Pistol Range Table of Contents

PISTOL RANGE FIGURES

PISTOL RANGE TABLES

1.0 INTRODUCTION

This report documents the results of the Pistol Range (PIR) (AOC-36) 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 PIR to collect sufficient data for all applicable media to allow efficient planning and execution of future environmental actions.

The characterization effort for the PIR 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, sediment, surface and groundwater 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 PIR 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), soil boring and sampling, surface water, monitoring well installation and development, groundwater sampling, sample and monitoring well location survey, and aquifer testing. 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 the PIR AOC and previous investigations conducted at this AOC.

1.2.1 AOC Description and History

The 8.9 ha (20 acre) PIR is located in the north-central portion of RVAAP, west of George Road, east of Greenleaf Road and due north of the Winklepeck Burning Grounds. Currently, the is unmaintained and is

overgrown primarily with grass which is interspersed with small saplings. The PIR is bordered by wooded areas in all directions and does not have a boundary fence. An unnamed creek bisects the AOC approximately in half. Access to the AOC is via a northern road/field or a southern access road. Figure 2-1, Volume I shows the location of PIR within the RVAAP.

The PIR was initially constructed for use by the installation's security personnel who were completing their pistol qualifications. The shooting qualifier stood on the south side of the creek and shot over the creek toward targets on the north side. A soil embankment or berm on the north side of the creek acted as an embankment for the bullets. The embankment is approximately 165 ft long and 48 ft from the toe of the slope to the crest. The slope is located 150 to 200 ft from the edge of the creek. Another prominent structure at the PIR is a target storage shed on the extreme south end of the AOC. The PIR was used regularly from 1941 to 1993 by the Army and the local police departments, but currently is inactive. The target stands that were positioned at the base of the soil embankment have been removed.

1.2.2 Previous Investigation

The following evaluations and assessments have been conducted at the PIR:

1.2.2.1 USATHAMA's 1978 Installation Assessment

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 was identified in the wells indicating that some leaching had occurred.

1.2.2.2 Preliminary Assessment for RVAAP (February, 1996)

- This document could not be found.

1.2.2.3 1996 USACHPPM Relative Risk Site Evaluation

PIR was scored with a minimal (0.38) contaminant hazard factor (CHF) for sediments/human endpoint (low) with a potential migration pathway factor and receptor pathway factor. The AOC also had a moderate (2.21) CHF for the sediment ecological endpoint (medium) with a potential migration pathway factor and receptor pathway factor. The AOC also was scored with a moderate (11.73) CHF for surface soil with a potential migration pathway factor and receptor pathway factor. The final RRSE score for the AOC was medium.

1.2.2.4 2001 MKM Evaluation of Range Backstop Soils for Waste Characteristics

MKM sampled the range backstop soils for waste characterization (lead) as a part of a scoping of costs for future work at the AOC. The work was not funded by DOD and therefore the results were not submitted.

1.2.3 Regulatory Authorities

Volume 1, Section 1.2.3 identifies the regulatory authorities that oversee remedial activities for this AOC.

1.2.4 Regulatory Status of Pistol Range

Volume I, Section 1.2.4 identifies the regulatory status for this AOC.

2.0 ENVIRONMENTAL SETTING AT PISTOL RANGE

This section describes the physical characteristics of PIR 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 PIR is forested except for the clearing that defines the range. An unnamed stream flows through the range between the firing points and the target berm. This stream intersects Sand Creek near the Central Burn Pits AOC. This AOC is approximately 750 feet north of the Winklepeck Burning Grounds and 750 feet southwest of the Landfill North of Winklepeck AOC. The AOC mostly located within the stream valley topographic low. The AOC surface water flows to the north and south directly into the stream. George Road is located approximately 250 to the east.

2.1 SURFACE FEATURES

The topography at the PIR ranges from approximately 1025 to 1050 ft amsl and gently slopes to the center of the site toward the creek (USGS Topographic Map, Windham Quadrangle, 1994) which bisects the site.

Surface features at the PIR consist of a single small building that was used as a range control building while the AOC was in operation. The largest changes in elevation occur at two of the prominent surface features on the AOC; the elevation drops sharply at the creek channel and rises abruptly at the toe of the berm used as a small arms fire backstop.

2.2 METEOROLOGY AND CLIMATE

Meteorology and climate are addressed in Volume 1, Section 2.2.

2.3 SURFACE WATER HYDROLOGY

Surface water drainage generally follows the topography at the site to the center toward the creek. Surface drainage in the northern portion of the PIR flows north to south and drainage in the southern portion of PIR flows south to north.

2.4 GEOLOGY

No subsurface investigation was performed in the areas of PIR. However, the geology would be similar to that described previously in Volume 1, Section 2.0.

2.4.1 Glacial Deposits

No subsurface investigation was performed at the PIR. Refer to Volume 1, Section 2.0 for a description of RVAAP glacial deposits.

2.4.2 Sedimentary Rocks

Refer to Volume 1, Section 2.0 for descriptions of sedimentary rocks. Subsurface investigation was not conducted during the performance of this characterization. Therefore, site specific information regarding bedrock is not available.

2.5 SOIL

Three soil types are found at this site: the Ellsworth silt loam (2 to 6 percent), Ellsworth silt loam (6 to 12 percent) and Holly silt loam.

The Ellsworth silt loam (6 to12 percent) covers the majority of the northern and southern areas of the PIR with the Holly silt loam found along the creek bed. The Mahoning Silt Loam (2 - 6 percent) outcrops in the form of a small ridge in the northwest portion of the site.

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. The Ellsworth silt loam (2 to 6 percent slopes) is a gently sloping soil on knolls or side slopes parallel to drainageways. Runoff is medium, and the hazard of erosion is severe. These soils are characterized by seasonal wetness and snow.

Ellsworth silt loam (6 to 12 percent slopes) is a sloping soil adjacent to drainageways. Runoff is rapid, permeability is slow, slopes are moderate and the hazard of erosion is very severe.

The Holly series consists of deep, nearly level poorly drained soils on flood plains. These soils formed in recent alluvium. The Holly silt loam is a nearly level soil mostly on narrow flood plains and strips on large flood plains. Runoff is slow to ponded, and it is subject to flooding because this soil is in low areas along streams.

2.6 HYDROGEOLOGY

Volume 1, Section 2.6 describes the unconsolidated sediments and bedrock which influence the hydrogeological characteristics at RVAAP. This section describes the unconsolidated sediments and bedrock characteristics found at the PIR.

2.6.1 Unconsolidated Sediments

No subsurface investigation was performed in the areas of PIR. However, the unconsolidated sediments would be similar to those described in Volume 1, Section 2.0.

2.6.2 Bedrock

No subsurface investigation was performed in the areas of PIR. However, the bedrock would be similar to those described in Volume 1, Section 2.0, which provides a general bedrock description of facility.

2.7 DEMOGRAPHY AND LAND USE

The PIR is currently not being used. Demographics for the facility are discussed in Volume 1, Section 2.7.

2.8 ECOLOGY

Ecological information is found in Volume 1, Section 2.8.

3.0 CHARACTERIZATION ACTIVITIES AT PISTOL RANGE

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

3.1 FIELD ACTIVITIES

Field activities conducted from October 2004 thru May 2005 included:

- Collecting multi-incremental (MI) surface soil (0-1 ft) samples (11-16-04);
- Collecting surface water samples from drainage pathways (11-17-04);
- Collecting MI sediment samples from drainage pathways (11-17-04);
- Collected a geotechnical sample from a boring (11-17-04); and
- Conducting a sample location survey (12-13-04 – 01-17-05).

Sampling points for the characterization of this AOC were located to assess the impact that PIR operations may have had on soil, sediment and surface water; and to evaluate where contaminants related to the former range operations may have impacted the AOC. The following sections describe the rationales for, and methods of, sample collection employed during the investigation. Information from previous assessments and evaluations, plus institutional knowledge about the process operations, was used to determine the sampling locations, type of media collected, analyses run and numbers of samples for this characterization activity. Table PIR-1 summarizes the types and numbers of samples that were collected and the analyses conducted on the samples. A photolog of the investigation activities is provided in Appendix C. Figure PIR-1 shows the sampling locations for all media collected at this AOC.

