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WET STORAGE AREA FIGURES

WET STORAGE AREA FIGURES

1.0 INTRODUCTION

This report documents the results of Wet Storage Area (WSA) (AOC-45) sampling effort which was completed as part of the characterization of the 14 Ravenna Army Ammunition Plant (RVAAP) Area of concern (AOCs). This document summarizes the results of the field activities conducted from October 2004 to May 2005.

1.1 PURPOSE AND SCOPE

Characterization activities were conducted at WSA to collect sufficient data for all applicable media to allow efficient planning and execution of future environmental actions.

The characterization effort for the WSA was undertaken to accomplish the following:

- Collect characterization data using multi-increment (MI) sampling to provide data for future risk assessments that may be conducted;
- Develop and/or update the Conceptual Site Model to identify the key elements that should be considered in future actions;
- Assess AOC-specific physical characteristics;
- Assess potential sources of contamination;
- Allow initial assessment of the nature and lateral extent of soil, contamination (the depth of contamination was not evaluated for this characterization effort); and
- Conduct a preliminary human health and ecological screening.

The investigation approach to the WSA involved a combination of field and laboratory activities to characterize the site. Field investigation techniques included surface soil (0-1 ft) samples (multi-increment (MI) and discrete) and a sample location survey. The rationale for the AOC specific sampling plan was biased based on historical information including past usage, past investigations, ecological settings, climatic conditions, and geological and hydrologic characteristics. The field program was conducted in general accordance with the revised (USACE, 2001a) and the Final Sampling and Analysis Plan Addendum FSAP for the characterization of 14 RVAAP AOCs (MKM, 2004).

1.2 BACKGROUND INFORMATION

This section briefly describes WSA and previous studies conducted in this AOC.

1.2.1 AOC Description and History

The WSA located at the intersection of George Road and Newton Falls Road near the geographic center of RVAAP. The WSA is surrounded by a chain link fence.

The WSA is a 14.6 ha (36 acre) AOC and was used from 1941 to 1945 to store primary explosives including: lead azide, mercury fulminate and tetryl. The highly explosive, shock sensitive materials were stored in drums; the material within the drums was covered with water. The drums were stored in six separate igloos. Four of the igloos (WS-1, WS-IA, WS-2 and WS-2A) were located in the western portion of the 37-acre AOC. They were decontaminated and then demolished in 2004. The two

remaining igloos (WS-3 and WS-3A) are located in the eastern portion of the AOC. One of the eastern igloos was refurbished and used to conduct administrative functions.

The four igloos located in the western portion of the AOC (WS-1, WS-1A, WS-2 and WS-2A) were built approximately 150 ft apart. The two igloos located in the eastern portion of the AOC (WS-3 and WS-3A) are separated by approximately 400 ft. When constructed, each storage igloo was covered with earth. In four of the igloos, the floors were covered with a conductive lead lining to dissipate static electricity charges. When the lead floor was removed from the four demolished igloos, ACM liner and mastic were found beneath the lead. The floors, walls and ceilings of all six igloos were constructed from reinforced concrete. (Figure 1-2, in Volume I shows the location of WSA within the RVAAP).

1.2.2 Previous Investigation

The following evaluations have been conducted at the Wet Storage Area:

1.2.2.1 Installation Assessment of Ravenna Army Ammunition Plant (USATHAMA 1978)

This assessment identified the following conditions at RVAAP:

- Areas of RVAAP, including the productions areas (i.e. LL-5, LL-7, LL-8, LL-10 and LL-12), burning grounds, test areas and demolition areas were identified as sites contaminated with explosive waste which included: TNT, Composition B, lead azide, lead styphnate and black powder.
- Surface waters exiting the installation were not required to be monitored for nitrobodies and heavy metals.
- Analysis of the well water indicated potable quality.
- UXO items were identified in the demolition area.
- No environmental stress was identified at RVAAP.
- The chemical agent mustard may be buried within the old demolition grounds.
- The Ramsdell Quarry site landfill was identified as having a potential leaching problem.
- Trace quantities of 2,4,6-TNT were identified in the wells indicating that some leaching had occurred.

1.2.2.2 Relative Risk Site Evaluation for Newly Added Sites at the Ravenna Army Ammunition Plant (USACHPPM 1998).

WSA was scored with a moderate (18.6) contaminate hazard factor (CHF) for surface soil with a potential migration pathway factor and receptor pathway factor. The final Relative Risk Site Evaluation (RRSE) score for the AOC was “Medium”.

Confirmation samples were collected beneath the sub-floors of the four igloos that were demolished in 2004. Samples were collected and analyzed for lead and mercury. One sample, WSIA-001-CONF, exceeded the TVAAP specific background for lead (49 mg/kg).

1.2.3 Regulatory Authorities

Volume I, Section 1.2.3 identifies the regulatory authorities which oversee remedial activities for these AOCs.

1.2.4 Regulatory Status of Wet Storage Area

Volume I, Section 1.2.4 identifies the regulatory status for these AOCs.

2.0 ENVIRONMENTAL SETTING AT THE WET STORAGE AREA

This section describes the physical characteristics of the WSA that are factors in interpreting the potential contaminant transport pathways, receptor populations and exposure scenarios with respect to the evaluation of human health and ecological risks. The area immediately surrounding WSA is forested except for the clearing that defines the range former primary explosive storage area. An unnamed stream flows on the west perimeter of the AOC. This stream flows to Sand Creek. This AOC is approximately 2000 feet north of LL 9. The AOC surface water flows to the north/northwest. George Road is located approximately 200 feet to the northwest. Paris Windham Road is located approximately 250 feet south of the AOC. The AOC is approximately 1800 feet south of the Winklepeck Burning Grounds.

2.1 SURFACE FEATURES

The topography in the vicinity of the WSA AOC ranges from approximately 1050 to 1070 ft amsl with the highest point in the center of the AOC. The topography slopes gently towards the edge of the site. There is a sharp drop of approximately 30 ft on the west and north sides of the AOC to Sand Creek (USGS Topographic Map, Windham Quadrangle 1994).

2.2 METEOROLOGY AND CLIMATE

Meteorology and climate are addressed in Section 2.2 of Volume I.

2.3 SURFACE WATER HYDROLOGY

Surface water drainage generally follows the topography of the AOC, flowing from the center toward the west, north, and east.

2.4 GEOLOGY

No subsurface investigation was performed at the WSA. However, the geology would be similar to that described in Volume I, Section 2.4.

2.5 SOIL

According to the Soil Survey of Portage County, Ohio (USDA, 1978), RVAAP soils are described as being nearly level to gently sloping, and are poor to moderately well drained. Two soil types are found at this site: the Mahoning Silt Loam (2 to 6 percent slopes) and the Ellsworth silt loam (6 to 12 percent). The Mahoning Silt Loam covers the majority of the area, and the Ellsworth Silt Loam is found along the western and north edges as it slopes to the creek.

Mahoning Silt Loam (2 to 6 percent) is characterized by more gently sloped land with medium to rapid runoff and erosion is a hazard. Seasonal wetness and slow permeability are also attributes of this type of soil.

The Ellsworth series consists of deep, moderately well drained, gently sloping to very steep soils that formed in silty clay loam and silty clay glacial till. Ellsworth silt loam (6 to 12 percent) is characterized

as a sloping soil located adjacent to drainageways. Runoff is rapid, and the hazard of erosion for this soil type is very severe.

2.6 HYDROGEOLOGY

No subsurface investigation was performed at the WSA. However, the hydrogeology would be similar to that described in Volume I, Section 2.6.

2.7 DEMOGRAPHY AND LAND USE

Demographics and land use are discussed in Volume 1, Section 2.7.

2.8 ECOLOGY

Ecological information is provided in Volume I, Section 2.8.

3.0 CHARACTERIZATION ACTIVITIES AT THE WET STORAGE AREA

This section describes the field and analytical methods implemented during the characterization activities at the WSA AOC. The field and analytical programs were conducted in accordance with the RVAAP Facility Wide Sampling and Analysis Plan (FWSAP) (USACE, 2001a) and the RVAAP 14 AOC FWSAP Addendum (MKM, 2004). Investigation objectives, rationale for sampling locations and sampling methods are briefly discussed in this section.

Field activities conducted from October 2004 thru May 2005 included:

- Collecting MI surface soil (0-1 ft) samples (10-26-04 – 12-03-04);
- Conducting a sample location survey (12-13-04 – 01-07-05).

Information from previous assessments, evaluations and investigations, plus institutional knowledge about the operations, were used to determine the sampling locations, type of media collected, analyses run and numbers of samples for this characterization activity. Table WSA-1 summarizes the types and numbers of samples that were collected and the analyses that were conducted on the samples. A photo log of the investigation activities is provided in Appendix C. Figure WSA-1 shows the locations for the surface soil (0-1 ft) samples collected at this AOC.

3.1 MI SURFACE SOIL (0-1 FT) SAMPLING

Twenty-two MI surface soil (0-1 ft) samples were collected at this AOC to:

- Assess the potential impact of WSA operations on the soils within the AOC.
- Determine whether WSA testing operations contributed contaminants to dry drainage pathways.
- Determine the nature and extent of identified contamination (if present).

Areas surrounding the six igloos at WSA and dry drainage ditches on the AOC were divided into 20 MI sample grids. Each MI sampling grid is considered an exposure unit. Samples were collected as discussed in Volume I, Section 3.1.10.1. Three split samples were collected and submitted for analysis by an independent, USACE-approved laboratory. Analysis of MI surface soils (0-1 ft) for WSA included the following parameters: TAL Metals, Explosives, SVOCs and COPCs. Field sampling forms documenting the sampling activities are presented in Appendix E. Two VOC samples were collected as discrete surface soil (0-1 ft) samples to fulfill the 10 percent full suite requirement. Section 3.1.10.3 of Volume I describes the procedure used to collect discrete surface soil (0-1 ft) samples. Discrete VOC samples were not subjected to MI sample drying or processing. Samples were prepared, packaged and shipped per Volume I, Section 3.1.14.

3.2 SAMPLE LOCATION SURVEY

The sample location survey at the WSA was conducted per the specifications in Section 3.1.11, in Volume I of this characterization report. The sample location survey data can be found in Appendix S.

3.3 DEVIATIONS FROM THE WORK PLAN

Every effort was made to complete the field activities as outlined in the FWSAP and the approved RVAAP 14 AOC FWSAP Addendum. However, in some instances, circumstances or field conditions necessitated a modification. Changes made during the WSA AOC characterization were:

- Two ditches at igloo WS-3 were combined into one surface soil (0-1 ft) MI sample. WSAss-005M-SO was combined with WSAss-018M-SO. Two ditches at igloo WS-4 were combined into one surface soil (0-1 ft) sample. WSAss-006M-SO was combined with WSAss-019M-SO. This was due to a sample mapping error during MI grid layout.
- A contingency MI surface soil (0-1 ft) sample was added. WSAss-020M is a dry ditch sample that was collected north of sample WSAss-003M-SO, which is located near igloo WS-1A, to fulfill QA/QC requirements.

Although these deviations were implemented, the objectives of the WSA AOC characterization were still achieved.

4.0 NATURE OF CONTAMINATION AT THE WET STORAGE AREA

This section summarizes the surface soil (0-1 ft) analytical results obtained from the environmental sampling conducted at the WSA. The number of samples collected and the number of analytical results that exceeded either the RVAAP background criteria or Region 9 residential Preliminary Remediation Goals are listed in each subsection as discussed in Section 4.0, Volume I.

4.1 MI SURFACE SOIL (0-1 FT)

Twenty-two, MI surface soil (0-1 ft) (18 regular samples and four QC samples) samples were collected from various WSA locations. Additionally, two discrete surface soil (0-1 ft) samples were collected for VOC analysis. All positive detections were compared to RVAAP background and Region 9 residential PRG values as previously discussed.

Surface soil (0-1 ft) results at or above detection limits are presented in Table WSA-2. All surface soil (0-1 ft) analytical results are presented in Table WSA-3. Locations where analytes were detected at or above background concentrations and Region 9 residential PRGs are illustrated in Figures WSA-2 and WSA-3. Laboratory analytical reports are provided in Appendix F.

