a shoulder on the 2,4,6-TNT peak?	[ ]	[ ]
If the answer is "Yes", then tetryl decomposition is suspected. Peak height rather than peak area should be used for calculating TNT concentration. If teryl was identified in aqueous samples, was pH adjusted to <3? If the answer is "No", then check for tetryl decomposition, and qualify hits with **"J"** accordingly.	[ ]	[ ]
8. Sample Quality Control:	[X]	[ ]
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[X]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?		

	Yes	No
• MS/MSD: Were the percent recoveries within limits? LL1SS_531M-3063-SO >4x spike	[ ]	[ ]
Were the RPDs within control limits?		
• System Monitoring Compounds (Surrogates): Were surrogate recoveries within QC limits?	N	[ ]

9. Comments (attach additional sheets if necessary):

Need surr DL text

RDX from 1x, not confirmed b/c run @ 20x report 0.108 mg/kg

Validated/Reviewed by:

Signature: _____ Date: _____

Name: _____

+ICPMS

ICP METALS ANALYSIS (6010) CHECKLIST

Project Name: Ravenna LLI Confirmation

Laboratory: Microbac

Batch Number(s): _____

Sample Delivery Group: L1009060 8

	Yes	No
1. Holding Time:		
• Were samples analyzed within holding time (6-Months)?	[N]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of		
One calibration standard and a blank?	[ ]	[ ]
three calibration standards and a blank?	[N]	[ ]
• Was R ≥ 0.995	[N]	[ ]
3. QCMDL:		
• Was MDL Check performed?	[N]	[N/A]
QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[N]	[ ]
• Was the QC/MRL between 70-130% R? Common Elements can be between the MRL and 2X MRL level (Fe, Al, Mg and Ca)	[ ]	[N]
4. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 90 - 110%?	[N]	
5. Initial Calibration Blank (ICP):		

	Yes	No
• Were analytes in the blank ≤ 1/2 MRL?	[X]	[ ]

6. Interelement Check Standard:

• Was ICS-A (interferents only) conducted at the beginning of analytical sequence?	[X]	[ ]
• Was ICS-AB results within QC limits (80-120)?	[X]	[ ]

7. Continuing calibration Blank (CCB):

• Was CCB conducted every 10 samples?	[X]	[ ]
• Was CCB conducted at end of the analytical sequence?	[X]	[ ]
• Were analytes ≤ 1/2 MRL?	[X]	[ ]

8. Continuing Calibration Verification (CCV):

• Was CCV conducted every 10 samples?	[X]	[ ]
• Was CCV conducted at end of the analytical sequence?	[X]	[ ]
• Was the %R between 90-110?	[X]	[ ]

9. Sample Analysis:

• Were samples with levels higher than the calibration range (E), diluted and re-analyzed?	[ ]	[ ]

10. Sample Quality Control:

• Method Blanks: Were target analytes ≤ 1/2 MRL?	[X]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[X]	[ ]
• MS: Were the percent recoveries within limits?	[X]	[ ]
• MD: Were the RPDs within control limits?	[X]	[ ]

11. Serial Dilution:

• Was serial dilution (1:4) conducted when needed?	[X]	[ ]

	Yes	No
• Was there an agreement between diluted and undiluted results (<10%)?	[ ]	[N]
12. Method of Standard Addition (MSA):		
• Was MSA performed on samples suspected of matrix effect (R ≥ 0.995)?	[ ]	[ ]

13. Comments (attach additional sheets if necessary):

MRL Cd = 60% +58% but both ↓ MDL on CCB
MDL Cd ↓ MDL

MS on -06 -OK
Dup on -06 Cd (30%) but w/in ± RL
→ SD on -01 Al = 19.9% For 6010
on -02 For 6020

Validated/Reviewed by:

Signature: PMM MM Date: 11/30/10

Name: Patti Meeks

Hexavalent Chromium

~~CYANIDE~~ ANALYSIS CHECKLIST

Project Name: Ravenna LL1 Confirmation

Laboratory: Microbac

Batch Number(s): _____

Sample Delivery Group: L1009608

	Yes	No
1. Holding Time:		
• Were samples analyzed within holding time?	[N]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of		
One calibration standard and a blank?	[ ]	[ ]
5 ~~Six~~ calibration standards and a blank?	[N]	[ ]
• Was $R \geq 0.995$	[N]	[ ]
3. QCMDL:		
• Was MDL Check performed?	[ ]	[N]
4. QCMRL:		
• Were QC/MRL run at the beginning of every daily sequence??	[N]	[ ]
• Was the QC/MRL between 70-130% R?	[N]	[ ]
5. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within ~~80-120~~ 90-110%?	[N]	[ ]
7. Initial calibration Blank (ICP):		
• Were analytes in the blank ≤ 1/2 MRL?	[N]	[ ]

	Yes	No
7. Continuing calibration Blank (CCB):	[ ]	[ ]
• Was CCB conducted every 10 samples? N/A	[ ]	[N]
• Was CCB conducted at end of the analytical sequence?	[N]	[ ]
• Were analytes ≤ 1/2 MRL?		
8. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 10 samples? N/A	[ ]	[ ]
• Was the %R between ~~80-120~~ 90-110%?	[N]	[N]
	[N]	[ ]
9. Sample Analysis:		
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed?	[ ]	[ ]
12. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[N]	[ ]
• LCS: Were the percent recoveries for LCS within the limits? & LCSD	[N]	[ ]
• MS: Were the percent recoveries within limits? LLISS-531M-3063-SO	[ ]	[ ]
• MD: Were the RPDs within control limits? LLISS-531M-3063-SO	[N]	[ ]

13. Comments (attach additional sheets if necessary):

Sample @ 5X

	Yes	No

Validated/Reviewed by:

Signature: Patti Meeks Date: 11/30/10

Name: Patti Meeks

U.S. Army Corps of Engineers
Louisville District

Ravenna Army Ammunition Plant
Load Line 1 Confirmation Sampling, September 2010
Ravenna, Ohio

Chemical Quality Assurance Report
Sample Delivery Group:
81532

August 2011

Prepared for:
U.S. Army Corps of Engineers
Louisville District
Contract No. W912QR-08-D-0001
Delivery Order 0026

Prepared by:
MEC^X, LP
12269 East Vassar Drive
Aurora, Colorado 80014

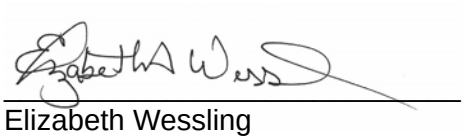
CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

MEC^X, LP (MEC^X) has completed the Chemical Quality Assurance Report for Sample Delivery Group 81532 from the Ravenna Army Ammunition Plant Load Line 1 Confirmation Sampling, September 2010. Notice is hereby given that an independent technical review has been conducted to determine the usability and bias of the analytical data.

Significant concerns and the resolution are as follows:

None.

As noted above, all concerns resulting from this independent technical review have been considered.



Elizabeth Wessling
Senior Environmental Chemist
MEC^X Independent Technical Review Team Leader

Patti Meeks, Ph.D.
Senior Environmental Chemist
MEC^X Independent Technical Review Team Member

Executive Summary

The overall objective of the project described in this document was to determine if contaminants are present in the soils beneath the former building slabs at Load Line 1.

The following analyses were performed for all primary samples by Microbac Laboratories, Inc. (Microbac) located in Marietta, Ohio:

- United States Environmental Protection Agency (USEPA) SW-846 Method 6010B and 6020 for eight metals
- USEPA SW-846 Method 8270C for four semivolatile compounds (SVOCs)
- USEPA SW-846 Method 8082 for seven polychlorinated biphenyls (PCBs)
- USEPA SW-846 Method 8330B for two explosive compounds
- USEPA SW-846 Method 7196A for hexavalent chromium

The following analyses were performed for the quality assurance (QA) sample by CT Laboratories (CT) in Baraboo, Wisconsin:

- United States Environmental Protection Agency (USEPA) SW-846 Method 6010B and 6020 for 22 metals
- USEPA SW-846 Method 7471A for mercury
- USEPA SW-846 Method 8270C for 75 semivolatile compounds (SVOCs)
- USEPA SW-846 Method 8082 for nine polychlorinated biphenyls (PCBs)
- USEPA SW-846 Method 8330B for 15 explosive compounds
- USEPA SW-846 Method 7196A for hexavalent chromium

Some data were rejected for poor matrix spike/matrix spike duplicate (MS/MSD) or laboratory control sample (LCS) recoveries. All remaining data were usable for its intended purpose with the qualification applied by MEC^{X}.

Specific concerns regarding the QA data are noted below:

- Only the following analytes were contaminants of concern and required analysis:
  - Metals – aluminum, antimony, arsenic, barium, cadmium, chromium, lead, manganese, and hexavalent chromium
  - Explosives – RDX and 2,4,6-trinitrotoluene
  - PCBs – Aroclor-1254
  - SVOCs – benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluroanthene, dibenz(a,h)anthracene
- For the analytes that were not contaminants of concern:
  - All nondetected PCB results (reported undiluted) had reporting limits (RLs) that exceeded the project criteria (excluding Aroclor-1254)
  - Forty-one SVOC analyte RLs exceeded project criteria and four SVOC analytes had method detection limits (MDLs) and RLs that exceeded the project criteria

- Eight explosive analyte RLs exceeded project criteria and one explosive analyte with an MDL and RL that exceeded the project criterion
- Three SVOC analytes had no project reporting limit criteria

Specific concerns regarding the primary data are noted below:

- None

Acronyms and Abbreviations

ADR	Automated Data Review
CCB	Continuing Calibration Blank
CCC	Calibration Check Compounds
CCV	Continuing Calibration Verification
DoD	Department of Defense
ICSA	Interference Check Sample A
ICSAB	Interference Check Sample AB
ICV	Initial Calibration Verification
ICP	Inductively Coupled Plasma
LCG	Louisville Chemistry Guidance
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MRL	Method Reporting Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MDL	Method Detection Limit
PCB	Polychlorinated Biphenyl
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SDG	Sample Delivery Group
SPCC	System Performance Check Compound
SVOC	Semivolatile Organic Compounds
TNT	Trinitrotoluene
USACE	United State Army Corps of Engineers
USEPA	United State Environmental Protection Agency
UST	Underground Storage Tank

TABLE OF CONTENTS

Tables

Appendices

1 INTRODUCTION

1.1 PROJECT OVERVIEW

The overall objective of the project described in this document was to determine if contaminants are present in the soils below Load Line 1.

Sampling was conducted by URS Corporation (URS) in September 2010. Four primary, one field duplicate, one blind field duplicate soil samples, and one equipment rinsate sample were collected and analyzed by the primary laboratory, Microbac Laboratories, Inc. (Microbac) located in Marietta, Ohio. One soil QA sample was collected and analyzed by the QA laboratory, CT Laboratories in Baraboo, Wisconsin. The following analyses were performed:

Table 1. Laboratory preparation and analysis methods

	Microbac		CT	
Parameter	**Method**	**Preparation Method**	**Method**	**Preparation Method**
Explosives	8330B	8330B	8330B	8330B
Hexavalent Chromium	7196A	3060A	7196A	3060A
Metals	6010B, 6020	3051	6010C	3050
Mercury	N/A	N/A	7471A	7471A
PCBs	8082	3550B	8082	3545
Semivolatiles	8270C	3545	8270C	3546

Preparation or analytical methods differed slightly between the laboratories for all methods except explosives. Differences in the preparation methods were expected to have little affect on the sample results. CT reported all metals by 6010C while Microbac reported antimony, arsenic, and lead by 6020. Generally, method 6020 is more sensitive as a mass spectrometer provides definitive identification. The data were not adversely affected by these differences.

This report describes findings of data validation performed by MEC^X, LP (MEC^X) on the site samples reported in one sample delivery group (SDG) from CT.

1.2 PREVIOUS ACTIVITIES AND DATA

The following summary was adapted from the Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (FWQAPP) prepared by Science Applications International Corporation (SAIC).

Located in northeastern Ohio on approximately 21,000 acres, RVAAP was established in 1940 to load, store, and demilitarize conventional artillery ammunition, bombs, mines, fuses and boosters, primers and percussion elements. Originally RVAAP operated as two separate units, the Portage Ordnance Depot and the Ravenna Ordnance Plant. During World War II, a contractor operated the Ravenna Ordnance Depot and the government operated the Portage Ordnance Depot. Ordnance production and storage for World War II continued until August

1945, at which time the facility was renamed as the Ravenna Arsenal, and the government assumed control of all operations. From 1951 to 1999, the entire facility was operated by contractors. Ordnance production at the facility was phased out and sent to Plum Brook Ordnance Works in Sandusky, Ohio and Keystone Ordnance Works in Meadville, Pennsylvania. All production at the facility had ceased by 1957 and the plant was placed on standby. In 1961, the plant was operational for seven months, processing and performing explosive melt-out of bombs. After deactivation late in 1961, the facility was renamed RVAAP. From mid-1968 until 1971, the plant was reactivated to load, assemble, and pack munitions on three load lines and two component lines. Operations ceased at Load Lines 1, 2, 3, and 4 in 1971; however, the Lines were reactivated to perform demilitarization operations for several months in 1973 and 1974. In 1992, RVAAP was again placed on “Inactive” status. Salvage and demolition operations started in 1998 and administrative control of the facility was transferred to the Ohio Army National Guard in 1999.

Since 1978, approximately 20 environmental investigations have been performed at RVAAP. Only a portion of these investigations are discussed below.

In 1989, the USEPA contracted Jacobs Engineering to perform a Resource Conservation and Recovery Act Facility Assessment. Thirty-one solid areas of concern were identified during the assessment; 13 of which were recommended for no further action. In 1996, the United States Army Corps of Engineers (USACE) performed a facility-wide preliminary assessment and conducted Phase I remedial investigations at 11 areas of concern. Salvage and demolition operations were performed in 1998. Monitoring wells were installed and a Phase II remedial investigation was performed at Load Line 1 by the USACE in 1999 and 2000, respectively.