3.1.1 MI Surface Soil (0-1 ft) Sampling

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

- Assess the potential impact of PIR operations on the soils within the AOC;
- Identify the potential contribution of contaminants from PIR operations to drainage pathways; and
- Determine the nature of identified contamination.

The AOC was divided into six MI grids encompassing the berm (backstop), the target area and the firing point. Each surface soil (0-1 ft) MI sampling grid is considered an exposure unit. One MI surface soil (0-1 ft) sample was collected from the firing point grid, one MI sample was collected from each of the two grids located at the target area and one MI sample was collected from each of the three grids at the backstop (berm) for a total of six MI soil samples collected at the PIR. MI samples were collected as described in Volume 1, Section 3.1.10.1.

One split sample was collected and submitted for analysis to an independent, USACE-approved laboratory. Analysis of MI surface soils (0-1 ft) for PIR included the following parameters: TAL Metals and Explosives. Field sampling forms documenting the surface soil (0-1 ft) sampling activities are presented in Appendix E. MI surface soil (0-1 ft) analytical results are presented in Appendix F. A VOC sample, as part of the surface soil (0-1 ft) MI sample, was collected as a discrete sample to fulfill the 10 percent full suite requirement and followed the FWSAP-approved VOC collection methods. The discrete surface soil (0-1 ft) sample was collected using a stainless steel push probe. Volume 1, Section 3.1.9.3 describes the procedure used to collect a discrete surface soil (0-1 ft) sample. Samples were prepared, packaged and shipped as required in Section 6.0 of the RVAAP 14 AOC FWSAP Addendum. The discrete VOC sample was not subjected to MI sample drying or processing.

3.1.2 Surface Water Sampling

A surface water sample was collected at this AOC to:

- Evaluate whether surface water is being impacted by runoff from PIR; and
- Identify the migration pathways for contaminated runoff (if any) from PIR.

One discrete surface water sample was collected from an unnamed creek, a tributary of Sand Creek that bisects the AOC. The surface water sample was collected prior to the collection of the MI sediment sample. The surface water was collected as specified in Section 4.6.2.1.1 of the FWSAP. Sampling containers were filled directly by submerging them into the creek's water. Water quality measurements (pH, conductivity, dissolved oxygen content, and temperature) were recorded just prior to sample collection. The sample was immediately placed into a cooler containing ice and submitted to the laboratory under a completed chain-of-custody.

One split sample was collected and submitted for analysis to an independent, USACE-approved laboratory. Analysis of surface water at PIR included the following parameters: TAL Metals, Explosives, Propellants, VOCs, SVOCs, Pesticides and PCBs. Samples were prepared, packaged and shipped as specified in Section 6.0 of the RVAAP 14 AOC FWSAP Addendum. Field sampling forms for the surface water are presented in Appendix O and analytical results are presented in Appendix P.

3.1.3 MI Sediment Sampling

A MI sediment sample was collected at this AOC to:

- Evaluate whether sediments are being impacted via surface water runoff at PIR;
- Evaluate the migration pathway for contaminants that may have been suspended in surface water runoff; and
- Evaluate whether contaminants may have migrated beyond the AOC boundaries.

Two MI sediment samples were collected from an unnamed creek, a tributary of Sand Creek that bisects the AOC. The creek was divided into two MI grids and one MI sediment sample was collected from each grid. One surface water sample which was collected at the AOC was collected from one of the MI sediment sampling grids. The MI sediment sample was co-located with an associated surface water

sample. The MI sediment sample was collected from 0 to 0.15 m (0 to 0.5 ft) interval below the sediment-water interface within the grid area. The MI sediment sample was collected and placed into a plastic lined 5 gallon bucket, sealed and transported to Building 1036 for processing. The homogenized sample was immediately placed into a cooler containing ice and submitted to the laboratory under a completed chain-of-custody. Analysis of sediment for PIR included the following parameters: TAL Metals and Explosives. The MI sediment sample was collected as defined in Section 4.2.2.2 of the FSAP Addendum for characterization of 14 AOCs (MKM, 2004).

One split sample was collected and submitted for analysis to an independent, USACE-approved laboratory. The sample was prepared, packaged and shipped as described in Section 6.0 of the RVAAP 14 AOC FWSAP Addendum. Field sampling forms are presented in Appendix Q and analytical results from the samples are presented in Appendix R.

3.1.4 Sample Location Survey

Surveying was conducted as specified in Section 4.3.2.3.12 of the FWSAP. Corners of the multi-incremental sampling grid, discrete soil/sediment locations and the surface water location were surveyed using a sub-meter GPS unit (Trimble). The sample location survey data can be found in Appendix S.

3.2 DEVIATIONS FROM THE WORK PLAN

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

- The saturated MI sediment sample was not air dried or sifted during processing because it was too wet to be able to dry the sample within the holding times for the requested analysis. The saturated MI sediment sample was homogenized in its saturated state and placed incrementally into the appropriate, pre-cleaned sample containers.

Although one change was identified, the objectives of the PIR AOC characterization were .still achieved.

4.0 NATURE OF CONTAMINATION AT PISTOL RANGE

This section summarizes the surface soil (0-1 ft), surface water and sediment analytical results obtained from the environmental sampling conducted at the PIR. The results are organized by media: surface soil (0-1 ft), surface water, and sediment. 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. Region 9 residential PRG values were used for the soil and sediment, whereas Region 9 tap water PRG values were used for water. The evaluation completed in this section is a preliminary comparison and is not intended to be used alone for making risk management decisions. The risk screening, presented later in this report, further discusses and evaluates the contaminants detected during this AOC characterization.

4.1 MI SURFACE SOIL (0-1 FT)

Seven MI surface soil (0-1 ft) (six regular and one QC) samples were collected from various locations during the AOC characterization at PIR. Additionally, one discrete surface soil (0-1 ft) sample was 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 PIR-2. All surface soil (0-1 ft) analytical results are presented in Table PIR-5. Locations where analytes were detected at or above RVAAP-specific background concentrations and Region 9 residential PRGs are illustrated in Figure PIR-2. Laboratory analytical reports are provided in Appendix F.

Other details pertinent to the surface soil (0-1 ft) analytical results:

- **Aluminum** exceeded the Region 9 residential PRG in four samples with a **maximum concentration of 9000 mg/kg**.
- **Arsenic** exceeded the Region 9 residential PRG in six samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 16 mg/kg**.
- **Cadmium** exceeded background in one sample with a **maximum concentration of 0.12 mg/kg**.
- **Chromium** exceeded background in three samples with a **maximum concentration of 28 mg/kg**.
- **Copper** exceeded background in six samples with a **maximum concentration of 150 mg/kg**.
- **Iron** exceeded the Region 9 residential PRG in seven samples with a **maximum concentration of 21000 mg/kg**.
- **Lead** exceeded the background in six samples, and exceeded background and the Region 9 residential PRG in two samples with a **maximum concentration of 1300 mg/kg**.
- **Manganese** exceeded the Region 9 residential PRG in seven samples with a **maximum concentration of 750 mg/kg**.
- **Sodium** exceeded background in seven samples with a **maximum concentration of 300 mg/kg**.
- **Vanadium** exceeded the Region 9 residential PRG in seven samples with a **maximum concentration of 16 mg/kg**.
- **Zinc** exceeded background in five samples with a **maximum concentration of 73 mg/kg**.

- **Mercury** exceeded background in three samples with a **maximum concentration of 0.053 mg/kg**.
- **Thallium** exceeded background in two samples with a **maximum concentration of 0.36 mg/kg**.
- **SVOCs, VOCs**, **propellants, explosives**, **pesticides** and **PCBs** were below Region 9 residential PRGs and/or laboratory detection limits.

4.2 MI SEDIMENT

Three MI sediment (two regular and one QC) samples were collected during the PIR AOC characterization activities. Additionally, two discrete (one regular and one QC) sediment samples were collected for VOC analysis. Results from the sediment samples were compared to facility-wide background concentrations for sediments and/or Region 9 residential PRGs.