Surface Soil (0-1 ft) analytical results are summarized as follows:

- **Aluminum** exceeded the Region 9 residential PRG in 22 samples with a **maximum concentration of 16000 mg/kg.**
- **Arsenic** exceeded the Region 9 residential PRG in 11 samples and exceeded background and the Region 9 residential PRG in 11 samples with a **maximum concentration of 21 mg/kg.**
- **Barium** exceeded background in one sample with a **maximum concentration of 110 mg/kg.**
- **Beryllium** exceeded background in one sample with a **maximum concentration of 1.0 mg/kg.**
- **Chromium** exceeded background in 21 samples with a **maximum concentration of 26 mg/kg.**
- **Cobalt** exceeded background in 11 samples with a **maximum concentration of 14 mg/kg.**
- **Copper** exceeded background in 19 samples with a **maximum concentration of 22 mg/kg.**
- **Iron** exceeded the Region 9 residential PRG in three samples, and exceeded background and the Region 9 residential PRG in 19 samples with a **maximum concentration of 32000 mg/kg.**
- **Lead** exceeded background in five samples with a **maximum concentration of 97 mg/kg.**
- **Magnesium** exceeded background in 11 samples with a **maximum concentration of 3900 mg/kg.**
- **Manganese** the Region 9 residential PRG in 22 samples with a **maximum concentration of 800 mg/kg.**
- **Nickel** exceeded background in 19 samples with a **maximum concentration of 32 mg/kg.**
- **Potassium** exceeded background in 20 samples with a **maximum concentration of 1900 mg/kg.**
- **Sodium** exceeded background in 20 samples with a **maximum concentration of 430 mg/kg.**
- **Vanadium** exceeded the Region 9 residential PRG in 22 samples with a **maximum concentration of 28 mg/kg.**
- **Zinc** exceeded background in 15 samples with a **maximum concentration of 140 mg/kg.**
- **Mercury** exceeded background in 11 samples with a **maximum concentration of 2.1 mg/kg.**

- **Thallium** exceeded background in five samples with a **maximum concentration of 0.31 mg/kg.**
- **2-Methylnaphthalene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.058 mg/kg.**
- **Acenaphthylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.016 J mg/kg.** J values are estimated results.
- **Benzo(a)anthracene** exceeded the Region 9 residential PRG in one sample with a **maximum concentration of 8.2 mg/kg.**
- **Benzo(a)pyrene** exceeded the Region 9 residential PRG in one sample with a **maximum concentration of 5.5 mg/kg.**
- **Benzo(b)fluoranthene** exceeded the Region 9 residential PRG in one sample with a **maximum concentration of 7.3 mg/kg.**
- **Benzo(g,h,i)perylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 3.7 mg/kg.**
- **Dibenzo(a,h)anthracene** exceeded the Region 9 residential PRG in one sample with a **maximum concentration of 0.94 mg/kg.**
- **Indeno(1,2,3-cd)pyrene** exceeded the Region 9 residential PRG in one sample with a **maximum concentration of 3.4 mg/kg.**
- **Phenanthrene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 12 mg/kg.**
- **Nitrocellulose** exceeded the laboratory detection limit in two samples with a **maximum concentration of 1.1 mg/kg.**
- **Explosives, VOCs, pesticides** and **PCBs** were below Region 9 residential PRGs and/or laboratory detection limits.

5.0 HUMAN HEALTH AND ECOLOGICAL RISK SCREENING FOR THE WET STORAGE AREA

This section details both the human health and ecological risk screening performed for WSA.

5.1 HUMAN HEALTH RISK SCREENING

Volume 1, Section 5.1 explains how the WSA data were screened to determine human health contaminants of potential concern (COPCs). Total chromium analytical results were conservatively screened against 1/10th of the PRG value; therefore, a screening value of 21 mg/kg was used rather than 210 mg/kg.

Table WSA-4 presents the human health screening table for surface soil (0-1 ft) at the WSA. A total of 45 constituents were detected including metals and semi-volatile organic compounds (SVOCs).

- Fifteen constituents had detections greater than background concentrations: arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, magnesium, nickel, potassium, sodium, zinc, mercury, and thallium.
- Ten constituents had detections above the adjusted Region 9 residential PRGs: aluminum, arsenic, iron, manganese, vanadium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)antracene, and indeno(1,2,3-cd)pyrene.
- Concentrations of two constituents, arsenic and iron, had exceeded both the RVAAP-specific background value established for that compound and the Region 9 residential PRG.
- Five constituents have no established background value or Region 9 residential PRG: 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, phenanthrene, and nitrocellulose.

Based on these comparisons, 12 constituents were identified as chemicals of potential concern (COPC) in surface soil (0-1 ft) at the WSA: arsenic, iron, 2-methylnaphthalene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene and nitrocellulose. The following COPCs were identified as COPCs because no screening criteria have been established: 2-methylnaphthalene, acenapthylene, benzo(g,h,i)perylene, phenanthrene and nitrocellulose.

5.2 ECOLOGICAL RISK SCREENING

See Volume I, Section 5.2 for an explanation of the procedures used to conduct this ecological risk screen.

Table WSA-5 presents the ecological screening table for surface soil (0-1ft) at the WSA. A total of 45 constituents were detected.

- Fifteen constituents had detections greater than background concentrations: arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, magnesium, nickel, potassium, sodium, zinc, mercury, and thallium.

- Fourteen constituents had detections above ecological screening values: aluminum, arsenic, chromium, iron, lead, manganese, nickel, selenium, vanadium, zinc, mercury, benzo(a)anthracene, benzo(a)pyrene, and chrysene.
- Four constituents have no screening value.

Based on these comparisons, 15 constituents were identified as chemicals of potential ecological concern (COPECs) in surface soil (0-1ft) at the WSA: arsenic, chromium, iron, lead, nickel, zinc, mercury, beta-BHC, benzo(a)anthracene, benzo(a)pyrene, carbazole, chrysene, dibenzofuran, 3-nitrotoluene, and nitrocellulose. Of these COPCs, carbazole, dibenzofuran, 3-nitrotoluene, and nitrocellulose were identified due to the lack of screening criteria. Beta-BHC was identified as a COPEC because it is considered persistent, bioaccumulative, and toxic.

6.0 SUMMARY AND CONCLUSION FOR THE CHARACTERIZATION OF THE WET STORAGE AREA

This section briefly summarizes the conditions that were found during the AOC characterization at WSA and the risk screening tasks that were completed.

6.1 NATURE OF CONTAMINATION

The nature of contamination for the WSA was characterized in surface soil (0-1 ft) media only. Eighteen of the contaminants that were detected above screening criteria were inorganics, and five SVOCs were also detected above screening criteria. Sample WSAss-004M, which was collected from just outside the doorway of a former storage igloo, contained all five SVOCs which were detected above screening criteria.

6.2 HUMAN HEALTH RISK SCREENING

An Human Health Risk Screening (HHRS) was conducted to compare the concentrations detected in the WSA samples to RVAAP-specific background values and U.S. EPA Region 9 residential PRGs. This preliminary screen was conducted to identify potential COPCs. The following table identifies the COPCs by media:

Table WSA-7

Chemical of Potential Concern – All Media

Soils		Sediment	Surface Water	Groundwater
Arsenic	Benzo(b)fluoranthene	No COPCs detected	No COPCs detected	Groundwater not sampled
Iron	Benzo(g,h,i)perylene			
2-Methylnaphthalene	Dibenzo(a,h)anthracene			
Acenaphthalene	Indeno(1,2,3-cd)pyrene			
Benzo(a)anthracene	Phenanthrene			
Benzo(a)pyrene	Nitrocellulose			

6.3 ECOLOGICAL RISK SCREENING

An Ecological Risk Screening (ERS) was performed to compare contaminant concentrations detected in the WSA to RVAAP-specific background values and ecological screening values. The ERS was conducted as outlined in Volume 1, Section 5.2. The ERS identified COPECs for the WSA. The following table summarizes those COPECs.

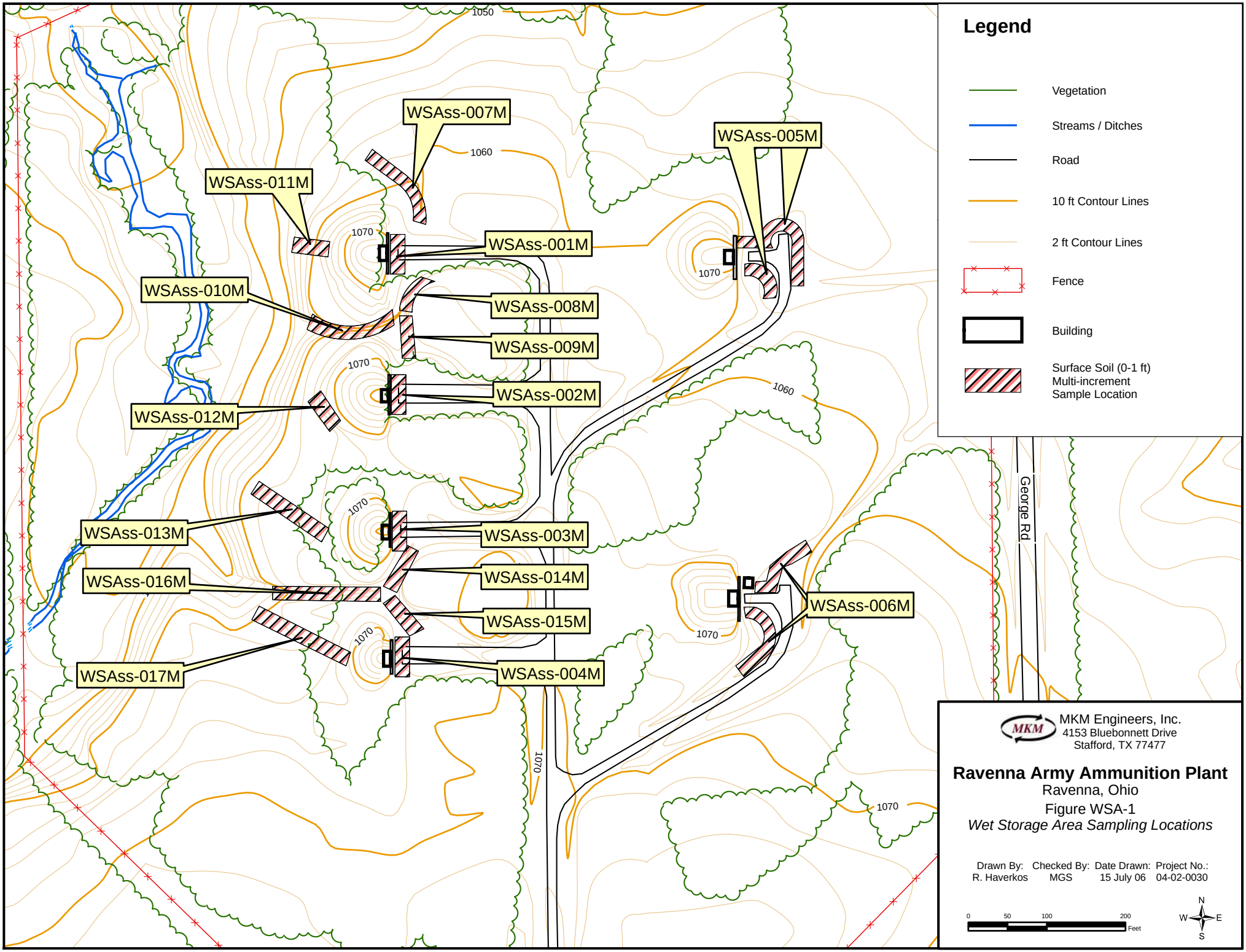
Table WSA-8

Chemical of Potential Ecological Concern – All Media

Soils		Sediment	Surface Water	Groundwater
Arsenic	Beta-BHC	Not Collected	Not Collected	Groundwater not evaluated for ERS
Chromium	Benzo(a)anthracene			
Iron	Benzo(a)pyrene			
Lead	Carbazole			
Nickel	Chrysene			
Zinc	Dibenzofuran			
Mercury	3-Nitrotoluene			
	Nitrocellulose			