Operations at the Load Lines consisted of melting and loading energetic compounds into large caliber shells. Water to wash down the lines and the building was collected in concrete sumps and discharged to a drainage ditch or settling pond. Soil and dry sediments outside the footprints of the buildings were removed by Shaw Engineering in 2003 and demolition of the buildings began in 2001. Soil samples collected by Shaw in 2003 found that the soils below the building slabs and foundations of Load Line 1 were more contaminated than Load Lines 2-4. At the time, the slabs and foundations were left intact in order to prevent water infiltration to the contaminated soils below. Floor slabs were subsequently removed and the soil samples described in this report were collected from beneath Load Line 1.

2 DESCRIPTION OF WORK PERFORMED

This section describes the data validation procedures used during the evaluation of the site sample and the assessments performed on the resulting data.

2.1 CHEMICAL QUALITY ASSURANCE REPORT TASKS

The QA sample was compared to the primary sample using the criteria in the FWQAPP. This data is presented in Section 4.0. The final electronic data deliverables (EDD) were then reviewed to determine the analytical completeness for the project. This data is presented in Section 5.0.

2.2 DATA VALIDATION PROCESS

One QA sample, presented in the table below, was validated at Level III.

Table 2. Validated QA sample identification table

Client Sample ID	Laboratory ID	Collected	Val Level	Validated Methods
LL1SS-528M-3060-QA	81532	9/21/2010	III	6010C, 7471A, 7196A, 8082, 8270C, 8330B

Data validators assessed results based on the FWQAPP, Quality Assurance Project Plan Addendum for the Sampling of Soils Below Floor Slabs at LLs-2, 3, 4, and Excavation and Transportation of Contaminated Soils to Load Line 4 (QAPP Addendum), Louisville Chemistry Guideline Version 5 (LCG), Shell for Analytical Chemistry Requirements (Shell), Department of Defense Quality Systems Manual for Environmental Laboratories Version 3 (DoD QSM), the specific EPA methods, the National Functional Guidelines for Organic Data Review (1994), and the National Functional Guidelines for Inorganic Data Review (1994). The specific items reviewed during Level III data validation are:

- Sample management (collection techniques, sample containers, preservation, handling, transport, chain-of-custody, holding times),
- Calibration data summary forms (initial and continuing),
- Method blank sample results,
- Laboratory control sample (LCS) or LCS/LCS duplicate (LCS/LCSD) recoveries and/or precision,
- Surrogate recoveries (if applicable),
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries and precision,
- Field QA/QC sample results,
- Other QC indicators as applicable,
- Gas Chromatography/Mass Spectrometry (GC/MS) tuning, if a GC/MS is used,
- Internal standards performance.

2.3 DATA VALIDATION QUALIFIERS

Data qualifiers, as defined below, were applied following the documents noted in Section 2.2:

U Nondetected at the limit of detection
The analyte was analyzed for but not definitively detected.

J Estimated
The identification of the analyte is acceptable but the quality assurance criteria indicate that the quantitative values may be outside the normal expected range of precision. Additionally used to identify detects reported below the reporting limit.

N Identity Presumptive and Tentative
There is presumptive evidence that the analyte is present but it has not been confirmed. There is an indication that the reported analyte is present; however, all quality control requirements necessary for confirmation were not met.

R Rejected
Data are considered to be rejected and shall not be used for environmental decisions.

Flagging Codes

The qualification codes in the following table may have been used to flag the data described in this document: Sample qualifications are summarized in Appendix B. All qualifications and associated qualification codes have been entered into the electronic data deliverables (EDD) received from the laboratories.

Table 3. Qualification code reference table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect.
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient was noncompliant.
R	Calibration RRF was noncompliant.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
Q	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	Not applicable	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable.	ICP Serial Dilution %D were not within control limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tuning was noncompliant
T	Presumed contamination as indicated by the trip blank results.	Not applicable.
+	False positive – reported compound was not	False positive – reported compound was not

Qualifier	Organics	Inorganics
	present.	present.
-	False negative – compound was present but not reported.	False negative – compound was present but not reported.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).

3 DATA ACQUISITION ACTIVITIES

3.1 SAMPLE COLLECTION

One multi-incremental soil sample was collected in September 2010. The sample was submitted under chain of custody to the QA laboratory, CT. All results were report in one SDG.

The chain of custody was appropriately signed by both field and/or laboratory personnel with the sample and all analyses accounted for and within the temperature limits of 4±2°C. No cooler custody seals were used; however, the laboratory noted that the tape used to seal the coolers was intact. All documentation regarding sample handling as presented in the case narratives, chains of custody, correspondence, and sample condition upon receipt forms, was evaluated.

3.2 SAMPLE ANALYSIS

CT analyzed one sample by USEPA SW-846 Method 6010C for 22 metals, USEPA SW-846 Method 741A for mercury, USEPA SW-846 Method 8270C for 75 SVOCs, USEPA SW-846 Method 8082 for nine PCBs, USEPA SW-846 Methods 8330B for 15 explosives, and USEPA SW-846 Method 7196A for hexavalent chromium.

Only the following analytes were contaminants of concern and required analysis:

- Metals – aluminum, antimony, arsenic, barium, cadmium, chromium, lead, manganese, and hexavalent chromium
- Explosives – RDX and 2,4,6-trinitrotoluene
- PCBs – Aroclors-1016, -1221, -1232, -1242, -1248, -1254, -1260
- SVOCs – benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluroanthene, dibenz(a,h)anthracene

3.3 DATA COMPLETENESS

Data completeness for the project described in this report was found to be acceptable as no deliverables were missing.

3.4 HOLDING TIME REQUIREMENTS

The soil extraction and analytical holding times for the analyses reviewed in this document are as follows:

Method	Analysis	Extraction Holding Time	Analysis Holding Time
SW-846 Method 6010C	Metals	N/A	180 days
SW-846 Method 7471A	Mercury	N/A	28 days
SW-846 Method 8270C	SVOCs	14 days	40 days
SW-846 Method 8082	PCBs	14 days	40 days

Method	Analysis	Extraction Holding Time	Analysis Holding Time
SW-846 Method 8330B	Explosives	14 days	40 days
SW-846 Method 7196A	Hexavalent chromium	30 days	7 days

All extraction and analytical holding times were met.

3.5 DETECTION LIMIT REQUIREMENTS

The following reporting limits for nondetected analytes exceeded the criteria listed in Tables 3.3 through 3.9 of the FWQAPP and Appendix A of the QAPP Addendum. Unless otherwise noted below, the MDLs met the project criteria:

- For the analytes that were not contaminants of concern:
  - All nondetected PCB results (reported undiluted; not including Aroclor-1254)
  - Forty-one SVOC analytes and four SVOC analytes with MDLs that also exceeded the project criteria
  - Eight explosive analytes and one explosive analyte with an MDL that also exceeded the project criteria

Three SVOC analytes had no project reporting limit criteria and the reporting limits for these analytes were not assessed.

4 QA DATA QUALITY EVALUATION

This section summarizes the data quality for each analytical method evaluated.

4.1 EXPLOSIVES

One sample was analyzed by CT for two explosives by USEPA SW-846 Method 8330B.

- MDL studies were not evaluated as part of this project.
- Calibration: Calibration criteria were met, with one exception listed below.
    - Initial calibration average percent relative standard deviations (%RSDs) were within the control limits listed in the LCG Table 5 of ≤20%.
    - The second source initial calibration verification standard (ICV) recoveries were within the control limits listed in LCG Table 5 of 85-115%.
    - The continuing calibration verification (CCV) standard %Ds for the retained analytes (see the Matrix Spike/Matrix Spike Duplicate section) were within the control limits listed in LCG Table 5 of ≤15%.
    - No MRL standards were analyzed in association with the samples; therefore, all nondetected results were qualified as estimated, "UJ," and all detects below 10× the reporting limit were qualified as estimated, "J." All qualified results were coded with a "C" qualification code. The detect for 2,4,6-trinitrotoluene was not qualified as the detect was >10× the reporting limit and at that concentration it was the reviewer's professional opinion that the CCVs adequately evaluated the instrument performance relative to the sample.
    - MDL checks were not analyzed in associated with the samples in these SDGs.
- Blanks: The method blank had no target compound detects above the control limit listed in LCG Table 5, of one-half the reporting limit for target compounds.
- Blank Spikes and Laboratory Control Samples: Recoveries were within the control limits listed in FWQAPP Table 3-1 of 40-140%.
- Surrogate Recovery: The surrogate recoveries were within the control limits listed in LCG Table 5 of 50-150%. Surrogate recoveries were not assessed in samples analyzed at 10× or greater dilutions as the surrogate was considered to be diluted out.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on the sample in this SDG. 4-Amino-2,6-dinitrotoluene was not recovered in either the MS or the MSD; therefore, nondetected 4-amino-2,6-dinitrotoluene in the sample was rejected, "R," and the result was coded with a "Q" qualification code. The remaining MS/MSD recoveries

and RPDs were within the control limits listed in FWQAPP Table 3-1 of 40-140% and ≤35%, respectively. The control limits do not apply when the native concentration is ≥4× the spike amount and nondetected results are not qualified for recoveries above the control limit.

- Compound Quantification and Reported Detection Limits: Compound quantification was not verified at a level III validation. The reporting limits were supported by the low point of the initial calibration. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  Target compound confirmation was performed by the laboratory for detects in the validated sample. RPDs were within the control limit listed in LCG Table 5 of ≤40%.

  The reviewer noted that the laboratory reported all detects from the primary column, regardless of the LCG requirement to report the higher of the two values unless there is evidence of matrix interference. The peak for 1,3,5-trinitrobenzene was affected by an incompletely resolved later-eluting peak; therefore, reporting the result from the primary column was deemed appropriate. The confirmation column results for both 2,4,6-trinitrotoluene and 2-amino-4,6-dinitrotoluene were both larger than the primary column results; however, both peaks appeared to contain additional baseline area that artificially increased the results. It was the reviewer's professional opinion that the primary column results for both analytes should be reported.

- System Performance: Review is not applicable at Level III validation.

- Manual integrations: Review is not applicable at Level III validation.

- Compound Identification: Compound identification was not verified at a Level III validation.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected and analyzed for explosives. There were no detects above the MDL the equipment rinsate sample.

4.2 POLYCHLORINATED BIPHENYLS (PCBS)

One sample was analyzed by CT for PCBs by USEPA SW-846 Method 8082.

- MDL studies were not evaluated as part of this project.

- Calibration: Calibration criteria were met.
    - Initial calibration %RSDs were within the control limit listed in LCG Table 3 of ≤20%.
    - The second source initial calibration verification standard (ICV) was within the control limits listed in LCG Table 3 of 85-115%.
    - The continuing calibration verification (CCV) standard %Ds were within the control limits listed in LCG Table 3 of ≤15%.
    - MRL standards were not analyzed in association with the validated samples. It was the reviewer's professional opinion that analysis of the MRL standards offers additional surety of results reported near the reporting limit; therefore, nondetected results were qualified as estimated, "UJ," and coded with a "C" qualification code. The detected results were >10× the reporting limit and qualifications were not applied as at these concentrations it was the reviewer's professional opinion that the CCVs adequately assessed the instrument's performance relative to the sample.
    - No MDL check was performed in association with the samples in these SDGs.
- Blanks: The method blanks had no target compound detects above the control limit listed in LCG Table 3, of one-half the reporting limit.
- Blank Spikes and Laboratory Control Samples: Recoveries were within the control limits listed in FWQAPP Table 3-1 of 40-140%.
- Surrogate Recovery: Recoveries were within the control limits listed in LCG Table 3 of 50-150%.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on LL1SS-528M-3060-QA. MS/MSD recoveries for Aroclor 1260 were 325% and 335%, respectively, attributed by the case narrative for this SDG to the parent sample concentration of Aroclor 1254. The sample detect for Aroclor 1254 was qualified as estimated, "J+" with a positive bias, and coded with a "Q" qualification code. Recoveries for Aroclor 1016 and all RPDs were within the control limits listed in FWQAPP Table 3-1 of 40-140% and ≤35%, respetively.
- Compound Identification: Compound identification was not verified at a Level III validation.
- Compound Quantification and Reported Detection Limits: Compound quantification was not verified at a Level III validation. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

In accordance with the LCG, the laboratory reported the higher of the two values unless there was an indication of interference with the higher concentration result. In that instance the lower result of the two values was reported.

The sample was analyzed on two analytical columns for target compound confirmation; however, the laboratory did not provide summary information for intercolumn %Ds. The reviewer calculated intercolumn %Ds for the sample detects, and both were ≤40%.

- System Performance: System performance is not evaluated at a Level III validation.
- Manual Integrations: Review is not applicable at a Level III validation.
- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:
    - Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected and analyzed for PCBs by the primary laboratory. There were no detects above the MDL in the equipment rinsate sample.

4.3 SEMIVOLATILE ORGANIC COMPOUNDS (SVOCS)

One sample was analyzed by CT for 75 semivolatile organic compounds by USEPA SW-846 Method 8270C.

- MDL studies were not evaluated as part of this project.
- GC/MS Tuning: The DFTPP tunes met the method abundance criteria. The samples were analyzed within 12 hours of the DFTPP injection time.
- Calibration: Calibration criteria were met.
    - Initial calibration average RRFs and ICV and CCV RRFs were within method control limits of ≥0.050 for system performance check compounds (SPCCs). The initial calibration %RSDs or r^2 were within the method control limits listed in the LCG Table 2, of ≤30% for calibration check compounds (CCCs) and ≤15% for %RSD or ≥0.990 for r^2 for remaining compounds affecting retained sample data.
    - All second source initial calibration verification standard recoveries affecting retained sample data were within the control limits listed in the LCG Table 2 of 70-130%.
    - The continuing calibration %Ds affecting retained sample data were within the method control limits of ≤20% listed in the LCG Table 2.

- MRL standards were not analyzed in association with the validated samples. It was the reviewer's professional opinion that analysis of the MRL standards offers additional surety of results reported near the reporting limit; therefore, the retained nondetected results were qualified as estimated, "UJ," and detects reported at concentrations less than 10× the reporting limit were qualified as estimated, "J." All results in the sample were qualified, and all qualified results were coded with a "C" qualification code.