Sediment results at or above detection limits are presented in Table PIR-3. All sediment analytical results are presented in Table PIR-6. Locations where analytes were detected at or above background concentrations and Region 9 residential PRGs are illustrated in Figure PIR-2. Laboratory analytical reports are provided in Appendix R.

Other details pertinent to the sediment analytical results:

- **Arsenic** exceeded the Region 9 residential PRG in six samples with a **maximum concentration of 12 mg/kg**.
- **Beryllium** exceeded background in two samples with a **maximum concentration of 0.48 mg/kg**.
- **Cadmium** exceeded background in two samples with a **maximum concentration of 0.086 mg/kg**.
- **Iron** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 15000 mg/kg**.
- **Lead** exceeded the background in six samples, and exceeded background and the Region 9 residential PRG in two samples with a **maximum concentration of 1300 mg/kg**.
- **Manganese** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 590 mg/kg**.
- **Sodium** exceeded background in three samples with a **maximum concentration of 200 mg/kg**.
- **Vanadium** exceeded the Region 9 residential PRG in two samples with a **maximum concentration of 9.9 mg/kg**.
- **SVOCs, VOCs, explosives, propellants, pesticides** and **PCBs** were below Region 9 residential PRGs and/or laboratory detection limits.

4.3 SURFACE WATER

One surface water sample was collected during the PIR AOC characterization activities. Results from analyses were compared to surface water background concentrations (USACE, 2000) and/or USEPA Region 9 tap water PRGs.

Surface water results at or above detection limits are presented in Table PIR-4. All surface water analytical results are presented in Table PIR-7. Locations where surface water analytes were detected at or above background concentrations and Region 9 tap water PRGs are illustrated in Figure PIR-2. Laboratory analytical reports are provided in Appendix P.

Other details pertinent to the surface water analytical result:

- **Arsenic** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.69 µg/L**.
- **TAL metals, pesticides, PCBs, VOCs, SVOCs, propellants** and **explosives** were below Region 9 tap water PRGs and/or laboratory detection limits.

5.0 HUMAN HEALTH AND ECOLOGICAL RISK SCREENING FOR PISTOL RANGE

This section details both the human health and ecological risk screening performed at PIR.

5.1 HUMAN HEALTH RISK SCREENING

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

5.1.1 Surface Soil (0-1 ft)

Table PIR-8 presents the human health screening table for surface soil (0-1 ft) at the PIR. A total of 28 metal constituents were detected including.

- Seven constituents had detections greater than background concentrations: cadmium, chromium, copper, lead, sodium, zinc and mercury.
- Five constituents had detections above the adjusted Region 9 residential PRGs: aluminum, arsenic, iron, manganese and vanadium.
- Concentrations of two constituents, arsenic and lead, exceeded both RVAAP-specific background concentrations and the Region 9 residential PRG.
- Based on these comparisons, arsenic and lead were identified as chemicals of potential concern (COPC) in surface soil (0-1ft) at the PIR.

5.1.2 Sediment

Table PIR-9 presents the human health screening table for sediment at the PIR. Twenty constituents were detected in sediment. These constituents included metals and one SVOC.

- Three constituents had detected concentrations greater than RVAAP-specific background values: beryllium, cadmium and sodium.
- Four constituents had detections above the adjusted Region 9 residential PRGs: arsenic, iron, manganese and vanadium.

No constituents had detected concentrations above both RVAAP-specific background and Region 9 residential PRGs. Based on these comparisons, no constituents were identified as COPCs in sediment at the PIR AOC.

5.1.3 Surface Water

Table PIR-10 presents the human health screening table for surface water at the PIR. One surface water sample was collected resulting in a total of ten detected constituents.

No constituents had detections greater than RVAAP-specific background concentrations or both RVAAP-specific background and the Region 9 tap water PRGs. Only arsenic had detections above the Region 9 tap water PRGs. Based on these comparisons, no constituents were identified as COPC in surface water.

5.2 ECOLOGICAL RISK SCREENING

Volume 1, Section 5.2 explains how the PIR data were screened to determine ecological contaminants of potential concern (COPECs).

5.2.1 Surface Soil (0-1 ft)

Table PIR-11 presents the ecological screening table for surface soil (0-1 ft) at the PIR. A total of 28 constituents were detected.

- Eight constituents had detections greater than RVAAP-specific background concentrations: arsenic, cadmium, chromium, copper, lead, sodium, zinc and mercury.
- Eleven constituents had detections above ecological screening values: aluminum, arsenic, chromium, copper, iron, lead, manganese, selenium, vanadium, zinc and mercury.

Based on these comparisons, seven constituents were identified as chemicals of potential ecological concern (COPECs) in surface soil (0-1 ft) at the PIR: arsenic, chromium, copper, lead, zinc, mercury and nitroglycerin. Of these COPECs, only nitroglycerin was identified due to the lack of screening criteria.

5.2.2 Sediment

Table PIR-12 presents the ecological screening table for sediment at the PIR. Twenty-one constituents were detected in sediment.

- Three constituents had detected concentrations greater than RVAAP-specific background values: beryllium, cadmium and sodium.
- No constituents exceeded the Sediment Reference Value (SRV) (OEPA, 2003).

Only arsenic had detections above the ecological screening value, but was below the SRV. Based on these comparisons, no constituents were identified as COPECs.

5.2.3 Surface Water

Table PIR-13 presents the ecological screening table for surface water at the PIR. Ten constituents were detected in surface water.

None of the constituents had detections greater than RVAAP-specific background values or were detected above ecological screening values. Based on these comparisons, no constituents were identified as COPECs in surface water at the PIR.

6.0 SUMMARY AND CONCLUSION OF THE CHARACTERIZATION OF PISTOL RANGE

This section briefly summarizes the existing conditions that were found during the AOC Characterization at PIR and the risk screening tasks that were completed.

6.1 NATURE OF CONTAMINATION

Contaminants were detected above screening criteria in three media: surface soil (0-1 ft), sediment and surface water. One constituent other than inorganics was detected above screening criteria in the samples collected from the various media. One propellant was detected above screening criteria in only one out of seven soil sample locations. Therefore, no inferences can be made regarding contaminant distribution in any of the media because of the low frequency of detection.

- In surface soil (0-1 ft), metals and one propellant were the only parameters with analytes that were detected at concentrations above background and/or Region 9 residential PRG screening values.
- In sediment, metals were the only parameter with analytes that were detected at concentrations above background and/or Region 9 residential PRG screening values.
- In surface water, only arsenic was detected above Region 9 tap water PRG screening values.

6.2 HUMAN HEALTH RISK SCREENING

A HHRS was conducted to compare the concentrations detected in the PIR samples to RVAAP-specific background concentrations and USEPA Region 9 residential or tap water PRGs. This preliminary screen was conducted to identify potential COPCs. The following table identifies the COPCs by media.