6.4 CONCLUSION

Based on the COPCs presented in Section 6.2 and the COPECs presented in Section 6.3, a full risk evaluation should be considered in the overall risk management decisions that are made for the WSA.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Vegetation
Streams / Ditches
Road
10 ft Contour Lines
2 ft Contour Lines
Fence
Building
Surface Soil (0-1 ft)
Multi-increment
Sample Location
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WSAss-005M
WSAss-011M
WSAss-001M
WSAss-010M
WSAss-008M
WSAss-009M
WSAss-002M
WSAss-012M
WSAss-013M
WSAss-003M
WSAss-016M
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WSAss-015M
WSAss-006M
WSAss-017M
WSAss-004M
1050
1060
1070
George Rd
MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure WSA-1
Wet Storage Area Sampling Locations
Drawn By: R. Haverkos
Checked By: MGS
Date Drawn: 15 July 06
Project No.: 04-02-0030
0 50 100 200 Feet
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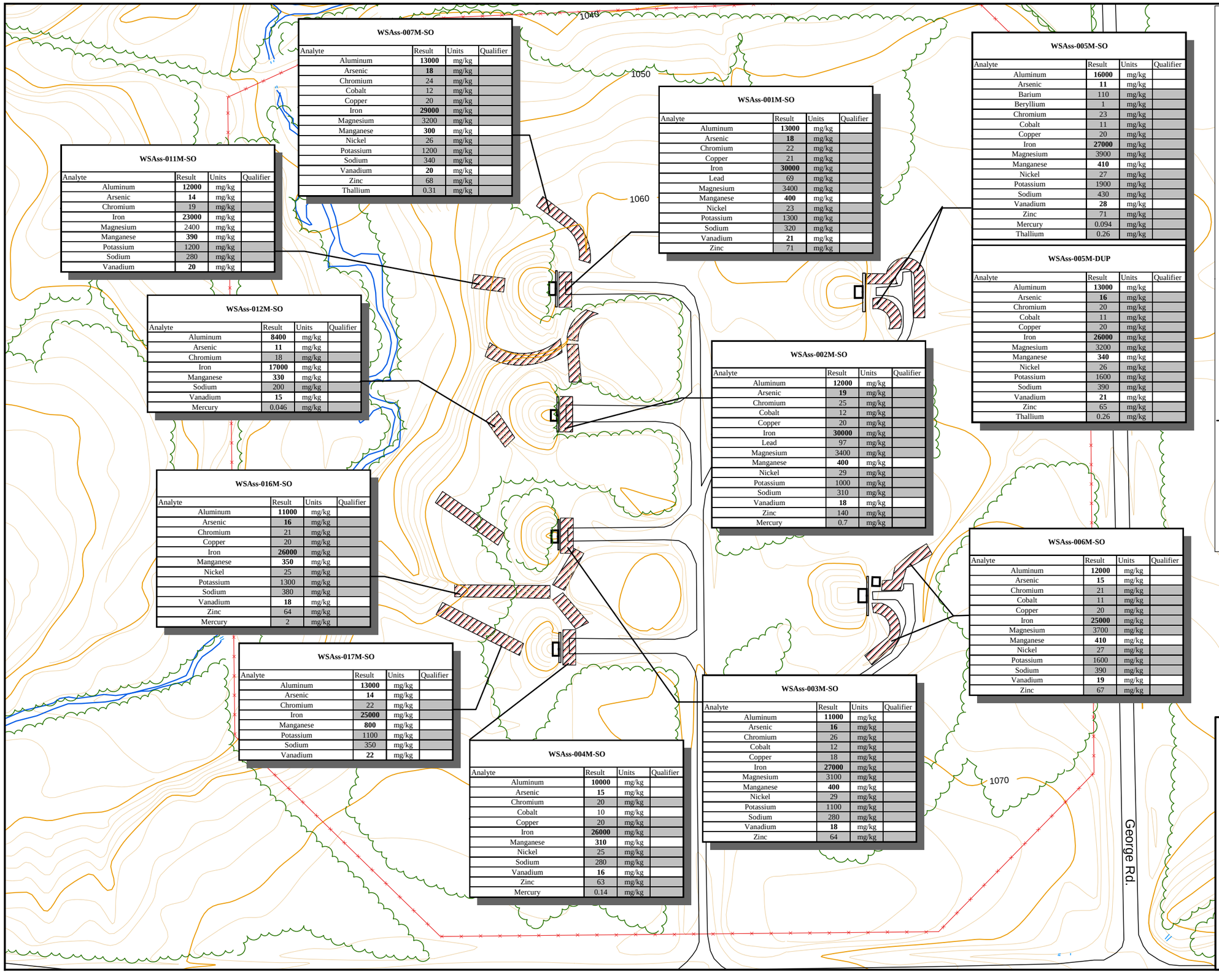
W
E
S



WSAss-007M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**18**	mg/kg	
Chromium	24	mg/kg	
Cobalt	12	mg/kg	
Copper	20	mg/kg	
Iron	**29000**	mg/kg	
Magnesium	3200	mg/kg	
Manganese	**300**	mg/kg	
Nickel	26	mg/kg	
Potassium	1200	mg/kg	
Sodium	340	mg/kg	
Vanadium	**20**	mg/kg	
Zinc	68	mg/kg	
Thallium	0.31	mg/kg	

WSAss-001M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**18**	mg/kg	
Chromium	22	mg/kg	
Copper	21	mg/kg	
Iron	**30000**	mg/kg	
Lead	69	mg/kg	
Magnesium	3400	mg/kg	
Manganese	**400**	mg/kg	
Nickel	23	mg/kg	
Potassium	1300	mg/kg	
Sodium	320	mg/kg	
Vanadium	**21**	mg/kg	
Zinc	71	mg/kg	

WSAss-005M-SO

Analyte	Result	Units	Qualifier
Aluminum	**16000**	mg/kg	
Arsenic	**11**	mg/kg	
Barium	110	mg/kg	
Beryllium	1	mg/kg	
Chromium	23	mg/kg	
Cobalt	11	mg/kg	
Copper	20	mg/kg	
Iron	**27000**	mg/kg	
Magnesium	3900	mg/kg	
Manganese	**410**	mg/kg	
Nickel	27	mg/kg	
Potassium	1900	mg/kg	
Sodium	430	mg/kg	
Vanadium	**28**	mg/kg	
Zinc	71	mg/kg	
Mercury	0.094	mg/kg	
Thallium	0.26	mg/kg	

WSAss-011M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**14**	mg/kg	
Chromium	19	mg/kg	
Iron	**23000**	mg/kg	
Magnesium	2400	mg/kg	
Manganese	**390**	mg/kg	
Potassium	1200	mg/kg	
Sodium	280	mg/kg	
Vanadium	**20**	mg/kg	

WSAss-005M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**16**	mg/kg	
Chromium	20	mg/kg	
Cobalt	11	mg/kg	
Copper	20	mg/kg	
Iron	**26000**	mg/kg	
Magnesium	3200	mg/kg	
Manganese	**340**	mg/kg	
Nickel	26	mg/kg	
Potassium	1600	mg/kg	
Sodium	390	mg/kg	
Vanadium	**21**	mg/kg	
Zinc	65	mg/kg	
Thallium	0.26	mg/kg	

WSAss-012M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8400**	mg/kg	
Arsenic	**11**	mg/kg	
Chromium	18	mg/kg	
Iron	**17000**	mg/kg	
Manganese	**330**	mg/kg	
Sodium	200	mg/kg	
Vanadium	**15**	mg/kg	
Mercury	0.046	mg/kg	

WSAss-002M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**19**	mg/kg	
Chromium	25	mg/kg	
Cobalt	12	mg/kg	
Copper	20	mg/kg	
Iron	**30000**	mg/kg	
Lead	97	mg/kg	
Magnesium	3400	mg/kg	
Manganese	**400**	mg/kg	
Nickel	29	mg/kg	
Potassium	1000	mg/kg	
Sodium	310	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	140	mg/kg	
Mercury	0.7	mg/kg	

WSAss-016M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**16**	mg/kg	
Chromium	21	mg/kg	
Copper	20	mg/kg	
Iron	**26000**	mg/kg	
Manganese	**350**	mg/kg	
Nickel	25	mg/kg	
Potassium	1300	mg/kg	
Sodium	380	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	64	mg/kg	
Mercury	2	mg/kg	

WSAss-006M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**15**	mg/kg	
Chromium	21	mg/kg	
Cobalt	11	mg/kg	
Copper	20	mg/kg	
Iron	**25000**	mg/kg	
Magnesium	3700	mg/kg	
Manganese	**410**	mg/kg	
Nickel	27	mg/kg	
Potassium	1600	mg/kg	
Sodium	390	mg/kg	
Vanadium	**19**	mg/kg	
Zinc	67	mg/kg	

WSAss-017M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**14**	mg/kg	
Chromium	22	mg/kg	
Iron	**25000**	mg/kg	
Manganese	**800**	mg/kg	
Potassium	1100	mg/kg	
Sodium	350	mg/kg	
Vanadium	**22**	mg/kg	

WSAss-003M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**16**	mg/kg	
Chromium	26	mg/kg	
Cobalt	12	mg/kg	
Copper	18	mg/kg	
Iron	**27000**	mg/kg	
Magnesium	3100	mg/kg	
Manganese	**400**	mg/kg	
Nickel	29	mg/kg	
Potassium	1100	mg/kg	
Sodium	280	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	64	mg/kg	

WSAss-004M-SO

Analyte	Result	Units	Qualifier
Aluminum	**10000**	mg/kg	
Arsenic	**15**	mg/kg	
Chromium	20	mg/kg	
Cobalt	10	mg/kg	
Copper	20	mg/kg	
Iron	**26000**	mg/kg	
Manganese	**310**	mg/kg	
Nickel	25	mg/kg	
Sodium	280	mg/kg	
Vanadium	**16**	mg/kg	
Zinc	63	mg/kg	
Mercury	0.14	mg/kg	

Legend

- Vegetation
- Streams / Ditches
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Surface Soil (0-1 ft) Multi-increment Sample Location

Notes:
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style.
If Result = or > PRG, then the value is presented with a bold style.
Result < PRG & Background, then the value is presented with a normal style.
mg / Kg milligrams per Kilogram (parts per million ppm)

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Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

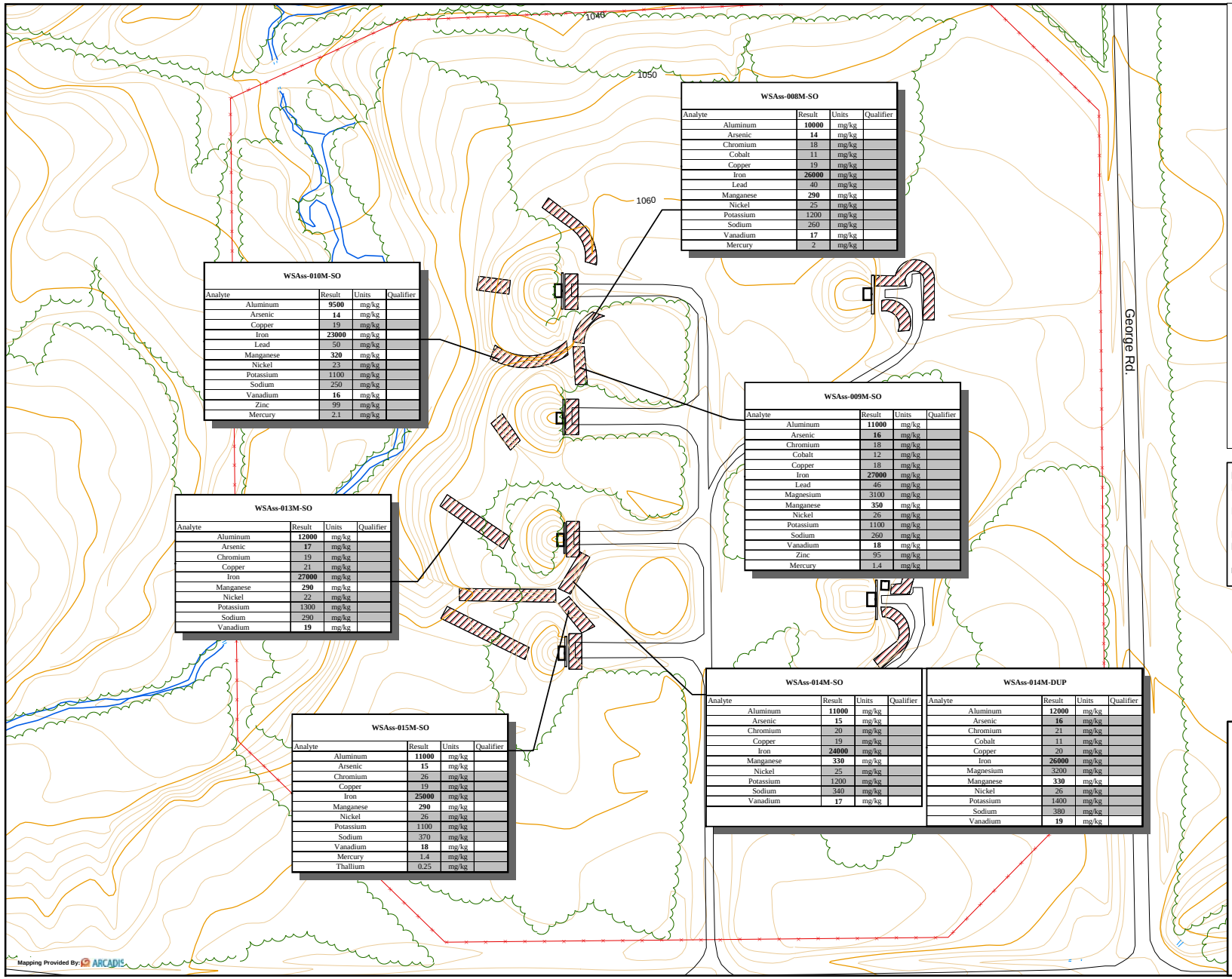
Figure WSA-2A

Wet Storage Area
Soil Sampling Locations
Exceedences-Inorganics

Drawn By:	Checked By:	Date Drawn:	Project No.:
R. Haverkos	MGS	15 July 06	04-02-0030

0 50 100 200 Feet

N W E S



WSAss-008M-SO

Analyte	Result	Units	Qualifier
Aluminum	**10000**	mg/kg	
Arsenic	**14**	mg/kg	
Chromium	18	mg/kg	
Cobalt	11	mg/kg	
Copper	19	mg/kg	
Iron	**26000**	mg/kg	
Lead	40	mg/kg	
Manganese	**290**	mg/kg	
Nickel	25	mg/kg	
Potassium	1200	mg/kg	
Sodium	260	mg/kg	
Vanadium	**17**	mg/kg	
Mercury	2	mg/kg	