- No MDL check standards were analyzed in association with these samples.

- Blanks: The method blanks had no target compound detects above the control limits listed in the LCG Table 2, of one-half the reporting limit for target compounds, and no common laboratory contaminant detects above the reporting limit.

- Blank Spikes and Laboratory Control Samples: Benzidine was recovered in the LCS at 4%, and 4-chloroaniline was recovered at 36%; therefore, the nondetected result for benzidine was rejected, "R," and the nondetected result for 4-chloroaniline was qualified as estimated, "UJ." Both results were coded with an "L" qualification code. Please note that neither qualified compound was a contaminant of concern. The remaining LCS recoveries were within the control limits listed in the FWQAPP Table 3-1 of 45-135%.

- Surrogate Recoveries: Recoveries for 2,4,6-tribromophenol and 2-fluorophenol were below the control limits at 34% and 49%, respectively. All acid target analytes were qualified as estimated, "J," for detects, or "UJ," for nondetects. Remaining surrogate recoveries were within the control limits of 50-150% listed in the LCG Table 2.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on LL1SS-528M-3060-QA. Outlier recoveries and RPDs affecting parent sample data are noted in the table below. Remaining recoveries and RPDs were within the control limits listed in FWQAPP Table 3-1 of 45-135% and ≤35%, respectively.

  Parent sample results were qualified only when both the MS and MSD recoveries were outside of the control limits. Nondetected results associated with recoveries less than 10% or average recoveries less than 10% were rejected, "R." All remaining retained results listed in the table below were qualified as estimated, "UJ," for nondetects and, "J," for detects. All qualified results were coded with a "Q" qualification code. Please note that none of the qualified compounds were contaminants of concern.

Samples qualified for MS/MSD recovery outliers		
Parent Sample	**Analyte**	**Recoveries**
LL1SS-528M-3060-QA	2,4,6-Trichlorophenol	35%, 44%
	2,4-Dinitrophenol	0%, 0%
	4,6-Dinitro-2-methylphenol	1%, 1%
	4-Chloroaniline	27%, 31%
	Benzidine	0%, 0%
	Benzoic acid	28%, 25%
	Hexachlorocyclopentadiene	22%, 29%

	Pentachlorophenol	0%, 0%

Bold analytes indicate rejected nondetected results.

The RPD for benzyl alcohol exceeded the QC limit at 38%. The result for benzyl alcohol was qualified as estimated, "UJ," and coded with an "*III" qualification code.

- Internal Standards Performance: The internal standard area counts and retention tmes were within the LCG Table 2 control limits established by the midpoint initial calibration standard: ±30 seconds for retention times and -50% / +100% for internal standard areas.

- Compound Identification: Verification of compound identification is not applicable at a Level III validation.

- Compound Quantification and Reported Detection Limits: Verification of compound quantification is not applicable at a Level III validation. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J," by the laboratory.

- System Performance: Review is not applicable at a Level III validation.

- Manual Integrations: Review is not applicable at a Level III validation; however, the reviewer noted that some routine manual integrations were performed for the samples.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    - Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG.

4.4 METALS

One sample was analyzed by CT for various metals by USEPA Methods 6010C and 7471A.

- MDL studies were not evaluated.

- Calibration: Except as noted below, calibration criteria were met.

    - Initial calibration: The mercury linear regression r value was within the control limit listed in LCG Table 9 of ≥0.995.

    - The inductively coupled plasma mass spectrometry (ICP) ICV and CCV recoveries were within the control limits listed in LCG Table 7 of 90-110% and Table 9 of 80-120% for mercury.

- MRL check standard recoveries were within the control limits listed in LCG Table 7 and Table 9 of 70-130%.

- No MDL check standards were analyzed in association with these samples.

- Method blanks and CCBs had no applicable detects above the control limit listed in the LCG Tables 7 and 9 of one-half the MRL.

- ICP interference check sample A (ICSA) and AB (ICSAB) recoveries were within the control limits listed in QAPP Table 7 of 80-120%.

- Laboratory Control Samples: Recoveries were within the control limits listed in FWQAPP Table 3-1 of 75-125%.

- Laboratory Duplicates: Laboratory duplicate analyses were performed on the sample in this SDG. The cadmium RPD exceeded the control limit at 37%; therefore, cadmium detected in the sample was qualified as estimated, "J," and the result was coded with an "E" qualification code. The remaining RPDs were within the control limit listed in FWQAPP Table 3-1 of ≤25%.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on the sample in this SDG. Except as noted below, recoveries were within the control limits listed in FWQAPP Table 3-1 of 75-125%. Matrix spike control limits were not applied when the native sample concentration exceeded the spiked amount by a factor of four or more.

  Antimony was rejected, "R," and the remaining results noted in the table below were qualified as estimated, "J," and were coded with a "Q" qualification code. When no other qualifications with conflicting bias were assigned to a result, detected results with low recoveries were assigned a negative bias, "J-." Please note that antimony was a contaminant of concern.

Samples qualified for MS/MSD recovery outliers			
Parent Sample	**Analyte**	**Recovery**	**Qualified Samples**
LL1SS-528M-3060-QA	Antimony	28%, 30%	Antimony in LL1SS-528M-3060-QA
	Cobalt	47%, 77%	Cobalt in LL1SS-528M-3060-QA
	Copper	67%, 71%	Copper in LL1SS-528M-3060-QA
	Zinc	57%, 63%	Zinc in LL1SS-528M-3060-QA
	Thallium	64%, 64%	Thallium in LL1SS-528M-3060-QA
	Lead	- - -, 52%	Lead in LL1SS-528M-3060-QA

"- - -" indicates an acceptable recovery

The cobalt RPD exceeded the control limit at 37%; therefore, cobalt detected in the sample was qualified as estimated, "J," and the result was coded with a "*III" qualification code. The remaining RPDs were within the control limit listed in FWQAPP Table 3-1 of ≤25%.

- Serial Dilution: Serial dilution analyses were performed for the sample in this SDG. Except as noted below, the %Ds were within the control limit listed in LCG Table 7 of ≤10%. The serial dilution control limit is only applicable when the original sample concentration is minimally ≥50× the MDL for ICP analytes.

  Results listed in the table below were qualified as estimated, "J." and the results were coded with an "A" qualification code. When no other qualifications with conflicting bias were assigned to a result, results with a higher serial dilution result were assigned a negative bias, "J-," and results with a lower serial dilution result were assigned a positive bias, "J+,"

Samples qualified for serial dilution %D outliers			
Parent Sample	**Analyte**	**%D**	**Qualified Samples**
LL1SS-528M-3060-QA	Arsenic	420%	Arsenic in LL1SS-528M-3060-QA
	Barium	11%	Barium in LL1SS-528M-3060-QA
	Cadmium	86%	Cadmium in LL1SS-528M-3060-QA
	Calcium	13%	Calcium in LL1SS-528M-3060-QA
	Chromium	16%	Chromium in LL1SS-528M-3060-QA
	Cobalt	22%	Cobalt in LL1SS-528M-3060-QA
	Copper	21%	Copper in LL1SS-528M-3060-QA
	Iron	19%	Iron in LL1SS-528M-3060-QA
	Lead	39%	Lead in LL1SS-528M-3060-QA
	Magnesium	23%	Magnesium in LL1SS-528M-3060-QA
	Manganese	14%	Manganese in LL1SS-528M-3060-QA
	Nickel	18%	Nickel in LL1SS-528M-3060-QA
	Vanadium	15%	Vanadium in LL1SS-528M-3060-QA
	Zinc	18%	Zinc in LL1SS-528M-3060-QA
	Mercury	31%	Mercury in LL1SS-528M-3060-QA
	Potassium	63%	Potassium in LL1SS-528M-3060-QA

- Internal Standards: Internal standards are not reviewed at a Level III validation.

- Sample Result Verification: Sample results are not verified at a Level III validation. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

- Manual Integrations: Manual integrations are not reviewed at a Level III validation.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample collected and analyzed for metals by the primary laboratory. There were no detects above the MDL in the equipment rinsate sample.

4.5 GENERAL CHEMISTRY - HEXAVALENT CHROMIUM

One sample was analyzed by CT for hexavalent chromium by USEPA SW-846 Method 7196A. As neither the FWQAPP not the LCG list quality control criteria for hexavalent chromium, the hexavalent chromium results were assessed against the criteria listed in the DoD QSM.

- MDL studies were not reviewed.
- Calibration: Except as noted below, calibration criteria were met.
    - Initial calibration: Initial calibration r value was ≥0.995
    - The ICV and CCV recoveries were within the control limits listed in DoD QSM Tables B-8 of 90-110%.
    - No MRL check standards recoveries were analyzed in association with the sample in this SDG; therefore, nondetected hexavalent chromium in the sample was qualified as estimated, "UJ." The qualified result was coded with a "C" qualification code.
    - MDL Verification: The laboratory did not analyzed MDL check standards.
- Blanks: The method blank had no detect above the control limit listed in the DoD QSM Tables B-8 of one-half the MRL.
- Blank Spikes and Laboratory Control Samples: The hexavalent chromium recovery was within the laboratory-established control limits of 80-120%.
- Laboratory Duplicates: A laboratory duplicate analysis was performed on the sample in this SDG. Hexavalent chromium was not detected in either sample.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on the sample in this SDG. Both recoveries were below the control limits listed in FWQAPP Table 3-1 of 75-125%, at 43% and 48%. Nondetected hexavalent chromium in the sample was qualified as estimated, "UJ." The qualified result was coded with a "Q" qualification code.
- Sample Result Verification: Sample results are not reviewed at a Level III validation. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."
- Manual Integrations: Manual integrations are not reviewed at a Level III validation.
- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

- Field Blanks and Equipment Rinsates: There were no field QC samples associated with the validated sample in this SDG. There was one equipment rinsate sample; however, it was not analyzed for hexavalent chromium.

5 PRIMARY DATA QUALITY EVALUATION SUMMARY

The following table summarizes the qualifications applied to the primary sample data:

Table 4. Primary data qualification summary

Analysis	Number of Samples Analyzed	Number of Analytes per Sample	Percent Rejected	Percent Estimated
Explosives	7	2	0	7.1%
PCBs	7	7	0	0%
SVOCs	7	4	0	0%
Metals	7	8	0	12.5%
Hexavalent chromium	7	1	0	0
		Totals	**0%**	**5.4%**

A complete summary of qualifications applied to the primary samples can be found in Appendix A of the Ravenna Army Ammunition Plant Load Line 1 Confirmation Sampling, September 2010 Data Validation Report. With the exception of rejected data, the primary data was found to be usable for its intended purpose with the qualifications applied by MEC^X.

6 DATA USABILITY SUMMARY

6.1 OVERALL COMPLETENESS REVIEW

As the data validated in this report are not inclusive of the entire field effort, no field completeness value was calculated.

The analytical completeness goal for the project that was established in the FWQAPP was 90% for each method. Data with reporting limits that exceeded the established criteria and data estimated for quality control outliers or for detects between the MDL and the RL were included in Table 5 for informational purposes only. Contaminants of concern that exceeded the criteria are noted in Section 6.2. As compared to the primary laboratory, the QA laboratory reported an additional 13 explosive analytes, 71 SVOC analytes, 2 PCBs, 15 metals analytes, and mercury. The number of analytes reported by the QA laboratory is noted parenthetically in the table below. Also, please note that the primary laboratory reported one extra analyte, silver, in one sample.

The following table summarizes the calculated completeness for the project.

Table 5. Overall analytical completeness

			Number of Results					
Analysis	**Samples Analyzed**	**Analytes per Sample**	**Total**	**Rejected**	**MDLs/RLs Exceeding Criteria**	**Estimated for QC Outliers**	**Estimated for Detects <RL**	**Percent Complete**
Explosives	8	2 (15)	29	1	1/8	1	3	96.6%
PCBs	8	7 (9)	65	0	0/7	9	0	100%
SVOCs	8	4 (75)	107	4	4/41	59	16	96.3%
Metals	8	8 (23)	88	1	0/0	24	6	98.9%
Hexavalent Chromium	8	1	8	0	0/0	1	0	100%
Totals			**297**	**6**	**5/56**	**94**	**25**	**98.0%**

6.2 DATA DEFICIENCIES

6.2.1 SOURCES

Some data were rejected for poor LCS and/or MS/MSD recoveries. All remaining data are usable as qualified by MEC^{X}. In instances where a data point had multiple results, the reviewer chose the most technically sound result to report and rejected the remaining data points. These rejected data points do not affect data quality or usability.

6.2.2 IMPACT ON DATA QUALITY

Some data were rejected for poor LCS and/or MS/MSD recoveries. The overall analytical completeness goal listed in the FWQAPP of 90% was met, with the actual completeness equal to 98%. Although 32% of the data was qualified, the data quality was not adversely impacted by these qualifications.

6.3 GENERAL DATA USABILITY

All data are usable with the assigned qualifications.

Specific concerns regarding the QA data are noted below:

- Only the following analytes were contaminants of concern and required analysis:
  - Metals – aluminum, antimony, arsenic, barium, cadmium, chromium, lead, manganese, and hexavalent chromium
  - Explosives – RDX and 2,4,6-trinitrotoluene
  - PCBs – Aroclor-1254
  - SVOCs – benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluroanthene, dibenz(a,h)anthracene
- For the analytes that were not contaminants of concern:
  - All nondetected PCB results (reported undiluted) had reporting limits (RLs) that exceeded the project criteria (excluding Aroclor-1254)
  - Forty-one SVOC analyte RLs exceeded project criteria and four SVOC analytes had method detection limits (MDLs) and RLs that exceeded the project criteria
  - Eight explosive analyte RLs exceeded project criteria and one explosive analyte with an MDL and RL that exceeded the project criterion
  - Three SVOC analytes had no project reporting limit criteria

Specific concerns regarding the primary data are noted below:

- None

In order to avoid repetition of the issues noted above, the following actions should be taken:

- The QA laboratory should be contacted and specific actions determined that will allow the PCBs to meet the reporting limit criterion. Increasing the sample extraction amount to 30 grams would meet the reporting limit criterion. Among other potential solutions, field personnel may be required to send additional sample volume to the laboratory for extraction.