Table PIR-15

Chemical of Potential Concern – All Media

Soils	Sediment	Surface Water	Groundwater
Arsenic Lead	No COPCs detected	No COPCs detected	Groundwater not sampled

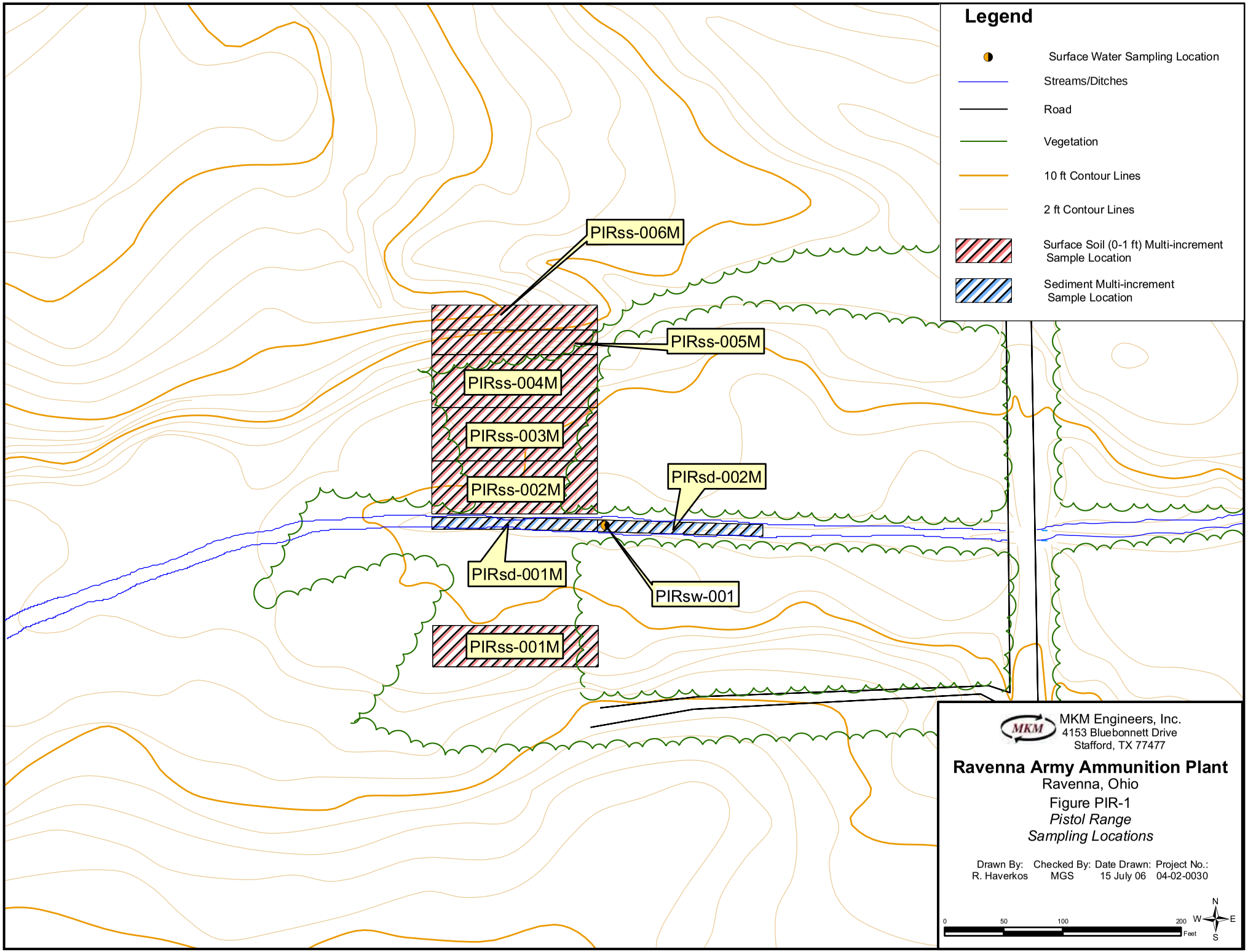
6.3 ECOLOGICAL RISK SCREENING

An ERS was performed to compare contaminant concentrations detected in PIR to RVAAP-specific background concentrations and ecological screening values. The ERS was conducted as outlined in Volume 1, Section 5.2. The ERS identified COPECs for PIR. The following table summarizes those COPECs by media.

Table PIR-16			
Chemical of Potential Ecological Concern – All Media			
Soils	**Sediment**	**Surface Water**	**Groundwater**
Arsenic Chromium Copper Lead Zinc Mercury Nitroglycerin	No COPECs detected	No COPECs detected	Groundwater not evaluated for ERS

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 PIR.


Legend
Surface Water Sampling Location
Streams/Ditches
Road
Vegetation
10 ft Contour Lines
2 ft Contour Lines
Surface Soil (0-1 ft) Multi-increment Sample Location
Sediment Multi-increment Sample Location
PIRss-006M
PIRss-005M
PIRss-004M
PIRss-003M
PIRss-002M
PIRsd-002M
PIRsd-001M
PIRsw-001
PIRss-001M
MKM
MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure PIR-1
Pistol Range
Sampling Locations
Drawn By: R. Haverkos
Checked By: MGS
Date Drawn: 15 July 06
Project No.: 04-02-0030
0
50
100
200
Feet
N
W
E
S

PIRss-006M-SO

Analyte	Result	Units	Qualifier
Aluminum	**9000**	mg/kg	
Copper	19	mg/kg	
Iron	**21000**	mg/kg	
Lead	100	mg/kg	
Manganese	**390**	mg/kg	
Sodium	290	mg/kg	
Vanadium	**16**	mg/kg	

PIRss-005M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8100**	mg/kg	
Arsenic	**13**	mg/kg	
Chromium	20	mg/kg	
Copper	150	mg/kg	
Iron	**19000**	mg/kg	
Lead	**1200**	mg/kg	
Manganese	**470**	mg/kg	
Sodium	270	mg/kg	
Vanadium	**16**	mg/kg	
Zinc	73	mg/kg	

PIRss-005M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**8400**	mg/kg	
Arsenic	**13**	mg/kg	
Chromium	18	mg/kg	
Copper	140	mg/kg	
Iron	**19000**	mg/kg	
Lead	**1300**	mg/kg	
Manganese	**460**	mg/kg	
Sodium	280	mg/kg	
Vanadium	**16**	mg/kg	
Zinc	72	mg/kg	
Mercury	0.053	mg/kg	

PIRss-003M-SO

Analyte	Result	Units	Qualifier
Arsenic	**12**	mg/kg	
Chromium	28	mg/kg	
Copper	46	mg/kg	
Iron	**16000**	mg/kg	
Manganese	**550**	mg/kg	
Sodium	300	mg/kg	
Vanadium	**14**	mg/kg	
Zinc	67	mg/kg	

PIRss-004M-SO

Analyte	Result	Units	Qualifier
Arsenic	**16**	mg/kg	
Copper	19	mg/kg	
Iron	**19000**	mg/kg	
Lead	36	mg/kg	
Manganese	**430**	mg/kg	
Sodium	300	mg/kg	
Vanadium	**14**	mg/kg	
Zinc	63	mg/kg	

PIRss-002M-SO

Analyte	Result	Units	Qualifier
Arsenic	**13**	mg/kg	
Copper	19	mg/kg	
Iron	**18000**	mg/kg	
Manganese	**540**	mg/kg	
Sodium	270	mg/kg	
Vanadium	**15**	mg/kg	
Zinc	69	mg/kg	
Mercury	0.045	mg/kg	

PIRsw-001-SW

Analyte	Result	Units	Qualifier
Arsenic	**0.69**	ug/l	

PIRsd-002M-SD

Analyte	Result	Units	Qualifier
Arsenic	**9.3**	mg/kg	
Iron	**13000**	mg/kg	
Manganese	**480**	mg/kg	**J**
Sodium	140	mg/kg	

PIRsd-001M-SD

Analyte	Result	Units	Qualifier
Arsenic	**9.9**	mg/kg	
Beryllium	0.48	mg/kg	
Cadmium	0.073	mg/kg	
Iron	**13000**	mg/kg	
Manganese	**590**	mg/kg	
Sodium	200	mg/kg	
Vanadium	**8.9**	mg/kg	

PIRsd-001M-DUP

Analyte	Result	Units	Qualifier
Arsenic	**12**	mg/kg	
Beryllium	0.43	mg/kg	
Cadmium	0.086	mg/kg	
Iron	**15000**	mg/kg	
Manganese	**550**	mg/kg	
Sodium	200	mg/kg	
Vanadium	**9.9**	mg/kg	

PIRss-001M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8400**	mg/kg	
Arsenic	**9.2**	mg/kg	
Cadmium	0.12	mg/kg	
Iron	**17000**	mg/kg	
Manganese	**750**	mg/kg	
Sodium	210	mg/kg	
Vanadium	**16**	mg/kg	
Mercury	0.05	mg/kg	