WSAss-010M-SO

Analyte	Result	Units	Qualifier
Aluminum	**9500**	mg/kg	
Arsenic	**14**	mg/kg	
Copper	19	mg/kg	
Iron	**23000**	mg/kg	
Lead	50	mg/kg	
Manganese	**320**	mg/kg	
Nickel	23	mg/kg	
Potassium	1100	mg/kg	
Sodium	250	mg/kg	
Vanadium	**16**	mg/kg	
Zinc	99	mg/kg	
Mercury	2.1	mg/kg	

WSAss-009M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**16**	mg/kg	
Chromium	18	mg/kg	
Cobalt	12	mg/kg	
Copper	18	mg/kg	
Iron	**27000**	mg/kg	
Lead	46	mg/kg	
Magnesium	3100	mg/kg	
Manganese	**350**	mg/kg	
Nickel	26	mg/kg	
Potassium	1100	mg/kg	
Sodium	260	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	95	mg/kg	
Mercury	1.4	mg/kg	

WSAss-013M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**17**	mg/kg	
Chromium	19	mg/kg	
Copper	21	mg/kg	
Iron	**27000**	mg/kg	
Manganese	**290**	mg/kg	
Nickel	22	mg/kg	
Potassium	1300	mg/kg	
Sodium	290	mg/kg	
Vanadium	**19**	mg/kg	

WSAss-014M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**15**	mg/kg	
Chromium	20	mg/kg	
Copper	19	mg/kg	
Iron	**24000**	mg/kg	
Manganese	**330**	mg/kg	
Nickel	25	mg/kg	
Potassium	1200	mg/kg	
Sodium	340	mg/kg	
Vanadium	**17**	mg/kg	

WSAss-014M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**16**	mg/kg	
Chromium	21	mg/kg	
Cobalt	11	mg/kg	
Copper	20	mg/kg	
Iron	**26000**	mg/kg	
Magnesium	3200	mg/kg	
Manganese	**330**	mg/kg	
Nickel	26	mg/kg	
Potassium	1400	mg/kg	
Sodium	380	mg/kg	
Vanadium	**19**	mg/kg	

WSAss-015M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**15**	mg/kg	
Chromium	26	mg/kg	
Copper	19	mg/kg	
Iron	**25000**	mg/kg	
Manganese	**290**	mg/kg	
Nickel	26	mg/kg	
Potassium	1100	mg/kg	
Sodium	370	mg/kg	
Vanadium	**18**	mg/kg	
Mercury	1.4	mg/kg	
Thallium	0.25	mg/kg	

Legend

- Vegetation
- Streams / Ditches
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Surface Soil (0-1 ft) Multi-increment Sample Location

Notes:
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style.
If Result = or > PRG, then the value is presented with a bold style.
Result < PRG & Background, then the value is presented with a normal style.
mg / Kg milligrams per Kilogram (parts per million ppm)

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Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure WSA-2B

Wet Storage Area
Soil Sampling Locations
Exceedences-Inorganics

Drawn By:	Checked By:	Date Drawn:	Project No.:
R. Haverkos	MGS	15 July 06	04-02-0030

0 50 100 200 Feet

N W E S

Mapping Provided By: ARCADIS

1040
1050
1060
1060
1070
George Rd.

Legend

- Vegetation
- Streams / Ditches
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Surface Soil (0-1 ft) Multi-increment Sample Location

Notes:
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style.
If Result = or > PRG, then the value is presented with a bold style.
Result < PRG & Background, then the value is presented with a normal style.
mg/kg - milligrams per Kilogram (parts per million - ppm)

WSAss-004M-SO

Analyte	Result	Units	Qualifier
Benzo(a)anthracene	**8.2**	mg/kg	
Benzo(a)pyrene	**5.5**	mg/kg	
Benzo(b)fluoranthene	**7.3**	mg/kg	
Dibenzo(a,h)anthracene	**0.94**	mg/kg	
Indeno(1,2,3-cd)pyrene	**3.4**	mg/kg	

Mapping Provided By: ARCADIS

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Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure WSA-3
Wet Storage Area
Soil Sampling Locations
Exceedences-Organics

Drawn By:	Checked By:	Date Drawn:	Project No.:
R. Haverkos	MGS	15 July 06	04-02-0030

0 50 100 200 Feet

N W E S

Table WSA-1
Wet Storage Area Summary of Sampling and Analysis
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

SAMPLE PREFIX		VOC	SVOC	Explosives	Propellants	TAL Metals	Chrome +6	Pesticides	PCB	Cyanides	Nitrate	TOC	Geo-Tech	Grain	FIELD QA/QC SAMPLES					
WSA	SAMPLE ID	8260B	8270C	8330	3532/8330	6010/7000	7196A	8081A	8082B	9010A/9012A	EPA 353.2	EPA 415.1	Analysis (Various)	Size ASTM D422	Multi-Incremental QA	Duplicate Sample	Equipment Blank	Trip Blank	MS/MSD	USACE Split
MULTI-INCREMENTAL SOILS																				
Surface Soils	SS-001M			1		1														
	SS-002M			1		1														
	SS-003M			1		1														
	SS-004M	1	1	1	1	1		1	1											
	SS-005M			1		1										1				1
	SS-006M			1		1														
Dry-Ditch Soils	SS-007M			1		1														
	SS-008M			1		1														
	SS-009M			1		1														
	SS-010M			1		1														
	SS-011M	1	1	1	1	1		1	1											
	SS-012M			1		1														
	SS-013M			1		1														
	SS-014M			1		1														
	SS-015M			1		1										1				1
	SS-016M			1		1														
	SS-017M			1		1									1					
	SS-018M	*Not taken*																		
	SS-019M	*Not taken*																		
Contingency	SS-020M			1		1										1				1
		2	2	18	2	18	0	2	2	0	0	0	0	0	1	3	0	0	0	3

Notes:
Blank cell indicates that either the sample was not analyzed for that compound and/or the sample did not have a QC or Split sample associated with the regular sample.

Table WSA-2
Wet Storage Area Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units	WSAss-001M-SO	WSAss-002M-SO	WSAss-003M-SO	WSAss-004D-SO	WSAss-004M-SO	WSAss-005M-DUP	WSAss-005M-SO	WSAss-006M-SO	WSAss-007M-SO	WSAss-008M-SO	WSAss-009M-SO	WSAss-010M-SO	WSAss-011D-SO	WSAss-011M-SO
		Sample Date:					10/27/2004	10/26/2004	10/26/2004	10/26/2004	10/26/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/29/2004	10/29/2004	10/28/2004	11/1/2004	11/1/2004
		Sample Depth:					0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**13000**	**12000**	**11000**		**10000**	**13000**	**16000**	**12000**	**13000**	**10000**	**11000**	**9500**		**12000**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**18**	**19**	**16**		**15**	**16**	**11**	**15**	**18**	**14**	**16**	**14**		**14**
	6010B	Barium	538	nc	88.4	mg/kg	54	56	65		52	74	110	67	52	56	55	51		48
	6010B	Beryllium	15	nc	0.88	mg/kg	0.74	0.79	0.77		0.7	0.81	1	0.79	0.81	0.69	0.71	0.61		0.62
	6010B	Calcium	--[n]		15800	mg/kg	4100	5400	5900		2400	2300	5100	4000	1200	1300	1300	1600		750
	6010B	Chromium	30	ca	17.4	mg/kg	22	25	26		20	20	23	21	24	18	18	16		19
	6010B	Cobalt	30	ca	10.4	mg/kg	10	12	12		10	11	11	11	12	11	12	9.6		8.9
	6010B	Copper	313	nc	17.7	mg/kg	21	20	18		20	20	20	20	20	19	18	19		16
	6010B	Iron	2346	nc	23100	mg/kg	**30000**	**30000**	**27000**		**26000**	**26000**	**27000**	**25000**	**29000**	**26000**	**27000**	**23000**		**23000**
	6010B	Lead	400	pbk	26.1	mg/kg	69	97	19		15	16	16	15	22	40	46	50		18
	6010B	Magnesium	--[n]		3030	mg/kg	3400	3400	3100		2900	3200	3900	3700	3200	3000	3100	2600		2400
	6010B	Manganese	176	nc	1450	mg/kg	**400**	**400**	**400**		**310**	**340**	**410**	**410**	**300**	**290**	**350**	**320**		**390**
	6010B	Nickel	156	nc	21.1	mg/kg	23	29	29		25	26	27	27	26	25	26	23		19
	6010B	Potassium	--[n]		927	mg/kg	1300	1000	1100		920	1600	1900	1600	1200	1200	1100	1100		1200
	6010B	Selenium	39	nc	1.4	mg/kg	0.42													
	6010B	Sodium	--[n]		123	mg/kg	320	310	280		280	390	430	390	340	260	260	250		280
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**21**	**18**	**18**		**16**	**21**	**28**	**19**	**20**	**17**	**18**	**16**		**20**
	6010B	Zinc	2346	nc	61.8	mg/kg	71	140	64		63	65	71	67	68	82	95	99		57
	7041	Antimony	3.1	nc	0.96	mg/kg										0.52				
	7471A	Mercury	2.3	nc	0.04	mg/kg	0.028	0.7	0.018		0.14	0.034	0.094	0.04	0.026	2	1.4	2.1		0.043
	7841	Thallium	0.52	nc	0.00	mg/kg						0.26	0.26		0.31					
Pesticides	8081A	beta-BHC	0.32	ca	--	mg/kg														0.0034
SVOCs	8270C	2-Methylnaphthalene	--		--	mg/kg					0.058									
	8270C	Acenaphthene	368	nc	--	mg/kg					1.5									
	8270C	Acenaphthylene	--		--	mg/kg					0.016 J									
	8270C	Anthracene	2189	nc	--	mg/kg					2.9									
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg					**8.2**									0.012 J
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg					**5.5**									0.019 J
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg					**7.3**									
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg					3.7									
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg					3.2									
	8270C	Benzyl alcohol	1833	nc	--	mg/kg					0.62 J									
	8270C	Carbazole	24	ca	--	mg/kg					1.4									
	8270C	Chrysene	62	ca	--	mg/kg					7.8									0.015 J
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg					**0.94**									
	8270C	Dibenzofuran	15	nc	--	mg/kg					0.54									
	8270C	Fluoranthene	229	nc	--	mg/kg					18									0.024 J
	8270C	Fluorene	275	nc	--	mg/kg					1.3									
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg					**3.4**									
	8270C	Naphthalene	5.6	nc	--	mg/kg					0.081									
	8270C	Phenanthrene	--		--	mg/kg					12									
	8270C	Phenol	1833	nc	--	mg/kg					0.028 J									
	8270C	Pyrene	232	nc	--	mg/kg					17									0.016 J

Table WSA-2
Wet Storage Area Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units	Sample Date:	Sample Depth:	WSAss-001M-SO 10/27/2004 0-1 ft	WSAss-002M-SO 10/26/2004 0-1 ft	WSAss-003M-SO 10/26/2004 0-1 ft	WSAss-004D-SO 10/26/2004 0-1 ft	WSAss-004M-SO 10/26/2004 0-1 ft	WSAss-005M-DUP 10/27/2004 0-1 ft	WSAss-005M-SO 10/27/2004 0-1 ft	WSAss-006M-SO 10/27/2004 0-1 ft	WSAss-007M-SO 10/27/2004 0-1 ft	WSAss-008M-SO 10/29/2004 0-1 ft	WSAss-009M-SO 10/29/2004 0-1 ft	WSAss-010M-SO 10/28/2004 0-1 ft	WSAss-011D-SO 11/1/2004 0-1 ft	WSAss-011M-SO 11/1/2004 0-1 ft
Explosives	8330	3-Nitrotoluene	73	nc	--	mg/kg			0.08 J													
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg							0.73 J									1.1

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analyte was a non-detect (with a "U" qualifier) or analysis was not performed
mg/kg - means milligrams per Kilogram (parts per million - ppm)
PRG - preliminary remediation goals
nc - non-cancer basis, value is 1/10 the published PRG
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
U - analyte not detected
J - estimated value
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style
If Result = or > PRG, then the value is presented with a bold style
If Result < PRG & Background, then the value is presented with a normal style