- The QA laboratory should be provided the project specific analyte list and cleanup goals.

7 QA SAMPLE COMPARISONS

The following table presents the QA sample and associated primary sample. Results are compared in the following sections. A full comparison of all sample detects can be found in Appendix C.

Table 6. QA sample and primary sample associations

QA Sample	QA SDG	Primary Sample	Primary SDG	Collection Date	Analyses
LL1SS-528M-3059-QA	815327	LL1SS-528M-3060-SO	L100906082	9/21/2010	Explosives, Hexavalent Chromium, Metals, PCBs, Semivolatiles

As noted in section 5.1, the QA laboratory reported an additional 13 explosive analytes, 71 SVOC analytes, 2 PCBs, 15 metals analytes, and mercury.

A total of 23% of the QA/primary pair results evaluated had RPDs above the control limit listed in FWQAPP Table 3-1 of 50%, or within ±the reporting limit for detects less than 5× the reporting limit. Four of the five total discrepancies were due to higher PCB and metals concentrations reported by the QA laboratory.

The following table summarizes the discrepancies by method.

Table 7. Primary/QA sample comparison summary

Method	Analytes	Primary/QA Sample Pairs	Total Analytes	Results within control limits	Results exceeding control limits
Explosives	2	1	2	1	1
PCBs	7	1	7	6	1
SVOCs	4	1	4	4	0
Metals	8	1	8	5	3
Hexavalent Chromium	1	1	1	1	0
		Total	**22**	**17**	**5**

Other than matrix interference noted by the primary laboratory in the PCB analyses, MEC^X was not able to determine a potential cause for the discrepancies.

8 CONCLUSIONS AND RECOMMENDATIONS

Five of 22 QA and primary data results were above the criteria of 50% RPD or within ± the reporting limit when one detect was less than 5× the reporting limit. As only one split sample was collected, there was insufficient data collected for the outliers to be statistically significant.

MEC^X recommends that the laboratories be informed of the shortened analyte lists necessary for this project as it should reduce the cost and increase the comparability of the final QA/primary pair results.

9 REFERENCES

Contract Laboratory Program National Functional Guidelines for Organic Data Review. United States Environmental Protection Agency Contract Laboratory Program (CLP). February 1994.

Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. United States Environmental Protection Agency. February 1994.

Department of Defense Quality Systems Manual for Environmental Laboratories, Version 3. DoD Data Quality Workgroup. January 2006.

Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. SAIC. March 2001.

Final Work Plan Addendum #1 for the Sampling of Soils Below Floor Slabs at RVAAP-08 Load Line 1 and Other Building Locations – Ravenna Army Ammunition Plant. URS Group, Inc. July 2009.

Louisville Chemistry Guideline, Version 5, Environmental Engineering Branch, United States Army Corps of Engineers, Louisville District. June 2002.

Quality Assurance Project Plan for Environmental Investigations at the Ravenna Army Ammunition Plant. SAIC. March 2001.

Quality Assurance Project Plan Addendum for the Sampling of Soils Below Floor Slabs at LLs-2, 3, 4, and Excavation and Transportation of Contaminated Soils to Load Lines 4. URS. April 2008.

Shell for Analytical Chemistry Requirements. United State Army Corps of Engineers. February 2001.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Revision 6. United States Environmental Protection Agency. February 2007.

APPENDIX A

Qualified Sample Result Forms

Qualification Code Reference Table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect.
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient was noncompliant.
R	Calibration RRF was noncompliant.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
Q	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	Not applicable	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable	ICP Serial Dilution %D were not within control limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tuning was noncompliant
T	Presumed contamination as indicated by the trip blank results.	Not applicable
+	False positive – reported compound was not present.	False positive – reported compound was not present.
-	False negative – compound was present but not reported.	False negative – compound was present but not reported.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).

Validated Sample Result Forms: 81532

Analysis Method 6010C

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Aluminum	7429-90-5	8170	0.12	0.04	mg/kg	B		
Antimony	7440-36-0	0.45	0.27	0.081	mg/kg	B	R	Q
Arsenic	7440-38-2	7.6	0.45	0.13	mg/kg		J-	A
Barium	7440-39-3	56.5	0.027	0.0081	mg/kg	B	J-	A
Beryllium	7440-41-7	0.35	0.012	0.004	mg/kg			
Cadmium	7440-43-9	0.22	0.021	0.0061	mg/kg	Y	J	E, A
Calcium	7440-70-2	12700	0.5	0.061	mg/kg	B	J-	A
Chromium	7440-47-3	132	0.064	0.019	mg/kg	M	J-	A
Cobalt	7440-48-4	5.3	0.049	0.015	mg/kg		J	Q, *III, A
Copper	7440-50-8	15.4	0.2	0.061	mg/kg	M	J-	Q, A
Iron	7439-89-6	17400	1	0.3	mg/kg	M,B	J-	A
Lead	7439-92-1	25.5	0.14	0.04	mg/kg		J-	Q, A
Magnesium	7439-95-4	2200	0.4	0.12	mg/kg	B	J-	A
Manganese	7439-96-5	411	0.05	0.016	mg/kg		J-	A
Nickel	7440-02-0	12.6	0.062	0.018	mg/kg		J-	A
Selenium	7782-49-2	0.44	0.42	0.071	mg/kg			
Silver	7440-22-4	0.022	0.057	0.017	mg/kg	J	J	
Thallium	7440-28-0	0.77	0.14	0.04	mg/kg	M	J-	Q
Vanadium	7440-62-2	12.9	0.034	0.011	mg/kg	B	J-	A
Zinc	7440-66-6	62.8	0.12	0.04	mg/kg	M	J-	Q, A

Analysis Method 6010C-NaK

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Potassium	7440-09-7	1100	36	11	mg/kg		J-	A
Sodium	7440-23-5	77.7	13	4	mg/kg			

Analysis Method 7196A

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Hexavalent Chromium	18540-29-9	6.5	6.5	1.9	mg/kg	UM	UJ	C, Q

Analysis Method 7471A

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Mercury	7439-97-6	0.026	0.008	0.0024	mg/kg		J+	A

Analysis Method 8000C

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** ADR

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Total Solids	TSO	99.1	1	1	%			

Analysis Method 8082

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
Aroclor 1016	12674-11-2	200	200	40	ug/kg	U	UJ	C
Aroclor 1221	11104-28-2	200	200	80	ug/kg	U	UJ	C
Aroclor 1232	11141-16-5	200	200	110	ug/kg	U	UJ	C
Aroclor 1242	53469-21-9	200	200	120	ug/kg	U	UJ	C
Aroclor 1248	12672-29-6	200	200	120	ug/kg	U	UJ	C
Aroclor 1254	11097-69-1	1900	200	92	ug/kg		J	C, Q
Aroclor 1260	11096-82-5	200	200	48	ug/kg	U	UJ	C
Aroclor 1262	37324-23-5	200	200	84	ug/kg	U	UJ	C
Aroclor 1268	11100-14-4	200	200	110	ug/kg	U	UJ	C
Decachlorobiphenyl	2051-24-3	105	125	60	ug/kg	S		

Analysis Method 8270C

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** III

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
1,2,4-Trichlorobenzene	120-82-1	400	400	21	ug/kg	U	UJ	C
1,2-Dichlorobenzene	95-50-1	400	400	24	ug/kg	U	UJ	C
1,3-Dichlorobenzene	541-73-1	400	400	20	ug/kg	U	UJ	C
1,4-Dichlorobenzene	106-46-7	400	400	19	ug/kg	U	UJ	C
2,4,5-Trichlorophenol	95-95-4	500	500	130	ug/kg	UM	UJ	C, S
2,4,6-Tribromophenol	118-79-6	34	125	35	ug/kg	S	J-	S
2,4,6-Trichlorophenol	88-06-2	500	500	130	ug/kg	UM	UJ	C, Q, S
2,4-Dichlorophenol	120-83-2	500	500	120	ug/kg	U	UJ	C, S
2,4-Dimethylphenol	105-67-9	400	400	100	ug/kg	U	UJ	C, S
2,4-Dinitrophenol	51-28-5	2000	2000	700	ug/kg	UM	R	Q
2,4-Dinitrotoluene	121-14-2	400	400	24	ug/kg	U	UJ	C
2,6-Dinitrotoluene	606-20-2	400	400	24	ug/kg	U	UJ	C
2-Chloronaphthalene	91-58-7	400	400	23	ug/kg	U	UJ	C
2-Chlorophenol	95-57-8	500	500	340	ug/kg	U	UJ	C, S
2-Fluoro-1,1'-biphenyl	321-60-8	75	105	45	ug/kg			
2-Fluorophenol	367-12-4	49	105	35	ug/kg		J-	S
2-Methyl-4,6-dinitrophenol	534-52-1	1000	1000	270	ug/kg	UM	R	Q
2-Methylnaphthalene	91-57-6	400	400	25	ug/kg	U	UJ	C
2-Methylphenol	95-48-7	1000	1000	420	ug/kg	U	UJ	C, S
2-Nitroaniline	88-74-4	400	400	23	ug/kg	U	UJ	C
2-Nitrophenol	88-75-5	500	500	280	ug/kg	U	UJ	C, S
3,3'-Dichlorobenzidine	91-94-1	500	500	150	ug/kg	U	UJ	C
3-Nitroaniline	99-09-2	1000	1000	22	ug/kg	U	UJ	C
4-Bromophenyl phenyl ether	101-55-3	400	400	25	ug/kg	U	UJ	C
4-Chloro-3-methylphenol	59-50-7	500	500	380	ug/kg	U	UJ	C, S
4-Chloroaniline	106-47-8	400	400	39	ug/kg	U	UJ	C, L, Q
4-Chlorophenyl phenyl ether	7005-72-3	400	400	26	ug/kg	U	UJ	C
4-Methylphenol	1319-77-3	2000	2000	660	ug/kg	U	UJ	C, S

Analysis Method 8270C

4-Nitroaniline	100-01-6	1000	1000	30	ug/kg	U	UJ	C
4-Nitrophenol	100-02-7	1000	1000	400	ug/kg	U	UJ	C, S
Acenaphthene	83-32-9	71	400	24	ug/kg	J	J	C
Acenaphthylene	208-96-8	400	400	24	ug/kg	U	UJ	C
Acetophenone	98-86-2	400	400	76	ug/kg	U	UJ	C
Anthracene	120-12-7	210	400	24	ug/kg	J	J	C
Benzidine	92-87-5	2000	2000	960	ug/kg	UM	R	L, Q
Benzo(a)anthracene	56-55-3	640	400	25	ug/kg			
Benzo(a)pyrene	50-32-8	600	400	23	ug/kg			
Benzo(b)fluoranthene	205-99-2	900	400	25	ug/kg			
Benzo(g,h,i)perylene	191-24-2	350	400	22	ug/kg	J	J	C
Benzo(k)fluoranthene	207-08-9	290	400	25	ug/kg	J	J	C
Benzoic acid	65-85-0	990	990	290	ug/kg	U	UJ	C, Q, S
Benzyl alcohol	100-51-6	1000	1000	84	ug/kg	U	UJ	C, *III
Bis(2-chloroethoxy)methane	111-91-1	400	400	23	ug/kg	U	UJ	C
Bis(2-chloroethyl) ether	111-44-4	400	400	25	ug/kg	U	UJ	C
Bis(2-chloroisopropyl) ether	108-60-1	400	400	30	ug/kg	U	UJ	C
Bis(2-ethylhexyl) phthalate	117-81-7	1000	1000	88	ug/kg	U	UJ	C
Butylbenzyl phthalate	85-68-7	400	400	74	ug/kg	U	UJ	C
Carbazole	86-74-8	180	400	28	ug/kg	J	J	C
Chrysene	218-01-9	610	400	25	ug/kg			
Dibenzo(a,h)anthracene	53-70-3	400	400	22	ug/kg	U	UJ	C
Dibenzofuran	132-64-9	43	400	24	ug/kg	J	J	C
Diethyl phthalate	84-66-2	400	400	65	ug/kg	U	UJ	C
Dimethyl phthalate	131-11-3	400	400	64	ug/kg	U	UJ	C
Di-n-butyl phthalate	84-74-2	130	400	80	ug/kg	J	J	C
Di-n-octyl phthalate	117-84-0	400	400	59	ug/kg	U	UJ	C
Fluoranthene	206-44-0	1600	400	26	ug/kg	M		
Fluorene	86-73-7	79	400	25	ug/kg	J	J	C
Hexachlorobenzene	118-74-1	400	400	28	ug/kg	U	UJ	C
Hexachlorobutadiene	87-68-3	400	400	63	ug/kg	U	UJ	C
Hexachlorocyclopentadiene	77-47-4	400	400	52	ug/kg	UM	UJ	C, Q

Analysis Method 8270C

Hexachloroethane	67-72-1	400	400	33	ug/kg	U	UJ	C
Indeno(1,2,3-cd)pyrene	193-39-5	350	400	23	ug/kg	J	J	C
Isophorone	78-59-1	400	400	50	ug/kg	U	UJ	C
Naphthalene	91-20-3	23	400	21	ug/kg	J	J	C
Nitrobenzene	98-95-3	400	400	59	ug/kg	U	UJ	C
Nitrobenzene-d5	4165-60-0	66	100	35	ug/kg			
N-Nitroso-di-n-propylamine	621-64-7	400	400	71	ug/kg	U	UJ	C
N-Nitrosodiphenylamine	86-30-6	810	810	50	ug/kg	U	UJ	C
N-Nitrosopyrrolidine	930-55-2	400	400	56	ug/kg	U	UJ	C
Pentachlorophenol	87-86-5	1000	1000	240	ug/kg	UM	R	Q
Phenanthrene	85-01-8	870	400	26	ug/kg			
Phenol	108-95-2	500	500	160	ug/kg	U	UJ	C, S
Phenol-d5	4165-62-2	67	100	40	ug/kg			
Pyrene	129-00-0	1100	400	26	ug/kg			
Terphenyl-d14	1718-51-0	74	125	30	ug/kg			