Legend

- Surface Water Sampling Location
- Streams/Ditches
- Vegetation
- Road
- 10 ft Contour Lines
- 2 ft Contours Lines
- Surface Soil (0-1 ft) Multi-increment Sample Location
- Sediment Multi-increment Sample Location

Notes:
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.
Result < PRG & Background, then the value is presented with a normal style.
Mg / Kg - Milligrams per Kilogram (parts per million - ppm)
Ug/L - Micrograms per Liter (parts per billion - ppb)

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure PIR-2

Pistol Range

Soil, Surface Water and Sediment Sampling Location Exceedences Inorganics and Organics

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

0 40 80 160 Feet

N W E S

Table PIR-1
Pistol Range 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					
PIR	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	1	1	1		1	1											
	SS-004M			1		1														
	SS-005M			1		1										1				1
	SS-006M			1		1														
		1	1	6	1	6	0	1	1	0	0	0	0	0	0	1	0	0	0	1
SURFACE WATER	SW-001	1	1	1	1	1		1	1											
Pond/Wet Ditch/Spring																				
		1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
SEDIMENT	SD-001M	1	1	1	1	1		1	1			1		1		1				1
Pond/Wet Ditch/Spring	SD-002M			1		1						1		1					1	
		1	1	2	1	2	0	1	1	0	0	2	0	2	0	1	0	0	1	0
DISPOSAL WASTE	001-WD																			
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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.
Grainsize and TOC are taken at "all major drainageway" sediments

Table PIR-2
Pistol Range Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRss-001M-SO	PIRss-002M-SO	PIRss-003D-SO	PIRss-003M-SO	PIRss-004M-SO	PIRss-005M-DUP	PIRss-005M-SO	PIRss-006M-SO
					Sample Date:	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
					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
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
Metals	6010B	Aluminum	7614 nc	17700	mg/kg	**8400**	7200		7000	6900	**8400**	**8100**	**9000**
	6010B	Arsenic	0.39 ca	15.4	mg/kg	**9.2**	**13**		**12**	16	**13**	**13**	**13**
	6010B	Barium	538 nc	88.4	mg/kg	87	62		59	48	51	51	42
	6010B	Beryllium	15 nc	0.88	mg/kg	0.6	0.54		0.6	0.55	0.53	0.53	0.56
	6010B	Cadmium	3.7 nc	0.00	mg/kg	0.12							
	6010B	Calcium	--[n]	15800	mg/kg	2000	1000		2800	2000	680	690	180
	6010B	Chromium	30 ca	17.4	mg/kg	15	16		28	16	18	20	16
	6010B	Cobalt	30 ca	10.4	mg/kg	6.4	7.2		6.9	7.3	7.3	7.4	8.4
	6010B	Copper	313 nc	17.7	mg/kg	9.8	19		46	19	140	150	19
	6010B	Iron	2346 nc	23100	mg/kg	**17000**	**18000**		**16000**	**19000**	**19000**	**19000**	**21000**
	6010B	Lead	400 pbk	26.1	mg/kg	17	25		24	36	**1300**	**1200**	100
	6010B	Magnesium	--[n]	3030	mg/kg	1500	1600		1700	1900	1800	1800	1900
	6010B	Manganese	176 nc	1450	mg/kg	**750**	**540**		**550**	**430**	**460**	**470**	**390**
	6010B	Nickel	156 nc	21.1	mg/kg	13	16		21	18	18	19	17
	6010B	Potassium	--[n]	927	mg/kg	480	590		570	670	770	700	740
	6010B	Selenium	39 nc	1.4	mg/kg	0.96	0.58		0.62	0.6	0.65	0.64	0.75
	6010B	Sodium	--[n]	123	mg/kg	210	270		300	300	280	270	290
	6010B	Vanadium	7.8 nc	31.1	mg/kg	**16**	**15**		**14**	**14**	**16**	**16**	**16**
	6010B	Zinc	2346 nc	61.8	mg/kg	54	69		67	63	72	73	55
	7041	Antimony	3.1 nc	0.96	mg/kg						0.51	0.89	
	7471A	Mercury	2.3 nc	0.04	mg/kg	0.05	0.045		0.037	0.03	0.053	0.039	0.04
SVOCs	8270C	Benzo(a)anthracene	0.62 ca	--	mg/kg				0.019 J				
	8270C	Benzo(b)fluoranthene	0.62 ca	--	mg/kg				0.029 J				
	8270C	Benzo(k)fluoranthene	6.2 ca	--	mg/kg				0.011 J				
	8270C	Chrysene	62 ca	--	mg/kg				0.018 J				
	8270C	Fluoranthene	229 nc	--	mg/kg				0.032 J				
	8270C	Pyrene	232 nc	--	mg/kg				0.028 J				
Propellants	8332	Nitroglycerine	35 ca	--	mg/kg				0.3 J				

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 PIR-3
Pistol Range Summary of Sediment Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							PIRsd-001D-DUP	PIRsd-001D-SD	PIRsd-001M-DUP	PIRsd-001M-SD	PIRsd-002M-SD
						Sample Date:	11/17/2004	11/17/2004	11/17/2004	11/17/2004	11/17/2004
						Sample Depth:	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Sediment Background Criteria	Units					
Metals	6010B	Aluminum	7614	nc	13900	mg/kg			4100	4500	2300
	6010B	Arsenic	0.39	ca	19.5	mg/kg			**12**	**9.9**	**9.3**
	6010B	Barium	538	nc	123	mg/kg			50	56	26
	6010B	Beryllium	15	nc	0.38	mg/kg			0.43	0.48	0.3
	6010B	Cadmium	3.7	nc	0.00	mg/kg			0.086	0.073	
	6010B	Calcium	--[n]		5510	mg/kg			1400	4000	1500 J
	6010B	Chromium	30	ca	18.1	mg/kg			7.1	7	5.7
	6010B	Cobalt	30	ca	9.1	mg/kg			4.7	4.9	3.6
	6010B	Copper	313	nc	27.6	mg/kg			8.8	7.8	9 J
	6010B	Iron	2346	nc	28200	mg/kg			**15000**	**13000**	**13000**
	6010B	Lead	400	pbk	27.4	mg/kg			12	11	6.8 J
	6010B	Magnesium	--[n]		2760	mg/kg			1200	1900	950
	6010B	Manganese	176	nc	1950	mg/kg			**550**	**590**	**480 J**
	6010B	Nickel	156	nc	17.7	mg/kg			11	10	7.2
	6010B	Potassium	--[n]		1950	mg/kg			440	450	290
	6010B	Sodium	--[n]		112	mg/kg			200	200	140
	6010B	Vanadium	7.8	nc	26.1	mg/kg			**9.9**	**8.9**	6
	6010B	Zinc	2346	nc	532	mg/kg			45	40	39 J
	7471A	Mercury	2.3	nc	0.06	mg/kg			0.017	0.024	0.016 J
SVOCs	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg			0.017 J	0.023 J	

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 PIR-4
Pistol Range Summary of Surface Water Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							PIRsw-001-SW
						Sample Date:	11/17/2004
						Sample Depth:	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)		Surface Water Background Criteria	Units	
Metals	6010B	Aluminum	36499	nc	3370	ug/l	58
	6010B	Barium	2555	nc	47.5	ug/l	30
	6010B	Calcium	--[n]		41400	ug/l	35000
	6010B	Iron	10950	nc	2560	ug/l	1500
	6010B	Magnesium	--[n]		10800	ug/l	9000
	6010B	Manganese	876	nc	391	ug/l	190
	6010B	Potassium	--[n]		3170	ug/l	1400
	6010B	Sodium	--[n]		21300	ug/l	4000
	6010B	Zinc	10950	nc	42	ug/l	5.2
	7060A	Arsenic	0.045	ca	3.2	ug/l	**0.69**