Table WSA-2
Wet Storage Area Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units	WSAss-012M-SO	WSAss-013M-SO	WSAss-014M-DUP	WSAss-014M-SO	WSAss-015M-SO	WSAss-016M-QA	WSAss-016M-SO	WSAss-017M-SO	WSAss-020M-DUP	WSAss-020M-SO
						Sample Date:	10/29/2004	10/29/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	12/3/2004	12/3/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**8400**	**12000**	**12000**	**11000**	**11000**	**11000**	**11000**	**13000**	**12000**	**12000**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**11**	**17**	**16**	**15**	**15**	**15**	**16**	**14**	**20**	**21**
	6010B	Barium	538	nc	88.4	mg/kg	45	45	57	54	48	52	51	60	51	52
	6010B	Beryllium	15	nc	0.88	mg/kg	0.5	0.64	0.7	0.66	0.63	0.68	0.68	0.66	0.77	0.79
	6010B	Calcium	--[n]		15800	mg/kg	1300	830	1100	1100	1100	1400	1300	1100	1800	1800
	6010B	Chromium	30	ca	17.4	mg/kg	18	19	21	20	26	22	21	22	19	20
	6010B	Cobalt	30	ca	10.4	mg/kg	6.6	10	11	10	9.9	9.9	10	10	14	14
	6010B	Copper	313	nc	17.7	mg/kg	16	21	20	19	19	22	20	15	22	21
	6010B	Iron	2346	nc	23100	mg/kg	**17000**	**27000**	**26000**	**24000**	**25000**	**25000**	**26000**	**25000**	**31000**	**32000**
	6010B	Lead	400	pbk	26.1	mg/kg	17	14	14	14	17	17	17	14	15	16
	6010B	Magnesium	--[n]		3030	mg/kg	1800	2900	3200	2900	2800	2700	2800	2600	3800	3900
	6010B	Manganese	176	nc	1450	mg/kg	**330**	**290**	**330**	**330**	**290**	**330**	**350**	**800**	**410**	**420**
	6010B	Nickel	156	nc	21.1	mg/kg	18	22	26	25	26	24	25	20	31	32
	6010B	Potassium	--[n]		927	mg/kg	740	1300	1400	1200	1100	1200	1300	1100	1500	1400
	6010B	Selenium	39	nc	1.4	mg/kg									0.74	0.85
	6010B	Sodium	--[n]		123	mg/kg	200	290	380	340	370	370	380	350	430	430
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**15**	**19**	**19**	**17**	**18**	**19**	**18**	**22**	**20**	**20**
	6010B	Zinc	2346	nc	61.8	mg/kg	56	61	61	57	60	66	64	58	68	69
	7041	Antimony	3.1	nc	0.96	mg/kg									0.51 J	
	7471A	Mercury	2.3	nc	0.04	mg/kg	0.046	0.019	0.022	0.03	1.4	0.84	2	0.04	0.026	0.033
	7841	Thallium	0.52	nc	0.00	mg/kg				0.26	0.25					
Pesticides	8081A	beta-BHC	0.32	ca	--	mg/kg										
SVOCs	8270C	2-Methylnaphthalene	--		--	mg/kg										
	8270C	Acenaphthene	368	nc	--	mg/kg										
	8270C	Acenaphthylene	--		--	mg/kg										
	8270C	Anthracene	2189	nc	--	mg/kg										
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg										
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg										
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg										
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg										
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg										
	8270C	Benzyl alcohol	1833	nc	--	mg/kg										
	8270C	Carbazole	24	ca	--	mg/kg										
	8270C	Chrysene	62	ca	--	mg/kg										
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg										
	8270C	Dibenzofuran	15	nc	--	mg/kg										
	8270C	Fluoranthene	229	nc	--	mg/kg										
	8270C	Fluorene	275	nc	--	mg/kg										
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg										
	8270C	Naphthalene	5.6	nc	--	mg/kg										
	8270C	Phenanthrene	--		--	mg/kg										
	8270C	Phenol	1833	nc	--	mg/kg										
	8270C	Pyrene	232	nc	--	mg/kg										

Table WSA-2
Wet Storage Area Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-012M-SO		WSAss-013M-SO		WSAss-014M-DUP		WSAss-014M-SO		WSAss-015M-SO		WSAss-016M-QA		WSAss-016M-SO		WSAss-017M-SO		WSAss-020M-DUP		WSAss-020M-SO	
					Sample Date:	10/29/2004		10/29/2004		10/27/2004		10/27/2004		10/27/2004		10/27/2004		10/27/2004		10/27/2004		12/3/2004		12/3/2004	
					Sample Depth:	0-1 ft		0-1 ft		0-1 ft		0-1 ft		0-1 ft		0-1 ft		0-1 ft		0-1 ft		0-1 ft		0-1 ft	
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																			
Explosives	8330	3-Nitrotoluene	73	nc	--	mg/kg																			
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg																			

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analyte was a non-detect (with a "U" qualifier) or analysis was not performed
mg/kg - means milligrams per Kilogram (parts per million - ppm)
PRG - preliminary remediation goals
nc - non-cancer basis, value is 1/10 the published PRG
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
U - analyte not detected
J - estimated value
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style
If Result = or > PRG, then the value is presented with a bold style
If Result < PRG & Background, then the value is presented with a normal style.

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-001M-SO	WSAss-002M-SO	WSAss-003M-SO	WSAss-004D-SO	WSAss-004M-SO	WSAss-005M-DUP	WSAss-005M-SO	WSAss-006M-SO	WSAss-007M-SO	WSAss-008M-SO	WSAss-009M-SO	WSAss-010M-SO	WSAss-011D-SO	WSAss-011M-SO
					Sample Date:	10/27/2004	10/26/2004	10/26/2004	10/26/2004	10/26/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/29/2004	10/29/2004	10/28/2004	11/1/2004	11/1/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units													
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**13000**	**12000**	**11000**		**10000**	**13000**	**16000**	**12000**	**13000**	**10000**	**11000**	**9500**		**12000**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**18**	**19**	**16**		**15**	**16**	**11**	**15**	**18**	**14**	**16**	**14**		**14**
	6010B	Barium	538	nc	88.4	mg/kg	54	56	65		52	74	110	67	52	56	55	51		48
	6010B	Beryllium	15	nc	0.88	mg/kg	0.74	0.79	0.77		0.7	0.81	1	0.79	0.81	0.69	0.71	0.61		0.62
	6010B	Cadmium	3.7	nc	0.00	mg/kg	0.255 U	0.24 U	0.245 U		0.225 U	0.245 U	0.25 U	0.23 U	0.275 U	0.12 U	0.125 U	0.12 U		0.115 U
	6010B	Calcium	--[n]		15800	mg/kg	4100	5400	5900		2400	2300	5100	4000	1200	1300	1300	1600		750
	6010B	Chromium	30	ca	17.4	mg/kg	22	25	26		20	20	23	21	24	18	18	16		19
	6010B	Cobalt	30	ca	10.4	mg/kg	10	12	12		10	11	11	11	12	11	12	9.6		8.9
	6010B	Copper	313	nc	17.7	mg/kg	21	20	18		20	20	20	20	20	19	18	19		16
	6010B	Iron	2346	nc	23100	mg/kg	**30000**	**30000**	**27000**		**26000**	**26000**	**27000**	**25000**	**29000**	**26000**	**27000**	**23000**		**23000**
	6010B	Lead	400	pbk	26.1	mg/kg	69	97	19		15	16	16	15	22	40	46	50		18
	6010B	Magnesium	--[n]		3030	mg/kg	3400	3400	3100		2900	3200	3900	3700	3200	3000	3100	2600		2400
	6010B	Manganese	176	nc	1450	mg/kg	**400**	**400**	**400**		**310**	**340**	**410**	**410**	**300**	**290**	**350**	**320**		**390**
	6010B	Nickel	156	nc	21.1	mg/kg	23	29	29		25	26	27	27	26	25	26	23		19
	6010B	Potassium	--[n]		927	mg/kg	1300	1000	1100		920	1600	1900	1600	1200	1200	1100	1100		1200
	6010B	Selenium	39	nc	1.4	mg/kg	0.42	0.7 U	0.75 U		0.7 U	0.75 U	0.75 U	0.7 U	0.85 U	0.7 U	0.75 U	0.7 U		0.7 U
	6010B	Silver	39	nc	0.00	mg/kg	0.5 U	0.475 U	0.495 U		0.455 U	0.485 U	0.5 U	0.46 U	0.55 U	0.48 U	0.5 U	0.48 U		0.47 U
	6010B	Sodium	--[n]		123	mg/kg	320	310	280		280	390	430	390	340	260	260	250		280
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**21**	**18**	**18**		**16**	**21**	**28**	**19**	**20**	**17**	**18**	**16**		**20**
	6010B	Zinc	2346	nc	61.8	mg/kg	71	140	64		63	65	71	67	68	82	95	99		57
	7041	Antimony	3.1	nc	0.96	mg/kg	0.7 U	0.6 U	0.65 U		0.7 U	0.7 U	0.75 U	0.7 U	0.75 U	0.52	0.65 U	0.65 U		0.7 U
	7471A	Mercury	2.3	nc	0.04	mg/kg	0.028	0.7	0.018		0.14	0.034	0.094	0.04	0.026	2	1.4	2.1		0.043
	7841	Thallium	0.52	nc	0.00	mg/kg	0.295 U	0.27 U	0.275 U		0.295 U	0.26	0.26	0.3 U	0.31	0.29 U	0.27 U	0.28 U		0.305 U
Pesticides	8081A	4,4'-DDD	2.4	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	4,4'-DDE	1.7	ca	--	mg/kg					0.02 U									0.001 U
	8081A	4,4'-DDT	1.7	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	Aldrin	0.029	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	alpha-BHC	0.09	sat	--	mg/kg					0.017 U									0.00085 U
	8081A	alpha-Chlordane	1.6	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	beta-BHC	0.32	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	delta-BHC	--		--	mg/kg					0.017 U									0.0034
	8081A	Dieldrin	0.030	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	Endosulfan I	37	nc	--	mg/kg					0.017 U									0.00085 U
	8081A	Endosulfan II	37	nc	--	mg/kg					0.017 U									0.00085 U
	8081A	Endosulfan sulfate	37	nc	--	mg/kg					0.017 U									0.00085 U
	8081A	Endrin	1.8	nc	--	mg/kg					0.017 U									0.00085 U
	8081A	Endrin aldehyde	--		--	mg/kg					0.017 U									0.00085 U
	8081A	Endrin ketone	--		--	mg/kg					0.017 U									0.00085 U
	8081A	gamma-BHC	0.44	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	gamma-Chlordane	1.6	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	Heptachlor	0.11	ca	--	mg/kg					0.017 UJ									0.00085 U
	8081A	Heptachlor epoxide	0.053	ca	--	mg/kg					0.017 U									0.00085 U
	8081A	Methoxychlor	31	nc	--	mg/kg					0.085 U									0.0041 U
	8081A	Toxaphene	0.44	ca	--	mg/kg					0.165 U									0.0085 U

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							WSAss-001M-SO	WSAss-002M-SO	WSAss-003M-SO	WSAss-004D-SO	WSAss-004M-SO	WSAss-005M-DUP	WSAss-005M-SO	WSAss-006M-SO	WSAss-007M-SO	WSAss-008M-SO	WSAss-009M-SO	WSAss-010M-SO	WSAss-011D-SO	WSAss-011M-SO
					Sample Date:		10/27/2004	10/26/2004	10/26/2004	10/26/2004	10/26/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/29/2004	10/29/2004	10/28/2004	11/1/2004	11/1/2004
					Sample Depth:		0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units														
PCBs	8082	Aroclor 1016	0.39	nc	--	mg/kg					0.0165 U									0.0165 U
	8082	Aroclor 1221	0.22	ca	--	mg/kg					0.0165 U									0.0165 U
	8082	Aroclor 1232	0.22	ca	--	mg/kg					0.0085 U									0.0085 U
	8082	Aroclor 1242	0.22	ca	--	mg/kg					0.0165 U									0.0165 U
	8082	Aroclor 1248	0.22	ca	--	mg/kg					0.0085 U									0.0085 U
	8082	Aroclor 1254	0.22	ca	--	mg/kg					0.0165 U									0.0165 U
	8082	Aroclor 1260	0.22	ca	--	mg/kg					0.0165 U									0.0165 U
VOCs	8260B	1,1,1-Trichloroethane	1200	sat	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,1,2,2-Tetrachloroethane	0.41	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,1,2-Trichloroethane	0.73	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,1-Dichloroethane	51	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,1-Dichloroethene	12	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,2-Dibromoethane	0.032	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,2-Dichloroethane	0.28	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	1,2-Dichloroethene (total)	6.9	nc	--	mg/kg				0.0065 U									0.006 U	
	8260B	1,2-Dichloropropane	0.34	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	2-Butanone	2231	nc	--	mg/kg				0.01 U									0.009 U	
	8260B	2-Hexanone	530	nc	--	mg/kg				0.0065 U									0.006 U	
	8260B	4-Methyl-2-pentanone	528	nc	--	mg/kg				0.0065 U									0.006 U	
	8260B	Acetone	1412	nc	--	mg/kg				0.01 U									0.009 U	
	8260B	Benzene	0.64	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Bromochloromethane	--		--	mg/kg				0.00335 U									0.00305 U	
	8260B	Bromodichloromethane	0.82	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Bromoform	62	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Bromomethane	0.39	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Carbon disulfide	36	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Carbon tetrachloride	0.25	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Chlorobenzene	15	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Chloroethane	3.0	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Chloroform	0.22	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Chloromethane	4.7	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	cis-1,2-Dichloroethene	4.3	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	cis-1,3-Dichloropropene	0.78	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Dibromochloromethane	1.1	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Ethylbenzene	395	sat	--	mg/kg				0.00335 U									0.00305 U	
	8260B	m&p-Xylenes	27	nc	--	mg/kg				0.0065 U									0.006 U	
	8260B	Methylene chloride	9.1	ca	--	mg/kg				0.0065 U									0.006 U	
	8260B	o-Xylene	27	nc	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Styrene	1700	sat	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Tetrachloroethene	0.48	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Toluene	520	sat	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Total Xylenes	27	nc	--	mg/kg				0.0065 U									0.006 U	
	8260B	trans-1,2-Dichloroethene	6.9	nc	--	mg/kg				0.00335 UJ									0.00305 U	