Analysis Method 8330B

Sample Name LL1SS-528M-3060-QA **AnalysisType:** RES

Lab Sample Name 850173 **Validation Level:** ADR

	CAS No	Result Value	RL	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Qualifier Code
1,2-Dinitrobenzene	528-29-0	102	127	75	ug/kg			
1,3,5-Trinitrobenzene	99-35-4	0.41	0.44	0.13	mg/kg	J	J	C
1,3-Dinitrobenzene	99-65-0	0.44	0.44	0.08	mg/kg	U	UJ	C
2,4,6-Trinitrotoluene	118-96-7	26	4.4	0.9	mg/kg	M	J	C, Q
2,4-Dinitrotoluene	121-14-2	0.44	0.44	0.2	mg/kg	U	UJ	C
2,6-Dinitrotoluene	606-20-2	0.5	0.5	0.07	mg/kg	U	UJ	C
2-Amino-4,6-dinitrotoluene	35572-78-2	0.3	0.44	0.05	mg/kg	J	J	C
2-Nitrotoluene	88-72-2	0.44	0.44	0.09	mg/kg	U	UJ	C
3-Nitrotoluene	99-08-1	0.44	0.44	0.07	mg/kg	U	UJ	C
4-Amino-2,6-dinitrotoluene	19406-51-0	0.44	0.44	0.07	mg/kg	UM	R	Q
4-Nitrotoluene	99-99-0	0.5	0.5	0.07	mg/kg	U	UJ	C
HMX	2691-41-0	0.44	0.44	0.12	mg/kg	U	UJ	C
Nitrobenzene	98-95-3	0.44	0.44	0.04	mg/kg	U	UJ	C
Nitroglycerin	55-63-0	15	15	5	mg/kg	U	UJ	C
PETN	78-11-5	1.5	1.5	0.5	mg/kg	U	UJ	C
RDX	121-82-4	0.44	0.44	0.16	mg/kg	U	UJ	C
Tetryl	479-45-8	0.44	0.44	0.09	mg/kg	U	UJ	C

APPENDIX B

Sample Qualification Summary

Sample	AnalyteName	Result	RL	MDL	Units	Qualifier	Code	Val Level
LL1SS-528M-3060-QA	Aroclor 1016	200	200	40	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1221	200	200	80	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1232	200	200	110	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1242	200	200	120	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1248	200	200	120	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1254	1900	200	92	ug/kg	J	C, Q	III
LL1SS-528M-3060-QA	Aroclor 1260	200	200	48	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1262	200	200	84	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Aroclor 1268	200	200	110	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Antimony	0.45	0.27	0.081	mg/kg	R	Q	III
LL1SS-528M-3060-QA	Arsenic	7.6	0.45	0.13	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Barium	56.5	0.027	0.0081	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Cadmium	0.22	0.021	0.0061	mg/kg	J	E, A	III
LL1SS-528M-3060-QA	Calcium	12700	0.5	0.061	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Chromium	132	0.064	0.019	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Cobalt	5.3	0.049	0.015	mg/kg	J	Q, *III, A	III
LL1SS-528M-3060-QA	Copper	15.4	0.2	0.061	mg/kg	J-	Q, A	III
LL1SS-528M-3060-QA	Iron	17400	1	0.3	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Lead	25.5	0.14	0.04	mg/kg	J-	Q, A	III
LL1SS-528M-3060-QA	Magnesium	2200	0.4	0.12	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Manganese	411	0.05	0.016	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Nickel	12.6	0.062	0.018	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Thallium	0.77	0.14	0.04	mg/kg	J-	Q	III
LL1SS-528M-3060-QA	Vanadium	12.9	0.034	0.011	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Zinc	62.8	0.12	0.04	mg/kg	J-	Q, A	III
LL1SS-528M-3060-QA	Potassium	1100	36	11	mg/kg	J-	A	III
LL1SS-528M-3060-QA	Hexavalent Chromium	6.5	6.5	1.9	mg/kg	UJ	C, Q	III
LL1SS-528M-3060-QA	Mercury	0.026	0.008	0.0024	mg/kg	J+	A	III
LL1SS-528M-3060-QA	1,2,4-Trichlorobenzene	400	400	21	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	1,2-Dichlorobenzene	400	400	24	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	1,3-Dichlorobenzene	400	400	20	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	1,4-Dichlorobenzene	400	400	19	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	2,4,5-Trichlorophenol	500	500	130	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	2,4,6-Trichlorophenol	500	500	130	ug/kg	UJ	C, Q, S	III
LL1SS-528M-3060-QA	2,4-Dichlorophenol	500	500	120	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	2,4-Dimethylphenol	400	400	100	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	2,4-Dinitrophenol	2000	2000	700	ug/kg	R	Q	III
LL1SS-528M-3060-QA	2,4-Dinitrotoluene	400	400	24	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	2,6-Dinitrotoluene	400	400	24	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	2-Chloronaphthalene	400	400	23	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	2-Chlorophenol	500	500	340	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	2-Methyl-4,6-dinitrophenol	1000	1000	270	ug/kg	R	Q	III
LL1SS-528M-3060-QA	2-Methylnaphthalene	400	400	25	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	2-Methylphenol	1000	1000	420	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	2-Nitroaniline	400	400	23	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	2-Nitrophenol	500	500	280	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	3,3'-Dichlorobenzidine	500	500	150	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	3-Nitroaniline	1000	1000	22	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	4-Bromophenyl phenyl ether	400	400	25	ug/kg	UJ	C	III

Sample	AnalyteName	Result	RL	MDL	Units	Qualifier	Code	Val Level
LL1SS-528M-3060-QA	4-Chloro-3-methylphenol	500	500	380	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	4-Chloroaniline	400	400	39	ug/kg	UJ	C, L, Q	III
LL1SS-528M-3060-QA	4-Chlorophenyl phenyl ether	400	400	26	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	4-Methylphenol	2000	2000	660	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	4-Nitroaniline	1000	1000	30	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	4-Nitrophenol	1000	1000	400	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	Acenaphthene	71	400	24	ug/kg	J	C	III
LL1SS-528M-3060-QA	Acenaphthylene	400	400	24	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Acetophenone	400	400	76	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Anthracene	210	400	24	ug/kg	J	C	III
LL1SS-528M-3060-QA	Benzidine	2000	2000	960	ug/kg	R	L, Q	III
LL1SS-528M-3060-QA	Benzo(g,h,i)perylene	350	400	22	ug/kg	J	C	III
LL1SS-528M-3060-QA	Benzo(k)fluoranthene	290	400	25	ug/kg	J	C	III
LL1SS-528M-3060-QA	Benzoic acid	990	990	290	ug/kg	UJ	C, Q, S	III
LL1SS-528M-3060-QA	Benzyl alcohol	1000	1000	84	ug/kg	UJ	C, *III	III
LL1SS-528M-3060-QA	Bis(2-chloroethoxy)methane	400	400	23	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Bis(2-chloroethyl) ether	400	400	25	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Bis(2-chloroisopropyl) ether	400	400	30	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Bis(2-ethylhexyl) phthalate	1000	1000	88	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Butylbenzyl phthalate	400	400	74	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Carbazole	180	400	28	ug/kg	J	C	III
LL1SS-528M-3060-QA	Dibenzo(a,h)anthracene	400	400	22	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Dibenzofuran	43	400	24	ug/kg	J	C	III
LL1SS-528M-3060-QA	Diethyl phthalate	400	400	65	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Dimethyl phthalate	400	400	64	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Di-n-butyl phthalate	130	400	80	ug/kg	J	C	III
LL1SS-528M-3060-QA	Di-n-octyl phthalate	400	400	59	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Fluorene	79	400	25	ug/kg	J	C	III
LL1SS-528M-3060-QA	Hexachlorobenzene	400	400	28	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Hexachlorobutadiene	400	400	63	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Hexachlorocyclopentadiene	400	400	52	ug/kg	UJ	C, Q	III
LL1SS-528M-3060-QA	Hexachloroethane	400	400	33	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Indeno(1,2,3-cd)pyrene	350	400	23	ug/kg	J	C	III
LL1SS-528M-3060-QA	Isophorone	400	400	50	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Naphthalene	23	400	21	ug/kg	J	C	III
LL1SS-528M-3060-QA	Nitrobenzene	400	400	59	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	N-Nitroso-di-n-propylamine	400	400	71	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	N-Nitrosodiphenylamine	810	810	50	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	N-Nitrosopyrrolidine	400	400	56	ug/kg	UJ	C	III
LL1SS-528M-3060-QA	Pentachlorophenol	1000	1000	240	ug/kg	R	Q	III
LL1SS-528M-3060-QA	Phenol	500	500	160	ug/kg	UJ	C, S	III
LL1SS-528M-3060-QA	1,3,5-Trinitrobenzene	0.41	0.44	0.13	mg/kg	J	C	III
LL1SS-528M-3060-QA	1,3-Dinitrobenzene	0.44	0.44	0.08	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	2,4,6-Trinitrotoluene	26	4.4	0.9	mg/kg	J	C, Q	III
LL1SS-528M-3060-QA	2,4-Dinitrotoluene	0.44	0.44	0.2	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	2,6-Dinitrotoluene	0.5	0.5	0.07	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	2-Amino-4,6-dinitrotoluene	0.3	0.44	0.05	mg/kg	J	C	III
LL1SS-528M-3060-QA	2-Nitrotoluene	0.44	0.44	0.09	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	3-Nitrotoluene	0.44	0.44	0.07	mg/kg	UJ	C	III

Sample	AnalyteName	Result	RL	MDL	Units	Qualifier	Code	Val Level
LL1SS-528M-3060-QA	4-Amino-2,6-dinitrotoluene	0.44	0.44	0.07	mg/kg	R	Q	III
LL1SS-528M-3060-QA	4-Nitrotoluene	0.5	0.5	0.07	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	HMX	0.44	0.44	0.12	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	Nitrobenzene	0.44	0.44	0.04	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	Nitroglycerin	15	15	5	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	PETN	1.5	1.5	0.5	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	RDX	0.44	0.44	0.16	mg/kg	UJ	C	III
LL1SS-528M-3060-QA	Tetryl	0.44	0.44	0.09	mg/kg	UJ	C	III

APPENDIX C

QA/Primary Sample Comparisons

Sample	Analyte	Result	RL	Units	Qualifier	QA Sample	Result	RL	Qualifier	RPD	w/in RL
LLIS-528M-3059-SO	Aroclor-1016	8.14	16.3	ug/kg	U	LL1SS-528M-3060-QA	200	200	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1221	8.14	16.3	ug/kg	U	LL1SS-528M-3060-QA	200	200	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1232	8.14	16.3	ug/kg	U	LL1SS-528M-3060-QA	200	200	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1242	8.14	16.3	ug/kg	U	LL1SS-528M-3060-QA	200	200	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1248	8.14	16.3	ug/kg	U	LL1SS-528M-3060-QA	200	200	U	N/A	Yes
LLIS-528M-3059-SO	Aroclor-1254	511	16.3	ug/kg		LL1SS-528M-3060-QA	1900	200		115.2	N/A
LLIS-528M-3059-SO	Aroclor-1260	8.14	16.3	ug/kg	U	LL1SS-528M-3060-QA	200	200	U	N/A	Yes
LLIS-528M-3059-SO	Benzo(a)anthracene	658	171	ug/kg		LL1SS-528M-3060-QA	640	400		N/A	Yes
LLIS-528M-3059-SO	Benzo(a)pyrene	594	171	ug/kg		LL1SS-528M-3060-QA	600	400		N/A	Yes
LLIS-528M-3059-SO	Benzo(b)fluoranthene	532	171	ug/kg		LL1SS-528M-3060-QA	900	400		N/A	Yes
LLIS-528M-3059-SO	Dibenzo(a,h)Anthracene	96.6	171	ug/kg	J	LL1SS-528M-3060-QA	400	400	U	N/A	Yes
LLIS-528M-3059-SO	2,4,6-Trinitrotoluene	50	4.94	mg/kg		LL1SS-528M-3060-QA	26	4.4	J+	63.2	N/A
LLIS-528M-3059-SO	RDX	0.108	0.247	mg/kg	J	LL1SS-528M-3060-QA	0.44	0.44	U	N/A	Yes
LLIS-528M-3059-SO	Aluminum	4600	15.1	mg/kg	J-	LL1SS-528M-3060-QA	8170	0.12		55.9	N/A
LLIS-528M-3059-SO	Antimony	0.354	0.502	mg/kg	J	LL1SS-528M-3060-QA	0.45	0.27		N/A	Yes
LLIS-528M-3059-SO	Arsenic	7.24	1.46	mg/kg		LL1SS-528M-3060-QA	7.6	0.45		N/A	Yes
LLIS-528M-3059-SO	Barium	42.8	0.378	mg/kg		LL1SS-528M-3060-QA	56.5	0.027		27.6	N/A
LLIS-528M-3059-SO	Cadmium	0.0988	0.0757	mg/kg	J-	LL1SS-528M-3060-QA	0.22	0.021		N/A	No
LLIS-528M-3059-SO	Chromium	19.2	0.189	mg/kg		LL1SS-528M-3060-QA	132	0.064		149.2	N/A
LLIS-528M-3059-SO	Lead	35.2	0.971	mg/kg		LL1SS-528M-3060-QA	25.5	0.14		32.0	N/A
LLIS-528M-3059-SO	Manganese	348	0.378	mg/kg		LL1SS-528M-3060-QA	411	0.05		16.6	N/A
LLIS-528M-3059-SO	Hexavalent Chromium	0.249	0.499	mg/kg	U	LL1SS-528M-3060-QA	6.5	6.5	U	N/A	Yes