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
ug/l - means micrograms per Liter (parts per billion - ppb)
PRG - preliminary remediation goals
nc - non-cancer basis
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 PIR-5
Pistol Range Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRss-001M-SO	PIRss-002M-SO	PIRss-003D-SO	PIRss-003M-SO	PIRss-004M-SO	PIRss-005M-DUP	PIRss-005M-SO	PIRss-006M-SO
					Sample Date:	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
					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
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
Metals	6010B	Aluminum	7614 nc	17700	mg/kg	**8400**	7200		7000	6900	**8400**	**8100**	**9000**
	6010B	Arsenic	0.39 ca	15.4	mg/kg	**9.2**	**13**		**12**	16	**13**	**13**	**13**
	6010B	Barium	538 nc	88.4	mg/kg	87	62		59	48	51	51	42
	6010B	Beryllium	15 nc	0.88	mg/kg	0.6	0.54		0.6	0.55	0.53	0.53	0.56
	6010B	Cadmium	3.7 nc	0.00	mg/kg	0.12	0.125 U		0.135 U	0.125 U	0.13 U	0.125 U	0.13 U
	6010B	Calcium	--[n]	15800	mg/kg	2000	1000		2800	2000	680	690	180
	6010B	Chromium	30 ca	17.4	mg/kg	15	16		28	16	18	20	16
	6010B	Cobalt	30 ca	10.4	mg/kg	6.4	7.2		6.9	7.3	7.3	7.4	8.4
	6010B	Copper	313 nc	17.7	mg/kg	9.8	19		46	19	140	150	19
	6010B	Iron	2346 nc	23100	mg/kg	**17000**	**18000**		**16000**	**19000**	**19000**	**19000**	**21000**
	6010B	Lead	400 pbk	26.1	mg/kg	17	25		24	36	**1300**	**1200**	100
	6010B	Magnesium	--[n]	3030	mg/kg	1500	1600		1700	1900	1800	1800	1900
	6010B	Manganese	176 nc	1450	mg/kg	**750**	**540**		**550**	**430**	**460**	**470**	**390**
	6010B	Nickel	156 nc	21.1	mg/kg	13	16		21	18	18	19	17
	6010B	Potassium	--[n]	927	mg/kg	480	590		570	670	770	700	740
	6010B	Selenium	39 nc	1.4	mg/kg	0.96	0.58		0.62	0.6	0.65	0.64	0.75
	6010B	Silver	39 nc	0.00	mg/kg	0.49 U	0.5 U		0.55 U	0.495 U	0.5 U	0.5 U	0.5 U
	6010B	Sodium	--[n]	123	mg/kg	210	270		300	300	280	270	290
	6010B	Vanadium	7.8 nc	31.1	mg/kg	**16**	**15**		**14**	**14**	**16**	**16**	**16**
	6010B	Zinc	2346 nc	61.8	mg/kg	54	69		67	63	72	73	55
	7041	Antimony	3.1 nc	0.96	mg/kg	0.7 U	0.7 U		0.75 U	0.7 U	0.51	0.89	0.7 U
	7471A	Mercury	2.3 nc	0.04	mg/kg	0.05	0.045		0.037	0.03	0.053	0.039	0.04
	7841	Thallium	0.52 nc	0.00	mg/kg	0.295 U	0.31 U		0.33 U	0.3 U	0.305 U	0.31 U	0.31 U
Pesticides	8081A	4,4'-DDD	2.4 ca	--	mg/kg				0.0009 U				
	8081A	4,4'-DDE	1.7 ca	--	mg/kg				0.0011 U				
	8081A	4,4'-DDT	1.7 ca	--	mg/kg				0.0009 U				
	8081A	Aldrin	0.029 ca	--	mg/kg				0.0009 U				
	8081A	alpha-BHC	0.09 sat	--	mg/kg				0.0009 U				
	8081A	alpha-Chlordane	1.6 ca	--	mg/kg				0.0009 U				
	8081A	beta-BHC	0.32 ca	--	mg/kg				0.0009 U				
	8081A	delta-BHC	--	--	mg/kg				0.0009 U				
	8081A	Dieldrin	0.030 ca	--	mg/kg				0.0009 U				
	8081A	Endosulfan I	37 nc	--	mg/kg				0.0009 U				
	8081A	Endosulfan II	37 nc	--	mg/kg				0.0009 U				
	8081A	Endosulfan sulfate	37 nc	--	mg/kg				0.0009 U				
	8081A	Endrin	1.8 nc	--	mg/kg				0.0009 U				
	8081A	Endrin aldehyde	--	--	mg/kg				0.0009 U				
	8081A	Endrin ketone	--	--	mg/kg				0.0009 U				
	8081A	gamma-BHC	0.44 ca	--	mg/kg				0.0009 U				

Table PIR-5
Pistol Range Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRss-001M-SO	PIRss-002M-SO	PIRss-003D-SO	PIRss-003M-SO	PIRss-004M-SO	PIRss-005M-DUP	PIRss-005M-SO	PIRss-006M-SO
					Sample Date:	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
					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
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
	8081A	gamma-Chlordane	1.6 ca	--	mg/kg				0.0009 U				
	8081A	Heptachlor	0.11 ca	--	mg/kg				0.0009 UJ				
	8081A	Heptachlor epoxide	0.053 ca	--	mg/kg				0.0009 U				
	8081A	Methoxychlor	31 nc	--	mg/kg				0.0045 U				
	8081A	Toxaphene	0.44 ca	--	mg/kg				0.009 U				
PCBs	8082	Aroclor 1016	0.39 nc	--	mg/kg				0.018 U				
	8082	Aroclor 1221	0.22 ca	--	mg/kg				0.018 U				
	8082	Aroclor 1232	0.22 ca	--	mg/kg				0.009 U				
	8082	Aroclor 1242	0.22 ca	--	mg/kg				0.018 U				
	8082	Aroclor 1248	0.22 ca	--	mg/kg				0.009 U				
	8082	Aroclor 1254	0.22 ca	--	mg/kg				0.018 U				
	8082	Aroclor 1260	0.22 ca	--	mg/kg				0.018 U				
VOCs	8260B	1,1,1-Trichloroethane	1200 sat	--	mg/kg			0.003 U					
	8260B	1,1,2,2-Tetrachloroethane	0.41 ca	--	mg/kg			0.003 U					
	8260B	1,1,2-Trichloroethane	0.73 ca	--	mg/kg			0.003 U					
	8260B	1,1-Dichloroethane	51 nc	--	mg/kg			0.003 U					
	8260B	1,1-Dichloroethene	12 nc	--	mg/kg			0.003 U					
	8260B	1,2-Dibromoethane	0.032 ca	--	mg/kg			0.003 U					
	8260B	1,2-Dichloroethane	0.28 ca	--	mg/kg			0.003 U					
	8260B	1,2-Dichloroethene (total)	6.9 nc	--	mg/kg			0.006 U					
	8260B	1,2-Dichloropropane	0.34 ca	--	mg/kg			0.003 U					
	8260B	2-Butanone	2231 nc	--	mg/kg			0.009 U					
	8260B	2-Hexanone	530 nc	--	mg/kg			0.006 U					
	8260B	4-Methyl-2-pentanone	528 nc	--	mg/kg			0.006 U					
	8260B	Acetone	1412 nc	--	mg/kg			0.009 U					
	8260B	Benzene	0.64 ca	--	mg/kg			0.003 U					
	8260B	Bromochloromethane	--	--	mg/kg			0.003 U					
	8260B	Bromodichloromethane	0.82 ca	--	mg/kg			0.003 U					
	8260B	Bromoform	62 ca	--	mg/kg			0.003 U					
	8260B	Bromomethane	0.39 nc	--	mg/kg			0.003 U					
	8260B	Carbon disulfide	36 nc	--	mg/kg			0.003 U					
	8260B	Carbon tetrachloride	0.25 ca	--	mg/kg			0.003 U					
	8260B	Chlorobenzene	15 nc	--	mg/kg			0.003 U					
	8260B	Chloroethane	3.0 ca	--	mg/kg			0.003 U					
	8260B	Chloroform	0.22 ca	--	mg/kg			0.003 U					
	8260B	Chloromethane	4.7 nc	--	mg/kg			0.003 U					
	8260B	cis-1,2-Dichloroethene	4.3 nc	--	mg/kg			0.003 U					
	8260B	cis-1,3-Dichloropropene	0.78 ca	--	mg/kg			0.003 U					
	8260B	Dibromochloromethane	1.1 ca	--	mg/kg			0.003 U					