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							WSAss-001M-SO	WSAss-002M-SO	WSAss-003M-SO	WSAss-004D-SO	WSAss-004M-SO	WSAss-005M-DUP	WSAss-005M-SO	WSAss-006M-SO	WSAss-007M-SO	WSAss-008M-SO	WSAss-009M-SO	WSAss-010M-SO	WSAss-011D-SO	WSAss-011M-SO
					Sample Date:		10/27/2004	10/26/2004	10/26/2004	10/26/2004	10/26/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/29/2004	10/29/2004	10/28/2004	11/1/2004	11/1/2004
					Sample Depth:		0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units														
	8260B	trans-1,3-Dichloropropene	0.78	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Trichloroethene	0.053	ca	--	mg/kg				0.00335 U									0.00305 U	
	8260B	Vinyl chloride	0.079	ca	--	mg/kg				0.00335 UJ									0.00305 U	
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2	nc	--	mg/kg					0.08 U									0.085 U
	8270C	1,2-Dichlorobenzene	600	sat	--	mg/kg					0.08 U									0.085 U
	8270C	1,3-Dichlorobenzene	53	nc	--	mg/kg					0.08 U									0.085 U
	8270C	1,4-Dichlorobenzene	3.4	ca	--	mg/kg					0.08 U									0.085 U
	8270C	2,2-oxybis (1-chloropropane)	2.9	ca	--	mg/kg					0.08 U									0.085 U
	8270C	2,4,5-Trichlorophenol	611	nc	--	mg/kg					0.16 U									0.17 U
	8270C	2,4,6-Trichlorophenol	0.61	nc	--	mg/kg					0.08 U									0.085 U
	8270C	2,4-Dichlorophenol	18	nc	--	mg/kg					0.16 U									0.17 U
	8270C	2,4-Dimethylphenol	122	nc	--	mg/kg					0.16 U									0.17 U
	8270C	2,4-Dinitrophenol	12	nc	--	mg/kg					0.325 U									0.345 U
	8270C	2,4-Dinitrotoluene	12	nc	--	mg/kg					0.016 U									0.017 U
	8270C	2,6-Dinitrotoluene	6.1	nc	--	mg/kg					0.016 U									0.017 U
	8270C	2-Chloronaphthalene	494	nc	--	mg/kg					0.08 U									0.085 U
	8270C	2-Chlorophenol	6.3	nc	--	mg/kg					0.08 U									0.085 U
	8270C	2-Methylnaphthalene	--		--	mg/kg					0.058									0.017 U
	8270C	2-Methylphenol	306	nc	--	mg/kg					0.0325 U									0.0345 U
	8270C	2-Nitroaniline	18.3	nc	--	mg/kg					0.08 U									0.085 U
	8270C	2-Nitrophenol	--		--	mg/kg					0.16 U									0.17 U
	8270C	3,3'-Dichlorobenzidine	1.1	ca	--	mg/kg					0.08 U									0.085 U
	8270C	3-Nitroaniline	1.8	nc	--	mg/kg					0.325 U									0.345 U
	8270C	4,6-Dinitro-2-methylphenol	0.61	nc	--	mg/kg					0.325 U									0.345 U
	8270C	4-Bromophenyl phenyl ether	--		--	mg/kg					0.08 U									0.085 U
	8270C	4-Chloro-3-methylphenol	--		--	mg/kg					0.16 U									0.17 U
	8270C	4-Chloroaniline	24	nc	--	mg/kg					0.325 U									0.345 U
	8270C	4-Chlorophenyl phenyl ether	--		--	mg/kg					0.08 U									0.085 U
	8270C	4-Methylphenol	31	nc	--	mg/kg					0.0325 U									0.0345 U
	8270C	4-Nitroaniline	23	ca	--	mg/kg					0.325 U									0.345 U
	8270C	4-Nitrophenol	--		--	mg/kg					0.325 U									0.345 U
	8270C	Acenaphthene	368	nc	--	mg/kg					1.5									0.017 U
	8270C	Acenaphthylene	--		--	mg/kg					0.016 J									0.017 U
	8270C	Anthracene	2189	nc	--	mg/kg					2.9									0.017 U
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg					**8.2**									0.017 U
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg					**5.5**									0.012 J
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg					**7.3**									0.019 J
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg					3.7									0.017 U
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg					3.2									0.017 U
	8270C	Benzoic acid	100000	max	--	mg/kg					- R									- R
	8270C	Benzyl alcohol	1833	nc	--	mg/kg					0.62 J									0.345 U
	8270C	Bis(2-chloroethoxy)methane	--		--	mg/kg					0.0325 U									0.0345 U
	8270C	Bis(2-chloroethyl) ether	0.22	ca	--	mg/kg					0.0325 U									0.0345 U

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						Sample Date:	10/27/2004	10/26/2004	10/26/2004	10/26/2004	10/26/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/29/2004	10/29/2004	10/28/2004	11/1/2004	11/1/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units	WSAss-001M-SO	WSAss-002M-SO	WSAss-003M-SO	WSAss-004D-SO	WSAss-004M-SO	WSAss-005M-DUP	WSAss-005M-SO	WSAss-006M-SO	WSAss-007M-SO	WSAss-008M-SO	WSAss-009M-SO	WSAss-010M-SO	WSAss-011D-SO	WSAss-011M-SO
	8270C	Bis(2-ethylhexyl) phthalate	35	ca	--	mg/kg					0.08 U									0.085 U
	8270C	Butylbenzyl phthalate	1222	nc	--	mg/kg					0.0325 U									0.0345 U
	8270C	Carbazole	24	ca	--	mg/kg					1.4									0.085 U
	8270C	Chrysene	62	ca	--	mg/kg					7.8									0.015 J
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg					**0.94**									0.017 U
	8270C	Dibenzofuran	15	nc	--	mg/kg					0.54									0.0345 U
	8270C	Diethyl phthalate	4888	nc	--	mg/kg					0.0325 U									0.0345 U
	8270C	Dimethyl phthalate	100000	max	--	mg/kg					0.0325 U									0.0345 U
	8270C	Di-n-butyl phthalate	611	nc	--	mg/kg					0.08 U									0.085 U
	8270C	Di-n-octyl phthalate	244	nc	--	mg/kg					0.16 U									0.17 U
	8270C	Fluoranthene	229	nc	--	mg/kg					18									0.024 J
	8270C	Fluorene	275	nc	--	mg/kg					1.3									0.017 U
	8270C	Hexachlorobenzene	0.30	ca	--	mg/kg					0.016 U									0.017 U
	8270C	Hexachlorobutadiene	6.2	ca	--	mg/kg					0.08 U									0.085 U
	8270C	Hexachlorocyclopentadiene	37	nc	--	mg/kg					0.485 U									0.5 U
	8270C	Hexachloroethane	35	ca	--	mg/kg					0.08 U									0.085 U
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg					**3.4**									0.017 U
	8270C	Isophorone	512	ca	--	mg/kg					0.08 U									0.085 U
	8270C	Naphthalene	5.6	nc	--	mg/kg					0.081									0.017 U
	8270C	Nitrobenzene	2	nc	--	mg/kg					0.016 U									0.017 U
	8270C	n-Nitroso-di-n-propylamine	0.069	ca	--	mg/kg					0.0325 U									0.0345 U
	8270C	n-Nitrosodiphenylamine	99	ca	--	mg/kg					0.016 U									0.017 U
	8270C	Pentachlorophenol	3.0	ca	--	mg/kg					0.16 U									0.17 U
	8270C	Phenanthrene	--		--	mg/kg					12									0.026 U
	8270C	Phenol	1833	nc	--	mg/kg					0.028 J									0.085 U
	8270C	Pyrene	232	nc	--	mg/kg					17									0.016 J
Explosives	8330	1,3,5-Trinitrobenzene	183	nc	--	mg/kg	0.0495 U	0.05 U	0.0495 U		0.05 U	0.05 U	0.05 U	0.0485 U	0.0495 U	0.05 U	0.0495 U	0.05 U		0.05 U
	8330	1,3-Dinitrobenzene	0.61	nc	--	mg/kg	0.0495 U	0.05 U	0.0495 U		0.05 U	0.05 U	0.05 U	0.0485 U	0.0495 U	0.05 U	0.0495 U	0.05 U		0.05 U
	8330	2,4,6-TNT	16	ca	--	mg/kg	0.0495 U	0.05 U	0.0495 U		0.05 U	0.05 U	0.05 U	0.0485 U	0.0495 U	0.05 U	0.0495 U	0.05 U		0.05 U
	8330	2,4-Dinitrotoluene	12	nc	--	mg/kg	0.0495 U	0.05 U	0.0495 U		0.05 U	0.05 U	0.05 U	0.0485 U	0.0495 U	0.05 U	0.0495 U	0.05 U		0.05 U
	8330	2,6-Dinitrotoluene	6.1	nc	--	mg/kg	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	2-Amino-4,6-Dinitrotoluene	--		--	mg/kg	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	2-Nitrotoluene	0.88	ca	--	mg/kg	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	3-Nitrotoluene	73	nc	--	mg/kg	0.08 J	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	4-Amino-2,6-Dinitrotoluene	--		--	mg/kg	0.15 U	0.15 U	0.15 U		0.15 U	0.15 U	0.15 U	0.145 U	0.15 U	0.15 U	0.15 U	0.15 U		0.15 U
	8330	4-Nitrotoluene	12	ca	--	mg/kg	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	HMX	306	nc	--	mg/kg	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	Nitrobenzene	2	nc	--	mg/kg	0.0495 U	0.05 U	0.0495 U		0.05 U	0.05 U	0.05 U	0.0485 U	0.0495 U	0.05 U	0.0495 U	0.05 U		0.05 U
	8330	RDX	4.4	ca	--	mg/kg	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
	8330	Tetryl	61	nc	--	mg/kg	0.2 U	0.2 U	0.2 U		0.2 U	0.2 U	0.2 U	0.195 U	0.2 U	0.2 U	0.2 U	0.2 U		0.2 U
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg					0.73 J									1.1
	8332	Nitroglycerine	35	ca	--	mg/kg					0.25 U									0.25 U
	SW8330 Modified	Nitroguanidine	611	nc	--	mg/kg					0.125 U									0.125 U

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-001M-SO	WSAss-002M-SO	WSAss-003M-SO	WSAss-004D-SO	WSAss-004M-SO	WSAss-005M-DUP	WSAss-005M-SO	WSAss-006M-SO	WSAss-007M-SO	WSAss-008M-SO	WSAss-009M-SO	WSAss-010M-SO	WSAss-011D-SO	WSAss-011M-SO
					Sample Date:	10/27/2004	10/26/2004	10/26/2004	10/26/2004	10/26/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/29/2004	10/29/2004	10/28/2004	11/1/2004	11/1/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units														

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analysis was not performed
mg/kg - means milligrams per Kilogram (parts per million - ppm)
PRG - preliminary remediation goals
nc - non-cancer basis, value is 1/10 the published PRG
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
U - analyte not detected
J - estimated value
R - result rejected during ADR validation
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style
If Result = or > PRG, then the value is presented with a bold style
If Result < PRG & Background, then the value is presented with a normal style