APPENDIX D

Validator Checklists

POLY CHLORINATED BIPHENYLS (PCB/AROCLORS) CHECKLIST

Project Name: Ravenna LL1

Laboratory: CT Laboratories

Batch Number(s): 34897

Sample Delivery Group: 81532

	Yes	No
1. Holding Time:		
(a) Were samples extracted within holding time?	[✓]	[ ]
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of five standards? (6)	[✓]	[ ]
• Did Aroclors 1016 and 1260 meet the RSD ≤ 20% or the r ≥ 0.99?	[✓]	[ ]
• Was manual integration "M" performed? N/A @ Level III If the answer is "Yes", check for supporting documents.	[ ]	[ ]
• Was the manual integration necessary?	[ ]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		
• Was MDL Check performed?	[ ]	[✓]
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[ ]	[✓]
• Was the QC/MRL between 70-130% R N/A	[ ]	[ ]
5. Initial Calibration Verification (ICV):		
Is the mid level (2nd source) recovery within 85 - 115%?	[✓]	[ ]

	Yes	No
6. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 12 hours?	[✓]	[ ]
• Was Drift or D ≤ 15% from the initial calibration with a maximum %D < 20% for a specific compound?	[✓]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[✓]	[ ]
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed? 4X for Av. 1254	[✓]	[ ]
• Were identified Aroclors confirmed on a second GC column?	[✓]	[ ]
• Were individual Aroclor standards used to determine the pattern of the peaks? (Individual Aroclors are 1221, 1232, 1242, 1248, and 1254. Both Aroclor 1016, and 1260 can be used from the mixed calibration standards.)	[✓]	[ ]
• Was RPD of target analyte conformation ≤ 40?	[✓]	[ ]
8. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits? 1260↑ due to presence of Av. 1254	[ ]	[✓]
Were the RPDs within control limits?	[✓]	[ ]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits?	[✓]	[ ]

9. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: L Calvin Date: 12.5.2010

Name: L.S. Calvin

SEMIVOLATILE ORGANIC ANALYSIS CHECKLIST

Project Name: Ravenna LL1

Laboratory: CT Laboratories

Batch Number(s): 34879

Sample Delivery Group: 81532

	Yes	No
1. Sample Holding Time:		
(a) Were samples extracted within holding time?	[✓]	[ ]
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. Instrument Tuning:		
Was the DFTPP tune performed at the beginning of each 12-hour period during which samples were analyzed?	[✓]	[ ]
3. Ion Mass Assignments:		
Was mass assignment based on m/z 198?	[✓]	[ ]
4. Ion Abundance:		
Indicate if DFTPP ions abundance relative to m/z 198 base peak met the ions abundance criteria:		
m/z — Acceptance Criteria		
51 — 30.0 - 60.0 %	[✓]	[ ]
68 — < 2% of mass 69	[✓]	[ ]
70 — < 2% of mass 69	[✓]	[ ]
127 — 40-60%	[✓]	[ ]
197 — < 1%	[✓]	[ ]
198 — 100%, Base peak	[✓]	[ ]
199 — 5-9%	[✓]	[ ]
275 — 10 - 30%	[✓]	[ ]
365 — > 1%	[✓]	[ ]
441 — present but < mass 443	[✓]	[ ]
442 — > 40%	[✓]	[ ]
443 — 17-23% of mass 442	[✓]	[ ]

	Yes	No
5.0 Initial Calibration:		
• Did the initial calibration consist of five or more standards?	5-stds [✓] (7) more [✓]	[ ] [ ]
If the calibration curve consists of 5-standards, check validity of the calibration model.		
Was the linear model applied?	[✓]	[ ]
• Did the followings System Performance Check Compounds (SPCC) meet the minimum mean response factor (RF)?		
RF		
N-nitroso-di-n-propylamine 0.05	[✓]	[ ]
Hexachlorocyclopentadiene 0.05	[✓]	[ ]
2,4-dinitrophenol 0.05	[✓]	[ ]
4-nitrophenol 0.05	[✓]	[ ]
• Did the RSD meet the criteria ≤ 30% for the followings each individual Calibration Check Compound (CCC)?		
Base/Neutral Fraction:		
Acenaphthene	[✓]	[ ]
1,4-Dichlorobenzene	[✓]	[ ]
Hexachlorobutadiene	[✓]	[ ]
Diphenylamine	[✓]	[ ]
Di-n-octylphthalate	[✓]	[ ]
Fluoranthene	[✓]	[ ]
Benzo(a)pyrene	[✓]	[ ]
Acid Fraction:		
4-Chloro-3-methylphenol	[✓]	[ ]
2,4-Dichlorophenol	[✓]	[ ]
2-Nitrophenol	[✓]	[ ]
Phenol	[✓]	[ ]
Pentachlorophenol	[✓]	[ ]
2,4,6-Trichlorophenol	[✓]	[ ]
• Are the RSDs for the remaining target analytes ≤ 15%? Benzidine r^2 0.982	[ ]	[✓]
• If the answer is "No", are the mean RSDs ≤ 15% or r ≥ 0.99 with a mean RSD ≤ 15% with a maximum RSD ≤ 30%?	[✓] [✓]	[ ] [ ]

	Yes	No
• Was manual integration "M" performed? N/A @ Level III	[ ]	[ ]
If the answer is "Yes", check for supporting documents.		
• Was the manual integration necessary? N/A @ Level III	[ ]	[ ]
If the answer is "No", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		

6. QCMDL:

• Was MDL Check performed?	[ ]	[ ]

7. QCMRL:

• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours?	[ ]	[ ]
All results qual'd Jov VJ/C N/A • Was the QC/MRL between 70-130% R	[ ]	[ ]
• For the non-contaminants of concern was the QC/MRL between 50-150% (Sporadic Marginal Failure)?	[ ]	[ ]

8. Initial Calibration Verification (ICV):

	[ ]	[ ]
• Is the mid level (2nd source) recovery within 70-130% for contaminants of concern ? Benzidine, +140% ok		
• Is the mid level (2nd source) recovery within 50-150% for non-contaminants of concern (Sporadic Marginal Failure)? N/A	[ ]	[ ]

(ICV was CCV, as samples immediately followed ICAL reprocessed for CCV criteria)

9. Continuing Calibration Verification (CCV):

• Was CCV conducted every 12 hours?	[ ]	[ ]
• Did any of SPCC meet the minimum RF values?	[ ]	[ ]

	Yes	No
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits? Benzidine 4% x	[ ]	[✓]
• MS/MSD: Were the percent recoveries within limits? Recoveries for 10 cmpds in both qual'd UJ/R or J/Q if <10%	[ ]	[✓]
Were the RPD within control limits? Benzyl alcohol @ 38% UJ/x TM	[ ]	[✓]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits? all acid TCs J/S or UJ/S	[ ]	[✓]

12. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: L.S. Calvin Date: 12.05.2010

Name: L.S. Calvin

NITROAROMATICS & NITRAMINE DATA ANALYSIS (EXPLOSIVE RESIDUES) CHECKLIST

Project Name: Ravenna LL1 Confirmation

Laboratory: CT

Batch Number(s): _____

Sample Delivery Group: 81532

	Yes	No
1. Holding Time: Were samples analyzed within holding time?	N	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of five standards? N/A @ III	[ ]	[ ]
• Did the RSD meet the criteria ≤ 20% for each individual Calibration Compound or r ≥ 0.99?	N	[ ]
• Was manual integration "M" performed? N/A @ III If the answer is "Yes", check for supporting documents.	[ ]	[ ]
• Was the manual integration necessary?	[ ]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		
• Was MDL Check performed?	[ ]	[ ]
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[ ]	N
• Was the percentage "D" for QC/MRL ≤ 30%?	[ ]	[ ]
5. Initial Calibration Verification (ICV):	N	[ ]

	Yes	No
• Was the ICV made of a 2nd source?	[N]	[ ]
• Was the mid level (2nd source) recovery within 85 - 115%?		
6. Continuing Calibration Verification (CCV): {Daily calibration}		
• Was midpoint calibration standard conducted at the beginning of the day?	[N]	[ ]
• Was midpoint calibration standard conducted every ten samples or every twelve hours?	[N]	[ ]
• Was midpoint calibration standard conducted after the last sample of the day?	[N]	[ ]
• Did the CCV meet the minimum requirements (D ≤ 15% with a maximum D ≤ 20% for a specific compound if the mean D ≤ 15%)?	[N]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires? N/A @ TII	[ ]	[ ]
• Were all identified hits, above the initial calibration curve, diluted and reanalyzed?	[N]	[ ]
• Were all identified hits confirmed on a second column?	[N]	[ ]
• Was RPD of target analyte confirmation ≤ 40?	[N]	[ ]
• Was there a shoulder on the 2,4,6-TNT peak? N/A @ TII	[ ]	[ ]
If the answer is "Yes", then tetryl decomposition is suspected. Peak height rather than peak area should be used for calculating TNT concentration. If teryl was identified in aqueous samples, was pH adjusted to <3? If the answer is "No", then check for tetryl decomposition, and qualify hits with "**J**" accordingly.	[ ]	[ ]
8. Sample Quality Control:	[N]	[ ]
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[N]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?		

	Yes	No
• MS/MSD: Were the percent recoveries within limits?	[ ]	N
Were the RPDs within control limits?		
• System Monitoring Compounds (Surrogates): Were surrogate recoveries within QC limits?	N	[ ]

9. Comments (attach additional sheets if necessary):

4-amino NR in MS/D

Validated/Reviewed by:

Signature: Patti Meeks Date: 12/3/10

Name: Patti Meeks

ICP METALS ANALYSIS (6010) CHECKLIST

Project Name: Ravenna LL1 confirmation

Laboratory: CT

Batch Number(s): _____

Sample Delivery Group: 81532

	Yes	No
1. Holding Time:		
• Were samples analyzed within holding time (6-Months)?	[N]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of N/A one calibration standard and a blank?	[ ]	[ ]
three calibration standards and a blank?	[ ]	[ ]
• Was R ≥ 0.995	[ ]	[ ]
3. QCMDL:		
• Was MDL Check performed?	[ ]	[N]
QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[N]	[ ]
	[N]	[ ]
• Was the QC/MRL between 70-130% R? Common Elements can be between the MRL and 2X MRL level (Fe, Al, Mg and Ca)	[N]	[ ]
4. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 90 - 110%?		
5. Initial Calibration Blank (ICP):		

	Yes	No
• Were analytes in the blank ≤ 1/2 MRL?	[ ]	[X]

6. Interelement Check Standard:

• Was ICS-A (interferents only) conducted at the beginning of analytical sequence?	[X]	[ ]
• Was ICS-AB results within QC limits (80-120)?	[X]	[ ]

7. Continuing calibration Blank (CCB):

• Was CCB conducted every 10 samples?	[X]	[ ]
• Was CCB conducted at end of the analytical sequence?	[X]	[ ]
• Were analytes ≤ 1/2 MRL?	[ ]	[X]

8. Continuing Calibration Verification (CCV):

• Was CCV conducted every 10 samples?	[X]	[ ]
• Was CCV conducted at end of the analytical sequence?	[X]	[ ]
• Was the %R between 90-110?	[X]	[ ]

9. Sample Analysis:

• Were samples with levels higher than the calibration range (E), diluted and re-analyzed?	[ ]	[ ]

10. Sample Quality Control:

• Method Blanks: Were target analytes ≤ 1/2 MRL?	[ ]	[X]	None sufficient to qualify
• LCS: Were the percent recoveries for LCS within the limits?	[X]	[ ]	
• MS: Were the percent recoveries within limits?	[ ]	[X]	
• MD: Were the RPDs within control limits?	[ ]	[X]	

11. Serial Dilution:

• Was serial dilution (1:4) conducted when needed?	[X]	[ ]

	Yes	No
• Was there an agreement between diluted and undiluted results (<10%)?	[ ]	[N]

12. Method of Standard Addition (MSA):

• Was MSA performed on samples suspected of matrix effect (R ≥ 0.995)? N/A	[ ]	[ ]

13. Comments (attach additional sheets if necessary):

Sb 28, 30%
Co ~~35~~ 47, 77
Cu 67, 71
Tl 64, 64
Zn 57, 63
Pb – 52

RPDs
Co = 37%

Dup Cd = 37%

SD:
As = 420? (-)
Ba = 11 (-)
Cd = 86 (+)
Ca = 13 (-)
Cr = 16 (-)
Co = 22 (-)
Cu = 21 (-)
Fe = 19 (-)
Pb = 39 (-)
Mg = 23 (-)
Mn = 14 (-)
Ni = (18)(-)
V = 15 (-)
Zn = (18)(-)
Hg = 31 (+)
~~Na =>~~
K = 63 (-)

Validated/Reviewed by:

Signature: P Meeks

Date: 12/3/10

Name: P. H. Meeks

Hexavalent Chromium

~~CYANIDE~~ ANALYSIS CHECKLIST

Project Name: Ravenna LL Confirmation

Laboratory: CT

Batch Number(s): _____

Sample Delivery Group: 81532

	Yes	No
1. Holding Time:		
• Were samples analyzed within holding time?	[N]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of		
One calibration standard and a blank? N/A per LL	[ ]	[ ]
Six calibration standards and a blank? ↓	[ ]	[ ]
• Was R ≥ 0.995	[N]	[ ]
3. QCMDL:		
• Was MDL Check performed?	[ ]	[ ]
4. QCMRL:		
• Were QC/MRL run at the beginning of every daily sequence??	[ ]	[N]
• Was the QC/MRL between 70-130% R?	[ ]	[ ]
5. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 80-120%?	[N]	[ ]
7. Initial calibration Blank (ICP):		
• Were analytes in the blank ≤ 1/2 MRL?	[N]	[ ]

	Yes	No
7. Continuing calibration Blank (CCB):	[N]	[ ]
• Was CCB conducted every 10 samples?	[N]	[ ]
• Was CCB conducted at end of the analytical sequence?	[N]	[ ]
• Were analytes ≤ 1/2 MRL?		
8. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 10 samples?	[N]	[ ]
• Was CCV conducted at end of the analytical sequence?	[N]	[ ]
• Was the %R between 80-120?	[N]	[ ]
9. Sample Analysis:		
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed?	[ ]	[ ]
12. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[N]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[N]	[ ]
• MS: Were the percent recoveries within limits?	[ ]	[N]
• MD: Were the RPDs within control limits?	[N]	[ ]