Table PIR-5
Pistol Range Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRss-001M-SO	PIRss-002M-SO	PIRss-003D-SO	PIRss-003M-SO	PIRss-004M-SO	PIRss-005M-DUP	PIRss-005M-SO	PIRss-006M-SO
					Sample Date:	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
					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
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
	8260B	Ethylbenzene	395 sat	--	mg/kg			0.003 U					
	8260B	m&p-Xylenes	27 nc	--	mg/kg			0.006 U					
	8260B	Methylene chloride	9.1 ca	--	mg/kg			0.006 U					
	8260B	o-Xylene	27 nc	--	mg/kg			0.003 U					
	8260B	Styrene	1700 sat	--	mg/kg			0.003 U					
	8260B	Tetrachloroethene	0.48 ca	--	mg/kg			0.003 U					
	8260B	Toluene	520 sat	--	mg/kg			0.003 U					
	8260B	Total Xylenes	27 nc	--	mg/kg			0.006 U					
	8260B	trans-1,2-Dichloroethene	6.9 nc	--	mg/kg			0.003 U					
	8260B	trans-1,3-Dichloropropene	0.78 ca	--	mg/kg			0.003 U					
	8260B	Trichloroethene	0.053 ca	--	mg/kg			0.003 U					
	8260B	Vinyl chloride	0.079 ca	--	mg/kg			0.003 U					
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2 nc	--	mg/kg				0.09 U				
	8270C	1,2-Dichlorobenzene	600 sat	--	mg/kg				0.09 U				
	8270C	1,3-Dichlorobenzene	53 nc	--	mg/kg				0.09 U				
	8270C	1,4-Dichlorobenzene	3.4 ca	--	mg/kg				0.09 U				
	8270C	2,2-oxybis (1-chloropropane)	2.9 ca	--	mg/kg				0.09 U				
	8270C	2,4,5-Trichlorophenol	611 nc	--	mg/kg				0.18 U				
	8270C	2,4,6-Trichlorophenol	0.61 nc	--	mg/kg				0.09 U				
	8270C	2,4-Dichlorophenol	18 nc	--	mg/kg				0.18 U				
	8270C	2,4-Dimethylphenol	122 nc	--	mg/kg				0.18 U				
	8270C	2,4-Dinitrophenol	12 nc	--	mg/kg				- R				
	8270C	2,4-Dinitrotoluene	12 nc	--	mg/kg				0.018 U				
	8270C	2,6-Dinitrotoluene	6.1 nc	--	mg/kg				0.018 U				
	8270C	2-Chloronaphthalene	494 nc	--	mg/kg				0.09 U				
	8270C	2-Chlorophenol	6.3 nc	--	mg/kg				0.09 U				
	8270C	2-Methylnaphthalene	--	--	mg/kg				0.018 U				
	8270C	2-Methylphenol	306 nc	--	mg/kg				0.037 U				
	8270C	2-Nitroaniline	18.3 nc	--	mg/kg				0.09 U				
	8270C	2-Nitrophenol	--	--	mg/kg				0.18 U				
	8270C	3,3'-Dichlorobenzidine	1.1 ca	--	mg/kg				0.09 U				
	8270C	3-Nitroaniline	1.8 nc	--	mg/kg				0.37 U				
	8270C	4,6-Dinitro-2-methylphenol	0.61 nc	--	mg/kg				- R				
	8270C	4-Bromophenyl phenyl ether	--	--	mg/kg				0.09 U				
	8270C	4-Chloro-3-methylphenol	--	--	mg/kg				0.18 U				
	8270C	4-Chloroaniline	24 nc	--	mg/kg				0.37 U				
	8270C	4-Chlorophenyl phenyl ether	--	--	mg/kg				0.09 U				
	8270C	4-Methylphenol	31 nc	--	mg/kg				0.037 U				
	8270C	4-Nitroaniline	23 ca	--	mg/kg				0.37 U				

Table PIR-5
Pistol Range Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRss-001M-SO	PIRss-002M-SO	PIRss-003D-SO	PIRss-003M-SO	PIRss-004M-SO	PIRss-005M-DUP	PIRss-005M-SO	PIRss-006M-SO
					Sample Date:	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
					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
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
	8270C	4-Nitrophenol	--	--	mg/kg				0.37 U				
	8270C	Acenaphthene	368 nc	--	mg/kg				0.018 U				
	8270C	Acenaphthylene	--	--	mg/kg				0.018 U				
	8270C	Anthracene	2189 nc	--	mg/kg				0.018 U				
	8270C	Benzo(a)anthracene	0.62 ca	--	mg/kg				0.019 J				
	8270C	Benzo(a)pyrene	0.062 ca	--	mg/kg				0.018 U				
	8270C	Benzo(b)fluoranthene	0.62 ca	--	mg/kg				0.029 J				
	8270C	Benzo(g,h,i)perylene	--	--	mg/kg				0.018 U				
	8270C	Benzo(k)fluoranthene	6.2 ca	--	mg/kg				0.011 J				
	8270C	Benzoic acid	100000 max	--	mg/kg				- R				
	8270C	Benzyl alcohol	1833 nc	--	mg/kg				0.37 U				
	8270C	Bis(2-chloroethoxy)methane	--	--	mg/kg				0.037 U				
	8270C	Bis(2-chloroethyl) ether	0.22 ca	--	mg/kg				0.037 U				
	8270C	Bis(2-ethylhexyl) phthalate	35 ca	--	mg/kg				0.09 U				
	8270C	Butylbenzyl phthalate	1222 nc	--	mg/kg				0.037 U				
	8270C	Carbazole	24 ca	--	mg/kg				0.09 U				
	8270C	Chrysene	62 ca	--	mg/kg				0.018 J				
	8270C	Dibenzo(a,h)anthracene	0.062 ca	--	mg/kg				0.018 U				
	8270C	Dibenzofuran	15 nc	--	mg/kg				0.037 U				
	8270C	Diethyl phthalate	4888 nc	--	mg/kg				0.037 U				
	8270C	Dimethyl phthalate	100000 max	--	mg/kg				0.037 U				
	8270C	Di-n-butyl phthalate	611 nc	--	mg/kg				0.09 U				
	8270C	Di-n-octyl phthalate	244 nc	--	mg/kg				0.18 U				
	8270C	Fluoranthene	229 nc	--	mg/kg				0.032 J				
	8270C	Fluorene	275 nc	--	mg/kg				0.018 U				
	8270C	Hexachlorobenzene	0.30 ca	--	mg/kg				0.018 U				
	8270C	Hexachlorobutadiene	6.2 ca	--	mg/kg				0.09 U				
	8270C	Hexachlorocyclopentadiene	37 nc	--	mg/kg				0.55 U				
	8270C	Hexachloroethane	35 ca	--	mg/kg				0.09 U				
	8270C	Indeno(1,2,3-cd)pyrene	0.62 ca	--	mg/kg				0.018 U				
	8270C	Isophorone	512 ca	--	mg/kg				0.09 U				
	8270C	Naphthalene	5.6 nc	--	mg/kg				0.018 U				
	8270C	Nitrobenzene	2 nc	--	mg/kg				0.018 U				
	8270C	n-Nitroso-di-n-propylamine	0.069 ca	--	mg/kg				0.037 U				
	8270C	n-Nitrosodiphenylamine	99 ca	--	mg/kg				0.018 UJ				
	8270C	Pentachlorophenol	3.0 ca	--	mg/kg				0.18 U				
	8270C	Phenanthrene	--	--	mg/kg				0.0275 U				
	8270C	Phenol	1833 nc	--	mg/kg				0.09 U				
	8270C	Pyrene	232 nc	--	mg/kg				0.028 J				