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							WSAss-012M-SO	WSAss-013M-SO	WSAss-014M-DUP	WSAss-014M-SO	WSAss-015M-SO	WSAss-016M-QA	WSAss-016M-SO	WSAss-017M-SO	WSAss-020M-DUP	WSAss-020M-SO
						Sample Date:	10/29/2004	10/29/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	12/3/2004	12/3/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units										
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**8400**	**12000**	**12000**	**11000**	**11000**	**11000**	**11000**	**13000**	**12000**	**12000**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**11**	17	**16**	**15**	**15**	**15**	16	**14**	**20**	**21**
	6010B	Barium	538	nc	88.4	mg/kg	45	45	57	54	48	52	51	60	51	52
	6010B	Beryllium	15	nc	0.88	mg/kg	0.5	0.64	0.7	0.66	0.63	0.68	0.68	0.66	0.77	0.79
	6010B	Cadmium	3.7	nc	0.00	mg/kg	0.11 U	0.12 U	0.26 U	0.26 U	0.24 U	0.13 U	0.245 U	0.24 U	0.12 U	0.115 U
	6010B	Calcium	--[n]		15800	mg/kg	1300	830	1100	1100	1100	1400	1300	1100	1800	1800
	6010B	Chromium	30	ca	17.4	mg/kg	18	19	21	20	26	22	21	22	19	20
	6010B	Cobalt	30	ca	10.4	mg/kg	6.6	10	11	10	9.9	9.9	10	10	14	14
	6010B	Copper	313	nc	17.7	mg/kg	16	21	20	19	19	22	20	15	22	21
	6010B	Iron	2346	nc	23100	mg/kg	**17000**	**27000**	**26000**	**24000**	**25000**	**25000**	**26000**	**25000**	**31000**	**32000**
	6010B	Lead	400	pbk	26.1	mg/kg	17	14	14	14	17	17	17	14	15	16
	6010B	Magnesium	--[n]		3030	mg/kg	1800	2900	3200	2900	2800	2700	2800	2600	3800	3900
	6010B	Manganese	176	nc	1450	mg/kg	**330**	**290**	**330**	**330**	**290**	**330**	**350**	**800**	**410**	**420**
	6010B	Nickel	156	nc	21.1	mg/kg	18	22	26	25	26	24	25	20	31	32
	6010B	Potassium	--[n]		927	mg/kg	740	1300	1400	1200	1100	1200	1300	1100	1500	1400
	6010B	Selenium	39	nc	1.4	mg/kg	0.65 U	0.7 U	0.75 U	0.8 U	0.7 U	0.75 U	0.75 U	0.7 U	0.74	0.85
	6010B	Silver	39	nc	0.00	mg/kg	0.445 U	0.48 U	0.5 U	0.5 U	0.475 U	0.5 U	0.485 U	0.475 U	0.47 U	0.46 U
	6010B	Sodium	--[n]		123	mg/kg	200	290	380	340	370	370	380	350	430	430
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**15**	**19**	**19**	**17**	**18**	**19**	**18**	**22**	**20**	**20**
	6010B	Zinc	2346	nc	61.8	mg/kg	56	61	61	57	60	66	64	58	68	69
	7041	Antimony	3.1	nc	0.96	mg/kg	0.65 U	0.7 U	0.7 U	0.7 U	0.7 U	0.75 U	0.65 U	0.7 U	0.51 J	0.65 U
	7471A	Mercury	2.3	nc	0.04	mg/kg	0.046	0.019	0.022	0.03	1.4	0.84	2	0.04	0.026	0.033
	7841	Thallium	0.52	nc	0.00	mg/kg	0.285 U	0.295 U	0.305 U	0.26	0.25	0.315 U	0.285 U	0.295 U	0.295 UJ	0.285 U
Pesticides	8081A	4,4'-DDD	2.4	ca	--	mg/kg										
	8081A	4,4'-DDE	1.7	ca	--	mg/kg										
	8081A	4,4'-DDT	1.7	ca	--	mg/kg										
	8081A	Aldrin	0.029	ca	--	mg/kg										
	8081A	alpha-BHC	0.09	sat	--	mg/kg										
	8081A	alpha-Chlordane	1.6	ca	--	mg/kg										
	8081A	beta-BHC	0.32	ca	--	mg/kg										
	8081A	delta-BHC	--		--	mg/kg										
	8081A	Dieldrin	0.030	ca	--	mg/kg										
	8081A	Endosulfan I	37	nc	--	mg/kg										
	8081A	Endosulfan II	37	nc	--	mg/kg										
	8081A	Endosulfan sulfate	37	nc	--	mg/kg										
	8081A	Endrin	1.8	nc	--	mg/kg										
	8081A	Endrin aldehyde	--		--	mg/kg										
	8081A	Endrin ketone	--		--	mg/kg										
	8081A	gamma-BHC	0.44	ca	--	mg/kg										
	8081A	gamma-Chlordane	1.6	ca	--	mg/kg										
	8081A	Heptachlor	0.11	ca	--	mg/kg										
	8081A	Heptachlor epoxide	0.053	ca	--	mg/kg										
	8081A	Methoxychlor	31	nc	--	mg/kg										
	8081A	Toxaphene	0.44	ca	--	mg/kg										

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-012M-SO	WSAss-013M-SO	WSAss-014M-DUP	WSAss-014M-SO	WSAss-015M-SO	WSAss-016M-QA	WSAss-016M-SO	WSAss-017M-SO	WSAss-020M-DUP	WSAss-020M-SO
					Sample Date:	10/29/2004	10/29/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	12/3/2004	12/3/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units										
PCBs	8082	Aroclor 1016	0.39 nc	--	mg/kg										
	8082	Aroclor 1221	0.22 ca	--	mg/kg										
	8082	Aroclor 1232	0.22 ca	--	mg/kg										
	8082	Aroclor 1242	0.22 ca	--	mg/kg										
	8082	Aroclor 1248	0.22 ca	--	mg/kg										
	8082	Aroclor 1254	0.22 ca	--	mg/kg										
	8082	Aroclor 1260	0.22 ca	--	mg/kg										
VOCs	8260B	1,1,1-Trichloroethane	1200 sat	--	mg/kg										
	8260B	1,1,2,2-Tetrachloroethane	0.41 ca	--	mg/kg										
	8260B	1,1,2-Trichloroethane	0.73 ca	--	mg/kg										
	8260B	1,1-Dichloroethane	51 nc	--	mg/kg										
	8260B	1,1-Dichloroethene	12 nc	--	mg/kg										
	8260B	1,2-Dibromoethane	0.032 ca	--	mg/kg										
	8260B	1,2-Dichloroethane	0.28 ca	--	mg/kg										
	8260B	1,2-Dichloroethene (total)	6.9 nc	--	mg/kg										
	8260B	1,2-Dichloropropane	0.34 ca	--	mg/kg										
	8260B	2-Butanone	2231 nc	--	mg/kg										
	8260B	2-Hexanone	530 nc	--	mg/kg										
	8260B	4-Methyl-2-pentanone	528 nc	--	mg/kg										
	8260B	Acetone	1412 nc	--	mg/kg										
	8260B	Benzene	0.64 ca	--	mg/kg										
	8260B	Bromochloromethane	--	--	mg/kg										
	8260B	Bromodichloromethane	0.82 ca	--	mg/kg										
	8260B	Bromoform	62 ca	--	mg/kg										
	8260B	Bromomethane	0.39 nc	--	mg/kg										
	8260B	Carbon disulfide	36 nc	--	mg/kg										
	8260B	Carbon tetrachloride	0.25 ca	--	mg/kg										
	8260B	Chlorobenzene	15 nc	--	mg/kg										
	8260B	Chloroethane	3.0 ca	--	mg/kg										
	8260B	Chloroform	0.22 ca	--	mg/kg										
	8260B	Chloromethane	4.7 nc	--	mg/kg										
	8260B	cis-1,2-Dichloroethene	4.3 nc	--	mg/kg										
	8260B	cis-1,3-Dichloropropene	0.78 ca	--	mg/kg										
	8260B	Dibromochloromethane	1.1 ca	--	mg/kg										
	8260B	Ethylbenzene	395 sat	--	mg/kg										
	8260B	m&p-Xylenes	27 nc	--	mg/kg										
	8260B	Methylene chloride	9.1 ca	--	mg/kg										
	8260B	o-Xylene	27 nc	--	mg/kg										
	8260B	Styrene	1700 sat	--	mg/kg										
	8260B	Tetrachloroethene	0.48 ca	--	mg/kg										
	8260B	Toluene	520 sat	--	mg/kg										
	8260B	Total Xylenes	27 nc	--	mg/kg										
	8260B	trans-1,2-Dichloroethene	6.9 nc	--	mg/kg										

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-012M-SO	WSAss-013M-SO	WSAss-014M-DUP	WSAss-014M-SO	WSAss-015M-SO	WSAss-016M-QA	WSAss-016M-SO	WSAss-017M-SO	WSAss-020M-DUP	WSAss-020M-SO
					Sample Date:	10/29/2004	10/29/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	12/3/2004	12/3/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units										
	8260B	trans-1,3-Dichloropropene	0.78	ca	--	mg/kg										
	8260B	Trichloroethene	0.053	ca	--	mg/kg										
	8260B	Vinyl chloride	0.079	ca	--	mg/kg										
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2	nc	--	mg/kg										
	8270C	1,2-Dichlorobenzene	600	sat	--	mg/kg										
	8270C	1,3-Dichlorobenzene	53	nc	--	mg/kg										
	8270C	1,4-Dichlorobenzene	3.4	ca	--	mg/kg										
	8270C	2,2-oxybis (1-chloropropane)	2.9	ca	--	mg/kg										
	8270C	2,4,5-Trichlorophenol	611	nc	--	mg/kg										
	8270C	2,4,6-Trichlorophenol	0.61	nc	--	mg/kg										
	8270C	2,4-Dichlorophenol	18	nc	--	mg/kg										
	8270C	2,4-Dimethylphenol	122	nc	--	mg/kg										
	8270C	2,4-Dinitrophenol	12	nc	--	mg/kg										
	8270C	2,4-Dinitrotoluene	12	nc	--	mg/kg										
	8270C	2,6-Dinitrotoluene	6.1	nc	--	mg/kg										
	8270C	2-Chloronaphthalene	494	nc	--	mg/kg										
	8270C	2-Chlorophenol	6.3	nc	--	mg/kg										
	8270C	2-Methylnaphthalene	--		--	mg/kg										
	8270C	2-Methylphenol	306	nc	--	mg/kg										
	8270C	2-Nitroaniline	18.3	nc	--	mg/kg										
	8270C	2-Nitrophenol	--		--	mg/kg										
	8270C	3,3'-Dichlorobenzidine	1.1	ca	--	mg/kg										
	8270C	3-Nitroaniline	1.8	nc	--	mg/kg										
	8270C	4,6-Dinitro-2-methylphenol	0.61	nc	--	mg/kg										
	8270C	4-Bromophenyl phenyl ether	--		--	mg/kg										
	8270C	4-Chloro-3-methylphenol	--		--	mg/kg										
	8270C	4-Chloroaniline	24	nc	--	mg/kg										
	8270C	4-Chlorophenyl phenyl ether	--		--	mg/kg										
	8270C	4-Methylphenol	31	nc	--	mg/kg										
	8270C	4-Nitroaniline	23	ca	--	mg/kg										
	8270C	4-Nitrophenol	--		--	mg/kg										
	8270C	Acenaphthene	368	nc	--	mg/kg										
	8270C	Acenaphthylene	--		--	mg/kg										
	8270C	Anthracene	2189	nc	--	mg/kg										
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg										
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg										
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg										
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg										
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg										
	8270C	Benzoic acid	100000	max	--	mg/kg										
	8270C	Benzyl alcohol	1833	nc	--	mg/kg										
	8270C	Bis(2-chloroethoxy)methane	--		--	mg/kg										
	8270C	Bis(2-chloroethyl) ether	0.22	ca	--	mg/kg										

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-012M-SO	WSAss-013M-SO	WSAss-014M-DUP	WSAss-014M-SO	WSAss-015M-SO	WSAss-016M-QA	WSAss-016M-SO	WSAss-017M-SO	WSAss-020M-DUP	WSAss-020M-SO
					Sample Date:	10/29/2004	10/29/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	12/3/2004	12/3/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units									
	8270C	Bis(2-ethylhexyl) phthalate	35	ca	--	mg/kg									
	8270C	Butylbenzyl phthalate	1222	nc	--	mg/kg									
	8270C	Carbazole	24	ca	--	mg/kg									
	8270C	Chrysene	62	ca	--	mg/kg									
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg									
	8270C	Dibenzofuran	15	nc	--	mg/kg									
	8270C	Diethyl phthalate	4888	nc	--	mg/kg									
	8270C	Dimethyl phthalate	100000	max	--	mg/kg									
	8270C	Di-n-butyl phthalate	611	nc	--	mg/kg									
	8270C	Di-n-octyl phthalate	244	nc	--	mg/kg									
	8270C	Fluoranthene	229	nc	--	mg/kg									
	8270C	Fluorene	275	nc	--	mg/kg									
	8270C	Hexachlorobenzene	0.30	ca	--	mg/kg									
	8270C	Hexachlorobutadiene	6.2	ca	--	mg/kg									
	8270C	Hexachlorocyclopentadiene	37	nc	--	mg/kg									
	8270C	Hexachloroethane	35	ca	--	mg/kg									
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg									
	8270C	Isophorone	512	ca	--	mg/kg									
	8270C	Naphthalene	5.6	nc	--	mg/kg									
	8270C	Nitrobenzene	2	nc	--	mg/kg									
	8270C	n-Nitroso-di-n-propylamine	0.069	ca	--	mg/kg									
	8270C	n-Nitrosodiphenylamine	99	ca	--	mg/kg									
	8270C	Pentachlorophenol	3.0	ca	--	mg/kg									
	8270C	Phenanthrene	--		--	mg/kg									
	8270C	Phenol	1833	nc	--	mg/kg									
	8270C	Pyrene	232	nc	--	mg/kg									
Explosives	8330	1,3,5-Trinitrobenzene	183	nc	--	mg/kg	0.05 U	0.0495 U	0.0495 U	0.0485 U	0.049 U	0.049 U	0.049 U	0.049 U	0.0495 U	0.05 U
	8330	1,3-Dinitrobenzene	0.61	nc	--	mg/kg	0.05 U	0.0495 U	0.0495 U	0.0485 U	0.049 U	0.049 U	0.049 U	0.049 U	0.0495 U	0.05 U
	8330	2,4,6-TNT	16	ca	--	mg/kg	0.05 U	0.0495 U	0.0495 U	0.0485 U	0.049 U	0.049 U	0.049 U	0.049 U	0.0495 U	0.05 U
	8330	2,4-Dinitrotoluene	12	nc	--	mg/kg	0.05 U	0.0495 U	0.0495 U	0.0485 U	0.049 U	0.049 U	0.049 U	0.049 U	0.0495 U	0.05 U
	8330	2,6-Dinitrotoluene	6.1	nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	2-Amino-4,6-Dinitrotoluene	--		--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	2-Nitrotoluene	0.88	ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	3-Nitrotoluene	73	nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	4-Amino-2,6-Dinitrotoluene	--		--	mg/kg	0.15 U	0.15 U	0.15 U	0.145 U	0.145 U	0.145 U	0.145 U	0.145 U	0.15 U	0.15 U
	8330	4-Nitrotoluene	12	ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	HMX	306	nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	Nitrobenzene	2	nc	--	mg/kg	0.05 U	0.0495 U	0.0495 U	0.0485 U	0.049 U	0.049 U	0.049 U	0.049 U	0.0495 U	0.05 U
	8330	RDX	4.4	ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	Tetryl	61	nc	--	mg/kg	0.2 U	0.2 U	0.195 U	0.195 U	0.195 U	0.195 U	0.195 U	0.195 U	0.2 U	0.2 U
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg										
	8332	Nitroglycerine	35	ca	--	mg/kg										
	SW8330 Modified	Nitroguanidine	611	nc	--	mg/kg										