13. Comments (attach additional sheets if necessary):

43 + 40%

	Yes	No

Validated/Reviewed by:

Signature: Patti Meeks Date: 12/3/10

Name: Patti Meeks

APPENDIX I

Waste Manifests

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	1616

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites

Generator's Phone: 330 358-7312

6. Transporter 1 Company Name: ~~The Acme Company~~ Patrick Inc, #246 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address

Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601

U.S. EPA ID Number: State ID 05008

Facility's Phone: 330-823-6220

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: LARRY STRATTON — Signature: Larry Stratton — Month 9 Day 23 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T WHEELER — Signature — Month 9 Day 23 Year 10

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

.RDOUS ...TE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0107

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites

6. Transporter 1 Company Name
~~The Acme Company~~ Patrick Inc. #219
U.S. EPA ID Number: N/A

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220
U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month 9 Day 23 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: WAYNE M. PAULUS
Signature:
Month 9 Day 23 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: T. WHEELER
Signature:
Month 9 Day 23 Year 10

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0168

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites

6. Transporter 1 Company Name: ~~The Acme Company~~ Patrick Inc # 243 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Richard Roberts — Signature: Richard Roberts — Month 9 Day 23 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T Wheeler — Signature — Month 9 Day 23 Year 10

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736

2. Page 1 of: 1

3. Emergency Response Phone: 330-720-1061

4. Waste Tracking Number: 0169

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites LL1

6. Transporter 1 Company Name: ~~The Acme Company~~ Patrick Inc # 244
U.S. EPA ID Number: N/A

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
330-823-6220
Facility's Phone:
U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month 9 Day 23 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Tom Welsch
Signature: Tom Welsch
Month 9 Day 23 Year 10
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: T Wheeler
Signature
Month Day Year 10

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0170

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LC1

Generator's Phone: 330 358-7312

6. Transporter 1 Company Name: The ~~Acme Company~~ Patrick # 246 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
330-823-6220

U.S. EPA ID Number: State ID 05008

Facility's Phone:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: LARRY STRATTEN — Signature: Larry Stratten — Month 9 Day 23 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T Wheeler — Signature: T Wheeler — Month 9 Day 23 Year 10

ÒUS /FEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0171

me and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
s Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites LL1

porter 1 Company Name ~~The Acme Company~~ Patrick # 219 — U.S. EPA ID Number: N/A

Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
330-823-6220
Facility's Phone:

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

GENERATOR

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: WAYNE M. PAVLUS — Signature — Month 9 Day 23 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T WHEELER — Signature — Month 9 Day 23 Year 10

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0172

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LL1

Generator's Phone: 330 358-7312

6. Transporter 1 Company Name: ~~The Acme Company~~ Patrick Inc # 243 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: R Roberts — Signature: R Roberts — Month 9 Day 23 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T Wheeler — Signature — Month 9 Day 23 Year 10

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0173

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites LC1

6. Transporter 1 Company Name
~~The Home Company~~ Patrick Inc # 246
U.S. EPA ID Number: N/A

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220
U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month 9 Day 23 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: LARRY STRATEN
Signature: Larry Straten
Month 9 Day 23 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name:
Signature:
Month 9 Day 23 Year 10

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0174

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites LL1

6. Transporter 1 Company Name: ~~The Acme Company~~ Patrick Inc # 219 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number
State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: WAYNE M. PAULUS — Signature — Month 9 Day 23 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in ~~Item 17a~~

Printed/Typed Name: T W HEEKIL — Signature — Month 9 Day 28 Year 10

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0175

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites LL1

6. Transporter 1 Company Name ~~The Acme Company~~ Patrick # 243 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220
U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 23 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: R. Roberts — Signature: R Roberts — Month 9 Day 23 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Jeff Heeter — Signature — Month Day Year 10

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

169-BLC-O 6 10498 (Rev. 8/08) DESIGNATED FACILITY TO GENERATOR

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
OH5210020736	1	330-720-1061	0177

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites LL1

6. Transporter 1 Company Name
~~The Acme Company~~ Patriot Inc # 246
U.S. EPA ID Number: N/A

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220
U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Approval # 10-EWS-01

GENERATOR

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: LARRY STRATER
Signature: Larry Strater
Month 9 Day 27 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: T Wheeler
Signature:
Month 9 Day 28 Year 10

169-BLC-O 6 10498 (Rev. 8/06)

DESIGNATED FACILITY TO GENERATOR

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
OH5210020736	1	330-720-1061	0178

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LL 1

6. Transporter 1 Company Name: ~~The Lane Company~~ Patrick Inc # 219 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patt — Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: WAYNE M. PAULUS — Signature — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: WHEELER — Signature — Month 9 Day 28 Year 10

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0179

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)
LL2, LL3 Sites

6. Transporter 1 Company Name ~~Thaxton Company~~ Patrick Inc. # 243 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220
U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
GENERATOR	1. Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 27 Year 10

INT'L
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: R Roberts — Signature: R Roberts — Month 9 Day 27 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: T Wheeler — Signature — Month 9 Day 28 Year 10

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
OH5210020736	1	330-720-1061	0180

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LL1

6. Transporter 1 Company Name: ~~The Acme Company~~ Patriot Inc # 236 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: ROBERT LEIBFORTH — Signature: Robert M Leibforth — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T Wheeler — Signature: T Wheeler — Month 9 Day 28 Year 10

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0161

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites

6. Transporter 1 Company Name: ~~The Acme Company~~ Petrack Inc # 244 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
330-823-6220
Facility's Phone:

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patt — Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Tom Welsch — Signature: Tom Welsch — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T WHEELER — Signature: T W — Month 9 Day 30 Year 10

169-BLC-O 6 10498 (Rev. 8/06)

DESIGNATED FACILITY TO GENERATOR

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	082

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LL1

Generator's Phone: 330 358-7312

6. Transporter 1 Company Name: ~~The Acme Company~~ Patrick # 246 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address

Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601

U.S. EPA ID Number: State ID 05008

Facility's Phone: 330-823-6220

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 27 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: LARRY STRATTEN — Signature: Larry Stratten — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T WHEELER — Signature — Month 9 Day 27 Year 10

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0183

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LL1

Generator's Phone: 330 358-7312

6. Transporter 1 Company Name: ~~Thurnbage Company~~ Patrick # 219 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address

Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
330-823-6220

U.S. EPA ID Number: State ID 05008

Facility's Phone:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: WAYNE M. DAVIS — Signature — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T WHEELER — Signature — Month 9 Day 27 Year 10

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0184

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites LA1

6. Transporter 1 Company Name: ~~The Amos Company~~ Patrick # 243 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address

Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: R. Roberts — Signature: R. Roberts — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: T. Wheeler — Signature — Month 9 Day 28 Year 10

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	OH5210020736	1	330-720-1061	0185

5. Generator's Name and Mailing Address

Ravenna Army Ammunition Plant
8451 State Route 5 Ravenna, OH 44266-9297
Generator's Phone: 330 358-7312

Generator's Site Address (if different than mailing address)

LL2, LL3 Sites L4

6. Transporter 1 Company Name: ~~Thaydone Company~~ Patrick # 236 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Central Waste Inc.
12003 Oyster Road
Alliance, OH 44601
Facility's Phone: 330-823-6220

U.S. EPA ID Number: State ID 05008

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non RCRA, Non DOT Regulated Soil	01	DT	EST. 22	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

Approval # 10-EWS-01

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month 9 Day 27 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: ROBERT LEIBFORTH — Signature: Robert M. Leibforth — Month 9 Day 27 Year 10

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: TWEETER — Signature — Month 9 Day 28 Year 10

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189628
Date: 9/23/2010
Time: 08:25:20 - 08:44:15

Scale
Gross:71640 lb In Scale 1
Tare:30580 lb Out Scale 1
Net:41060 lb

Truck: PATRICK246
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi
Generator: RVNA ARMY/Ravenna Army Am

Manifest: 166

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	20.53	ton	$11.75/Ton	$241.23

Customer Account Balance: 607.70

Total Taxes: $366.47
Total Amount: $607.70

Driver: _____

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189631
Date: 9/23/2010
Time: 08:41:35 - 08:55:42

			Scale
	Gross:	86380 lb	In Scale 1
Truck: PATRICK219	Tare:	30220 lb	Out Scale 1
Customer: 0231/Environmental Waste	Net:	56160 lb	

Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 167

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	28.08	ton	$11.75/Ton	$329.94
				Total Taxes:	$501.23
Customer Account Balance:	1,438.87			Total Amount:	$831.17

Driver: _____

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189634
Date: 9/23/2010
Time: 08:50:59 - 09:05:49

		Scale
Gross:	82720 lb	In Scale 1
Tare:	29640 lb	Out Scale 1
Net:	53080 lb	

Truck: PATRICK243
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi
Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0168

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	26.54	ton	$11.75/Ton	$311.85

Customer Account Balance: 2,224.46

Total Taxes: $473.74
Total Amount: $785.59

Driver: RCR

Deputy Weighmaster: Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189640
Date: 9/23/2010
Time: 08:59:58 - 09:20:55

			Scale
	Gross:	72920 lb	In Scale 1
Truck: PATRICK244	Tare:	29540 lb	Out Scale 1
Customer: 0231/Environmental Waste	Net:	43380 lb	

Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0169

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	21.69	ton	$11.75/Ton	$254.86
				Total Taxes:	$387.17
Customer Account Balance:	2,866.49			Total Amount:	$642.03

Driver: _____ Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189668
Date: 9/23/2010
Time: 10:32:42 - 10:46:43

			Scale
	Gross:	80500 lb	In Scale 1
	Tare:	30500 lb	Out Scale 1
	Net:	50000 lb	

Truck: PATRICK246
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0170

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	25.00	ton	$11.75/Ton	$293.75

Customer Account Balance: 3,606.49

Total Taxes: $446.25
Total Amount: $740.00

Driver: _____

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189675
Date: 9/23/2010
Time: 10:53:06 - 11:05:55

			Scale
Gross:	84080 lb	In	Scale 1
Tare:	30260 lb	Out	Scale 1
Net:	53820 lb		

Truck: PATRICK219
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

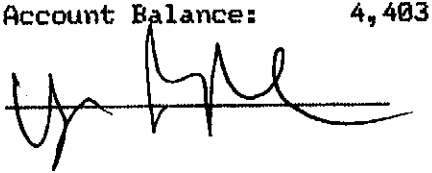
Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0171

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	26.91	ton	$11.75/Ton	$316.19
				Total Taxes:	$480.35
Customer Account Balance:	4,403.03			Total Amount:	$796.54

Driver: 

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189676
Date: 9/23/2010
Time: 10:59:08 - 11:11:28

		Scale
Gross:	88880 lb	In Scale 1
Tare:	29560 lb	Out Scale 1
Net:	59320 lb	

Truck: PATRICK243
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0172

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	29.66	ton	$11.75/Ton	$348.51
				Total Taxes:	$529.44
Customer Account Balance:	5,280.98			Total Amount:	$877.95

Driver: RCR

Deputy Weighmaster: Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189699
Date: 9/23/2010
Time: 12:37:29 - 12:54:17

		Scale
Gross:	82500 lb	In Scale 1
Tare:	30400 lb	Out Scale 1
Net:	52100 lb	

Truck: PATRICK246
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi
Generator: RVNA ARMY/Ravenna Army Am

Manifest: 173

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	26.05	ton	$11.75/Ton	$306.09
				Total Taxes:	$465.00
Customer Account Balance:	6,052.07			Total Amount:	$771.09

Driver: _____

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189701
Date: 9/23/2010
Time: 12:52:42 - 13:09:21

			Scale
	Gross:	82900 lb	In Scale 1
Truck: PATRICK219	Tare:	29840 lb	Out Scale 1
Customer: 0231/Environmental Waste	Net:	53060 lb	

Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0174

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	26.53	ton	$11.75/Ton	$311.73
				Total Taxes:	$473.57
Customer Account Balance:	6,837.37			Total Amount:	$785.30

Driver: _____ Deputy Weighmaster: _____

Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189703
Date: 9/23/2010
Time: 13:07:53 - 13:18:55

			Scale
	Gross: 67520 lb	In	Scale 1
Truck: PATRICK243	Tare: 29460 lb	Out	Scale 1
Customer: 0231/Environmental Waste	Net: 38060 lb		

Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0175

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	19.03	ton	$11.75/Ton	$223.60
				Total Taxes:	$339.69
Customer Account Balance:	7,400.66			Total Amount:	$563.29

Driver: _____ Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189891
Date: 9/27/2010
Time: 08:24:55 - 08:39:19

Scale
Gross:83020 lb In Scale 1
Tare:30480 lb Out Scale 1
Net:52540 lb

Truck: PATRICK246
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0177

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	26.27	ton	$11.75/Ton	$308.67
				Total Taxes:	$468.92
Customer Account Balance:	8,178.25			Total Amount:	$777.59

Driver: _____

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189894
Date: 9/27/2010
Time: 08:41:06 - 08:51:46

Gross:85240 lb In Scale 1
Tare:29960 lb Out Scale 1
Net:55280 lb

Truck: PATRICK219
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi
Generator: RVNA ARMY/Ravenna Army Am

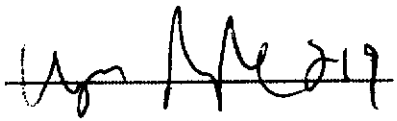
Manifest: 0178

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	27.64	ton	$11.75/Ton	$324.77

Customer Account Balance: 8,996.39

Total Taxes: $493.37
Total Amount: $818.14

Driver: 

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189898
Date: 9/27/2010
Time: 08:54:34 - 09:08:41

		Scale
Gross:	95500 lb	In Scale 1
Tare:	29640 lb	Out Scale 1
Net:	65860 lb	

Truck: PATRICK243
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0179

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	32.93	ton	$11.75/Ton	$386.93
				Total Taxes:	$587.81
Customer Account Balance:	9,971.13			Total Amount:	$974.74

Driver: RCR

Deputy Weighmaster: Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189904
Date: 9/27/2010
Time: 09:07:04 - 09:20:14

		Scale
Gross:	81740 lb	In Scale 1
Tare:	28160 lb	Out Scale 1
Net:	53580 lb	

Truck: PATRICK236
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: PUSHWALL

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0180

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	26.79	ton	$11.75/Ton	$314.78
				Total Taxes:	$478.20
Customer Account Balance:	10,764.11			Total Amount:	$792.98

Driver: Robert Lafferth

Deputy Weighmaster: Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189910
Date: 9/27/2010
Time: 09:30:22 - 09:45:51

		Scale
Gross:	91140 lb	In Scale 1
Tare:	29560 lb	Out Scale 1
Net:	61580 lb	

Truck: PATRICK244
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0181

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	30.79	ton	$11.75/Ton	$361.78
				Total Taxes:	$549.60
Customer Account Balance:	11,675.49			Total Amount:	$911.38

Driver: Tom

Deputy Weighmaster: Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189924
Date: 9/27/2010
Time: 10:32:10 - 10:46:23

			Scale
Gross:	95620 lb	In	Scale 1
Tare:	30380 lb	Out	Scale 1
Net:	65240 lb		

Truck: PATRICK246
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0182

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	32.62	ton	$11.75/Ton	$383.29

Customer Account Balance: 12,641.05

Total Taxes: $582.27
Total Amount: $965.56

Driver: _____

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189932
Date: 9/27/2010
Time: 11:00:12 - 11:11:14

Scale
Gross:94100 lb In Scale 1
Tare:29900 lb Out Scale 1
Net:64200 lb

Truck: PATRICK219
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi
Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0183

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	32.10	ton	$11.75/Ton	$377.18

Customer Account Balance: 13,591.22

Total Taxes: $572.99
Total Amount: $950.17

Driver: _____ Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189939
Date: 9/27/2010
Time: 11:12:58 - 11:23:41

			Scale
Gross:	88500 lb	In	Scale 1
Tare:	29600 lb	Out	Scale 1
Net:	58900 lb		

Truck: PATRICK243
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: coal bucket/ dump tr

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0184

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	29.45	ton	$11.75/Ton	$346.04
				Total Taxes:	$525.69
Customer Account Balance:	14,462.95			Total Amount:	$871.73

Driver: RCR

Deputy Weighmaster: _____
Tracy Wheeler

CENTRAL WASTE INC
CENTRAL WASTE LANDFILL
12003 OYSTER RD
ALLIANCE OH, 44601

Ticket: 189945
Date: 9/27/2010
Time: 11:37:54 - 11:57:30

		Scale
Gross:	77300 lb	In Scale 1
Tare:	28120 lb	Out Scale 1
Net:	49180 lb	

Truck: PATRICK236
Customer: 0231/Environmental Waste
Carrier: PATRICK/patrick truckinTruck Type: PUSHWALL

Profile: 10-EWS-01/Contaminated Soi

Generator: RVNA ARMY/Ravenna Army Am

Manifest: 0185

Comment:

Origin	Materials & Services	Quantity	Unit	Rate /Unit	Amount
OH067/Portage	100% of ISW/INDUSTRIAL SOLID	24.59	ton	$11.75/Ton	$288.93
				Total Taxes:	$438.93
Customer Account Balance:	15,190.81			Total Amount:	$727.86

Driver: Robert Lilforth Deputy Weighmaster: _____
Tracy Wheeler

APPENDIX J

Inspection Forms (SWP3)

Ravenna Army Ammunition Plant
Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form
Load Lines 1, 2, and 3

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more.

Inspector: B. Pratt

Date: 9-20-10

Days since last rainfall: 5

Amount of last rainfall: 0.5 inches

Stabilization Measures

Drainage Area	Date Since Last Disturbance	Date of Next Disturbance	Stabilized (Yes/No)	Stabilized With	Condition
Load Line 1					
Melt Pour Complex (CB-4, 4-WN, 4A, 4A-WS)	9-20-10	9-21-10	NO	NA	Good
Perimeter Areas/Misc.	↓	↓	↓	↓	↓
Stockpile Area					
Load Line 2					
Melt Pour Complex (DB-4, DB-4-WN)					
Explosive Handling Area (DB-10, 10-VP2)		N			
Perimeter/Miscellaneous Areas					
Stockpile Area					
Load Line 3					
Melt Pour Complex (EB-4, EB-4A, EB-4WN, EB-4A-WN)			A		
Explosive Handling Area (EA-6, EA-6A, EB-25)					
Perimeter/Miscellaneous Areas					
Stockpile Area					

Stabilization required: NA

To be performed by: _____ On or before: _____

Ravenna Army Ammunition Plant
Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form
Load Lines 1, 2, and 3

Inspector: B. Pratt

Date: 9-20-10

Stabilized Construction Entrances

Construction Entrance Location	Does Mud Get Tracked onto Road?	Is the Gravel Clean or is it Filled with Sediment?	Does all Traffic use the Stabilized Entrance to Leave the Site?	Is the Culvert Beneath the Entrance Working?
Load Line 1	No	Clean	Yes	NA
Load Line 2		N		
Load Line 3		A		

Stabilization required:

NA

To be performed by: _____ On or before: _____

Ravenna Army Ammunition Plant
Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form
Load Lines 1, 2, and 3

Inspector: B. Pratt

Date: 9-20-10

Silt Fence and Straw Bales

Drainage Area Perimeter	Has Silt Fence Reached 1/3 of Fence Height?	Is Fence Properly Secured?	Is There Evidence of Washout or Topping Over?	Comment
Load Line 1				
Melt Pour Complex (CB-4, 4-WN, 4A, 4A-WS)	NO	yes	NO	
Perimeter Areas/Misc.	↓	↓	↓	
Stockpile Area				
Load Line 2				
Melt Pour Complex (DB-4, DB-4-WN)				
Explosive Handling Area (DB-10, 10-VP2)				
Perimeter/Miscellaneous Areas		N		
Stockpile Area				
Load Line 3				
Melt Pour Complex (EB-4, EB-4A, EB-4WN, EB-4A-WN)				
Explosive Handling Area (EA-6, EA-6A, EB-25)			A	
Perimeter/Miscellaneous Areas				
Stockpile Area				

Maintenance required for silt fence and straw bales:

NA

To be performed by: _____ On or before: _____

Ravenna Army Ammunition Plant
Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form
Load Lines 1, 2, and 3

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more.

Inspector: B Pratt

Date: 9-27-10

Days since last rainfall: 0

Amount of last rainfall: <0.5 inches

Stabilization Measures

Drainage Area	Date Since Last Disturbance	Date of Next Disturbance	Stabilized (Yes/No)	Stabilized With	Condition
Load Line 1					
Melt Pour Complex (CB-4, 4-WN, 4A, 4A-WS)	9-27-10	NA	yes	Seeding in progress	In progress
Perimeter Areas/Misc.	↓	↓	↓	↓	↓
Stockpile Area					
Load Line 2					
Melt Pour Complex (DB-4, DB-4-WN)					
Explosive Handling Area (DB-10, 10-VP2)					
Perimeter/Miscellaneous Areas					
Stockpile Area		N			
Load Line 3					
Melt Pour Complex (EB-4, EB-4A, EB-4WN, EB-4A-WN)			A		
Explosive Handling Area (EA-6, EA-6A, EB-25)					
Perimeter/Miscellaneous Areas					
Stockpile Area					

Stabilization required:

_____

_____

_____

To be performed by: _____ On or before: _____

Ravenna Army Ammunition Plant
Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form
Load Lines 1, 2, and 3

Inspector: B. Pratt

Date: 9-27-10

Stabilized Construction Entrances

Construction Entrance Location	Does Mud Get Tracked onto Road?	Is the Gravel Clean or is it Filled with Sediment?	Does all Traffic use the Stabilized Entrance to Leave the Site?	Is the Culvert Beneath the Entrance Working?
Load Line 1	No	Clean	Yes	NA
Load Line 2		N		
Load Line 3		A		

Stabilization required:

_____

_____

_____

To be performed by: _____ On or before: _____

Ravenna Army Ammunition Plant
Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form
Load Lines 1, 2, and 3

Inspector: B. Pratt

Date: 9-27-10

Silt Fence and Straw Bales

Drainage Area Perimeter	Has Silt Fence Reached 1/3 of Fence Height?	Is Fence Properly Secured?	Is There Evidence of Washout or Topping Over?	Comment
Load Line 1				
Melt Pour Complex (CB-4, 4-WN, 4A, 4A-WS)	NO	yes	NO	
Perimeter Areas/Misc.	↓	↓	↓	
Stockpile Area				CB4 SP removed CB4A SP being removed
Load Line 2				
Melt Pour Complex (DB-4, DB-4-WN)				
Explosive Handling Area (DB-10, 10-VP2)				
Perimeter/Miscellaneous Areas				
Stockpile Area		N		
Load Line 3				
Melt Pour Complex (EB-4, EB-4A, EB-4WN, EB-4A-WN)		A		
Explosive Handling Area (EA-6, EA-6A, EB-25)				
Perimeter/Miscellaneous Areas				
Stockpile Area				

Maintenance required for silt fence and straw bales:

_____

_____

_____

To be performed by: _____ On or before: _____

APPENDIX K

Comment Response Table

DRAFT REMEDIATION COMPLETION REPORT
SUB-SLAB SOILS AT RVAAP-08 LOAD LINE 1 AT THE
RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO
COMMENT RESPONSE TABLE
March 2, 2011

Comment Number	Page No./Line No.	New Page or Sheet	Comment	Recommendation	Response
Ohio EPA (Andrew Kocher)					
O-1	General Note		Ohio EPA notes and appreciates that the comments/responses for the Load Line 2, 3, and 4 Completion Report were incorporated within this report.	N/A	No response necessary.
O-2	General		The text throughout refers to MI® sampling.	Ohio EPA recommends changing the registered trademark symbol acronym to Incremental Sampling Methodology (ISM), which will not be registered and (although in draft form) is supported by the Interstate Technology & Regulatory Council.	The MI acronym was globally changed to ISM throughout the document.
O-3	Page 4-8/ Lines 12-14		This section discusses the soil test kits used to determine TNT concentrations. No description of the collection procedures or type of kit was given.	Please add some additional description on the test kit procedure. For example: Please add the type or brand of kit used, the procedure for collection of the sample, the method used, any interferences, value of the data, etc. An appendix could also be added, if desired (for example, an appendix for the Method or an appendix from the company that made the test kit).	Appendix B of the Work Plan contains most of the information requested in the comment. The procedure for sample collection was included in Section 4.4.1. Selected information from Appendix B in the Work Plan has been extracted and included in Section 4.4.2. The proposed revised text is as follows: *"Ensys® test kits from Strategic Diagnostics, Inc. were used to determine the TNT concentrations in the collected samples. The concentration of TNT in each sample was determined by evaluating how*

Comment Number	Page No./Line No.	New Page or Sheet	Comment	Recommendation	Response
					much color (as measured by a spectrophotometer) was developed. Analysis was in accordance with the procedures in Appendix B of the Quality Assurance Project Plan (QAPP) Addendum within the approved Work Plan (URS, 2008). The range of the Ensys® test kit for TNT is between 1 and 30 mg/kg, with a relative standard deviation of 8%. The least detectable concentration is 0.7 mg/kg TNT. Appropriate quality control measures were maintained during the analyses, including calibration check standards, duplicate analyses, and method blanks."
O-4	Page 4-10, Table 4-2		The table gives summary results of the field screening test kits for TNT. Some of the samples were diluted up to 4 times.	Please explain in the text why some of the samples were diluted 2 – 4 times.	The first paragraph in Section 4.4.2 has been revised to add the following: *"For TNT sample concentrations greater than 30 mg/kg the sample extract must be diluted with acetone and reanalyzed until the concentration is within the working range of the method. The dilution factor is then used in the calculation of the result."*
O-5	Appendix F/ Table F-1		This table has no key of legend.	Please add a legend explaining all the acronyms on the table.	An introduction to Appendix F has been prepared that defines the

Comment Number	Page No./Line No.	New Page or Sheet	Comment	Recommendation	Response
				Please include the following definitions: Abs, ND, DIL, DF, DUP, W, CBU, N, MI, TNT, ppm, etc.	acronyms used on Table F-1. The word "*Building"* has been added previous to the CB-4 designation in the Comment Column. Directions (i.e, North, South, etc.) have been spelled out.
O-6	Appendix F/ Table F-1		A few samples in the table have negative results which become non-detects for TNT.	In the legend, please explain the negative results.	The Introduction to Appendix F described in the previous comment also includes the following explanation of negative results: "*The TNT concentrations shown on Table F-1 are calculated by subtracting the final absorbance of the sample by four times the initial absorbance of the sample and dividing this result by 0.0323. If TNT is not detected in a sample, the addition of the developer solution will not change the color of the sample, therefore, the calculation will be a negative result.* *In a sample with a very high TNT concentration (e.g. , LL1CB4-SS-113SN-0008)the initial extract (i.e., before any dilutions) develops a dark red color before the addition of the developer solution. Thus there will be little difference between the sample absorbance and the initial absorbance, resulting in a negative number.*

Comment Number	Page No./Line No.	New Page or Sheet	Comment	Recommendation	Response
					However, the initial absorbance of the sample extract alone may be above the limits of the test, therefore, the sample extract must be diluted to achieve accurate results."
O-7	Appendix F/ Table F-1		Sample LL1CB4-SS-113SN-0008 in the table have negative results which become positive detects for TNT when diluted.	In the legend, please explain how the ND result for LL1CB4-SS-113SN-0008 gets diluted and creates a positive result. Note: Comments O-4, O-6, and O-7 could all be explained in one location (say in an additional appendix or Appendix F) and this appendix could be referenced in the table and text of the report.	Please see the response to Comment O-6.