Table WSA-3
Wet Storage Area Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						WSAss-012M-SO	WSAss-013M-SO	WSAss-014M-DUP	WSAss-014M-SO	WSAss-015M-SO	WSAss-016M-QA	WSAss-016M-SO	WSAss-017M-SO	WSAss-020M-DUP	WSAss-020M-SO
					Sample Date:	10/29/2004	10/29/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	12/3/2004	12/3/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units										

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analysis was not performed
mg/kg - means milligrams per Kilogram (parts per million - ppm)
PRG - preliminary remediation goals
nc - non-cancer basis, value is 1/10 the published PRG
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
U - analyte not detected
J - estimated value
R - result rejected during ADR validation
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style
If Result = or > PRG, then the value is presented with a bold style
If Result < PRG & Background, then the value is presented with a normal style

Table WSA-4
Wet Storage Area Human Health Risk Screening Tables for Surface Soil (0-1 ft)
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	Region 9 PRG (Res Soil)		Surface Soil Background	Maximum Detected	Frequency of Detection	COPC
Aluminum	7614	nc	17700	16000	22 / 22	No
Arsenic	0.39	ca	15.4	21	22 / 22	Yes, > BKG & PRG
Barium	538	nc	88.4	110	22 / 22	No
Beryllium	15	nc	0.88	1	22 / 22	No
Calcium	--[n]		15800	5900	22 / 22	No
Chromium	30	ca	17.4	26	22 / 22	No
Cobalt	30	ca	10.4	14	22 / 22	No
Copper	313	nc	17.7	22	22 / 22	No
Iron	2346	nc	23100	32000	22 / 22	Yes, > BKG & PRG
Lead	400	pbk	26.1	97	22 / 22	No
Magnesium	--[n]		3030	3900	22 / 22	No
Manganese	176	nc	1450	800	22 / 22	No
Nickel	156	nc	21.1	32	22 / 22	No
Potassium	--[n]		927	1900	22 / 22	No
Selenium	39	nc	1.4	0.85	3 / 22	No
Sodium	--[n]		123	430	22 / 22	No
Vanadium	7.8	nc	31.1	28	22 / 22	No
Zinc	2346	nc	61.8	140	22 / 22	No
Antimony	3.1	nc	0.96	0.52	2 / 22	No
Mercury	2.3	nc	0.04	2.1	22 / 22	No
Thallium	0.52	nc	0.00	0.31	5 / 22	No
beta-BHC	0.32	ca	--	0.0034	1 / 2	No
2-Methylnaphthalene	--		--	0.058	1 / 2	Yes, NTX
Acenaphthene	368	nc	--	1.5	1 / 2	No
Acenaphthylene	--		--	0.016	1 / 2	Yes, NTX
Anthracene	2189	nc	--	2.9	1 / 2	No
Benzo(a)anthracene	0.62	ca	--	8.2	1 / 2	Yes, > PRG
Benzo(a)pyrene	0.062	ca	--	5.5	2 / 2	Yes, > PRG
Benzo(b)fluoranthene	0.62	ca	--	7.3	2 / 2	Yes, > PRG
Benzo(g,h,i)perylene	--		--	3.7	1 / 2	Yes, NTX
Benzo(k)fluoranthene	6.2	ca	--	3.2	1 / 2	No
Benzyl alcohol	1833	nc	--	0.62	1 / 2	No
Carbazole	24	ca	--	1.4	1 / 2	No
Chrysene	62	ca	--	7.8	2 / 2	No
Dibenzo(a,h)anthracene	0.062	ca	--	0.94	1 / 2	Yes, > PRG
Dibenzofuran	15	nc	--	0.54	1 / 2	No
Fluoranthene	229	nc	--	18	2 / 2	No
Fluorene	275	nc	--	1.3	1 / 2	No
Indeno(1,2,3-cd)pyrene	0.62	ca	--	3.4	1 / 2	Yes, > PRG
Naphthalene	5.6	nc	--	0.081	1 / 2	No
Phenanthrene	--		--	12	1 / 2	Yes, NTX
Phenol	1833	nc	--	0.028	1 / 2	No
Pyrene	232	nc	--	17	2 / 2	No
3-Nitrotoluene	73	nc	--	0.08	1 / 22	No
Nitrocellulose	--		--	1.1	2 / 2	Yes, NTX

Notes:
-- - no value available
BKG - site specific background
PRG - USEPA Region 9 Preliminary Remediation Goals
NTX - no toxicity screening value available
nc - non-cancer basis, value is 1/10 the published PRG
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
*Concentration Units mg/kg

Table WSA-5
Wet Storage Area Ecological Risk Screening Tables for Shallow Soil (0-1 ft)
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Frequency of Detection	Average Concentration	Maximum Detected Concentration	Units	Surface Soil Background Concentration	Maximum Concentration > Background	Screening Value	Maximum Concentration > Screening value	PBT	COPC	COPC Rationale
Metals	Aluminum	22 / 22	11632	16000	mg/kg	17700	No	600 ss2	Yes	No	No	BLBKG
	Arsenic	22 / 22	16	21	mg/kg	15.4	Yes	9.9 ss1	Yes	No	Yes	ASL
	Barium	22 / 22	57	110	mg/kg	88.4	Yes	283 ss1	No	No	No	BSL
	Beryllium	22 / 22	0.72	1	mg/kg	0.88	Yes	10 ss1	No	No	No	BSL
	Calcium	22 / 22	2190	5900	mg/kg	15800	No	NUT	No	No	No	BLBKG
	Chromium	22 / 22	21	26	mg/kg	17.4	Yes	0.4 ss1	Yes	No	Yes	ASL
	Cobalt	22 / 22	11	14	mg/kg	10.4	Yes	20 ss1	No	No	No	BSL
	Copper	22 / 22	19	22	mg/kg	17.7	Yes	60 ss1	No	No	No	BSL
	Iron	22 / 22	26227	32000	mg/kg	23100	Yes	200 ss2	Yes	No	Yes	ASL
	Lead	22 / 22	26	97	mg/kg	26.1	Yes	40.5 ss1	Yes	No	Yes	ASL
	Magnesium	22 / 22	3059	3900	mg/kg	3030	Yes	NUT	No	No	No	BSL
	Manganese	22 / 22	373	800	mg/kg	1450	No	100 ss2	Yes	No	No	BLBKG
	Nickel	22 / 22	25	32	mg/kg	21.1	Yes	30 ss1	Yes	No	Yes	ASL
	Potassium	22 / 22	1248	1900	mg/kg	927	Yes	NUT	No	No	No	BSL
	Selenium	3 / 22	0.72	0.85	mg/kg	1.4	No	0.21 ss1	Yes	No	No	BLBKG
	Sodium	22 / 22	333	430	mg/kg	123	Yes	NUT	No	No	No	BSL
	Vanadium	22 / 22	19	28	mg/kg	31.1	No	2 ss1	Yes	No	No	BLBKG
	Zinc	22 / 22	71	140	mg/kg	61.8	Yes	8.5 ss1	Yes	No	Yes	ASL
	Antimony	2 / 22	0.67	0.52	mg/kg	0.96	No	5 ss1	No	No	No	BLBKG
	Mercury	22 / 22	0.50	2.1	mg/kg	0.04	Yes	0.00051 ss1	Yes	Yes	Yes	ASL
	Thallium	5 / 22	0.29	0.31	mg/kg	0.00	Yes	1 ss1	No	No	No	BSL
Pesticides	beta-BHC	1 / 2	0.010	0.0034	mg/kg	--	NA	0.00398 ss4	No	Yes	Yes	PBT
SVOCs	2-Methylnaphthalene	1 / 2	0.038	0.058	mg/kg	--	NA	3.24 ss4	No	No	No	BSL
	Acenaphthene	1 / 2	0.76	1.5	mg/kg	--	NA	20 ss1	No	No	No	BSL
	Acenaphthylene	1 / 2	0.016	0.016	mg/kg	--	NA	628 ss4	No	No	No	BSL
	Anthracene	1 / 2	1.5	2.9	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Benzo(a)anthracene	1 / 2	4.1	8.2	mg/kg	--	NA	5.21 ss4	Yes	No	Yes	ASL
	Benzo(a)pyrene	2 / 2	2.8	5.5	mg/kg	--	NA	1.52 ss4	Yes	No	Yes	ASL
	Benzo(b)fluoranthene	2 / 2	3.7	7.3	mg/kg	--	NA	59.8 ss4	No	No	No	BSL
	Benzo(g,h,i)perylene	1 / 2	1.9	3.7	mg/kg	--	NA	119 ss4	No	No	No	BSL
	Benzo(k)fluoranthene	1 / 2	1.6	3.2	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Benzyl alcohol	1 / 2	0.48	0.62	mg/kg	--	NA	658 ss4	No	No	No	BSL
	Carbazole	1 / 2	0.74	1.4	mg/kg	--	NA	--	NSL	No	Yes	NSL
	Chrysene	2 / 2	3.9	7.8	mg/kg	--	NA	4.73 ss4	Yes	No	Yes	ASL
	Dibenzo(a,h)anthracene	1 / 2	0.48	0.94	mg/kg	--	NA	18.4 ss4	No	No	No	BSL
	Dibenzofuran	1 / 2	0.29	0.54	mg/kg	--	NA	--	NSL	No	Yes	NSL
	Fluoranthene	2 / 2	9.0	18	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Fluorene	1 / 2	0.66	1.3	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Indeno(1,2,3-cd)pyrene	1 / 2	1.7	3.4	mg/kg	--	NA	109 ss4	No	No	No	BSL
	Naphthalene	1 / 2	0.049	0.081	mg/kg	--	NA	0.0994 ss4	No	No	No	BSL
	Phenanthrene	1 / 2	6.0	12	mg/kg	--	NA	45.7 ss4	No	No	No	BSL
	Phenol	1 / 2	0.056	0.028	mg/kg	--	NA	30 ss1	No	No	No	BSL
	Pyrene	2 / 2	8.5	17	mg/kg	--	NA	78.5 ss4	No	No	No	BSL
Explosives	3-Nitrotoluene	1 / 22	0.099	0.08	mg/kg	--	NA	--	NSL	No	Yes	NSL
Propellants	Nitrocellulose	2 / 2	0.92	1.1	mg/kg	--	NA	--	NSL	No	Yes	NSL

Notes:
ss1 - Preliminary Remediation Goals (Efroymson et al , 1997a)
ss2 - Toxiclogolgical Benchmarks for Soil and Litter Invertebrates (Eftymonson et al 1997b)
ss3 - Toxiclogolgical Benchmarks for Terrestrial Plants (Efrymonson et al 1997c)
ss4- Ecological Data Quality Level (USEPA Region 5, 1999)
-- - no value available
NA - not applicable
NUT - nutrient

BLBKG - below background concentration
PBT- persistent, bioaccumulative and toxic
NSL - no screening level
ASL- above screening level
BSL - below screening level

Table WSA-6
Wet Storage Area Ecological Risk Summary of Quantitative and Qualitative COPCs for Environmental Media
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Shallow Soil
Metals	Arsenic	X
	Chromium	X
	Iron	X
	Lead	X
	Magnesium	
	Nickel	X
	Zinc	X
	Arsenic	X
	Lead	X
	Mercury	X
Pesticides	beta-BHC	X
SVOCs	Benzo(a)anthracene	X
	Benzo(a)pyrene	X
	Carbazole	Q
	Chrysene	X
	Dibenzofuran	Q
Explosives	3-Nitrotoluene	Q
Propellants	Nitrocellulose	Q

Notes
COPC - chemical of potential concern
X - quantitative COPC
Q - qualitatative COPC

Total PAHs are only applicable to sediments. For soil and surface water, only the individual PAHs are screened