Table PIR-5
Pistol Range Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRss-001M-SO	PIRss-002M-SO	PIRss-003D-SO	PIRss-003M-SO	PIRss-004M-SO	PIRss-005M-DUP	PIRss-005M-SO	PIRss-006M-SO
					Sample Date:	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004	11/16/2004
					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
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
Explosives	8330	1,3,5-Trinitrobenzene	183 nc	--	mg/kg	0.0495 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.0495 U
	8330	1,3-Dinitrobenzene	0.61 nc	--	mg/kg	0.0495 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.0495 U
	8330	2,4,6-TNT	16 ca	--	mg/kg	0.0495 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.0495 U
	8330	2,4-Dinitrotoluene	12 nc	--	mg/kg	0.0495 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.0495 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	0.1 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	0.1 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	0.1 U
	8330	3-Nitrotoluene	73 nc	--	mg/kg	0.1 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	0.15 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	0.1 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	0.1 U
	8330	Nitrobenzene	2 nc	--	mg/kg	0.0495 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.0495 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	0.1 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	0.2 U
Propellants	353.2 Modified	Nitrocellulose	--	--	mg/kg				1.1 U				
	8332	Nitroglycerine	35 ca	--	mg/kg				0.3 J				
	SW8330 Modified	Nitroguanidine	611 nc	--	mg/kg				0.125 U				

Notes:
-- - no background/PRG value ia 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 PIR-6
Pistol Range Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							PIRsd-001D-DUP	PIRsd-001D-SD	PIRsd-001M-DUP	PIRsd-001M-SD	PIRsd-002M-SD
						Sample Date:	11/17/2004	11/17/2004	11/17/2004	11/17/2004	11/17/2004
						Sample Depth:	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Sediment Background Criteria	Units					
Metals	6010B	Aluminum	7614	nc	13900	mg/kg			4100	4500	2300
	6010B	Arsenic	0.39	ca	19.5	mg/kg			**12**	**9.9**	**9.3**
	6010B	Barium	538	nc	123	mg/kg			50	56	26
	6010B	Beryllium	15	nc	0.38	mg/kg			0.43	0.48	0.3
	6010B	Cadmium	3.7	nc	0.00	mg/kg			0.086	0.073	0.155 U
	6010B	Calcium	--[n]		5510	mg/kg			1400	4000	1500 J
	6010B	Chromium	30	ca	18.1	mg/kg			7.1	7	5.7
	6010B	Cobalt	30	ca	9.1	mg/kg			4.7	4.9	3.6
	6010B	Copper	313	nc	27.6	mg/kg			8.8	7.8	9 J
	6010B	Iron	2346	nc	28200	mg/kg			**15000**	**13000**	**13000**
	6010B	Lead	400	pbk	27.4	mg/kg			12	11	6.8 J
	6010B	Magnesium	--[n]		2760	mg/kg			1200	1900	950
	6010B	Manganese	176	nc	1950	mg/kg			**550**	**590**	**480 J**
	6010B	Nickel	156	nc	17.7	mg/kg			11	10	7.2
	6010B	Potassium	--[n]		1950	mg/kg			440	450	290
	6010B	Selenium	39	nc	1.7	mg/kg			1.15 U	1.2 U	0.95 U
	6010B	Silver	39	nc	0.00	mg/kg			0.75 U	0.8 U	0.6 U
	6010B	Sodium	--[n]		112	mg/kg			200	200	140
	6010B	Vanadium	7.8	nc	26.1	mg/kg			**9.9**	**8.9**	6
	6010B	Zinc	2346	nc	532	mg/kg			45	40	39 J
	7041	Antimony	3.1	nc	0.00	mg/kg			1.2 U	1 U	0.9 UJ
	7471A	Mercury	2.3	nc	0.06	mg/kg			0.017	0.024	0.016 J
	7841	Thallium	0.52	nc	0.89	mg/kg			0.5 U	0.435 U	0.385 U
Pesticides	8081A	4,4'-DDD	2.4	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	4,4'-DDE	1.7	ca	--	mg/kg			0.0017 U	0.0017 U	
	8081A	4,4'-DDT	1.7	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Aldrin	0.029	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	alpha-BHC	0.09	sat	--	mg/kg			0.00145 U	0.00145 U	
	8081A	alpha-Chlordane	1.6	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	beta-BHC	0.32	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	delta-BHC	--		--	mg/kg			0.00145 U	0.00145 U	
	8081A	Dieldrin	0.030	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Endosulfan I	37	nc	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Endosulfan II	37	nc	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Endosulfan sulfate	37	nc	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Endrin	1.8	nc	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Endrin aldehyde	--		--	mg/kg			0.00145 U	0.00145 U	
	8081A	Endrin ketone	--		--	mg/kg			0.00145 U	0.00145 U	
	8081A	gamma-BHC	0.44	ca	--	mg/kg			0.00145 U	0.00145 U	

Table PIR-6
Pistol Range Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						Sample Date:	11/17/2004	11/17/2004	11/17/2004	11/17/2004	11/17/2004
						Sample Depth:	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Sediment Background Criteria	Units	PIRsd-001D-DUP	PIRsd-001D-SD	PIRsd-001M-DUP	PIRsd-001M-SD	PIRsd-002M-SD
	8081A	gamma-Chlordane	1.6	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Heptachlor	0.11	ca	--	mg/kg			0.00145 UJ	0.00145 UJ	
	8081A	Heptachlor epoxide	0.053	ca	--	mg/kg			0.00145 U	0.00145 U	
	8081A	Methoxychlor	31	nc	--	mg/kg			0.007 U	0.007 U	
	8081A	Toxaphene	0.44	ca	--	mg/kg			0.0145 U	0.0145 U	
PCBs	8082	Aroclor 1016	0.39	nc	--	mg/kg			0.0285 U	0.028 U	
	8082	Aroclor 1221	0.22	ca	--	mg/kg			0.0285 U	0.028 U	
	8082	Aroclor 1232	0.22	ca	--	mg/kg			0.0145 U	0.0145 U	
	8082	Aroclor 1242	0.22	ca	--	mg/kg			0.0285 U	0.028 U	
	8082	Aroclor 1248	0.22	ca	--	mg/kg			0.0145 U	0.0145 U	
	8082	Aroclor 1254	0.22	ca	--	mg/kg			0.0285 U	0.028 U	
	8082	Aroclor 1260	0.22	ca	--	mg/kg			0.0285 U	0.028 U	
VOCs	8260B	1,1,1-Trichloroethane	1200	sat	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,1,2,2-Tetrachloroethane	0.41	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,1,2-Trichloroethane	0.73	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,1-Dichloroethane	51	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,1-Dichloroethene	12	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,2-Dibromoethane	0.032	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,2-Dichloroethane	0.28	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	1,2-Dichloroethene (total)	6.9	nc	--	mg/kg	0.006 U	0.006 U			
	8260B	1,2-Dichloropropane	0.34	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	2-Butanone	2231	nc	--	mg/kg	0.009 U	0.009 U			
	8260B	2-Hexanone	530	nc	--	mg/kg	0.006 U	0.006 U			
	8260B	4-Methyl-2-pentanone	528	nc	--	mg/kg	0.006 U	0.006 U			
	8260B	Acetone	1412	nc	--	mg/kg	0.009 U	0.009 U			
	8260B	Benzene	0.64	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Bromochloromethane	--		--	mg/kg	0.0031 U	0.00305 U			
	8260B	Bromodichloromethane	0.82	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Bromoform	62	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Bromomethane	0.39	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Carbon disulfide	36	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Carbon tetrachloride	0.25	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Chlorobenzene	15	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Chloroethane	3.0	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Chloroform	0.22	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Chloromethane	4.7	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	cis-1,2-Dichloroethene	4.3	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	cis-1,3-Dichloropropene	0.78	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Dibromochloromethane	1.1	ca	--	mg/kg	0.0031 U	0.00305 U			

Table PIR-6
Pistol Range Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							PIRsd-001D-DUP	PIRsd-001D-SD	PIRsd-001M-DUP	PIRsd-001M-SD	PIRsd-002M-SD
						Sample Date:	11/17/2004	11/17/2004	11/17/2004	11/17/2004	11/17/2004
						Sample Depth:	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Sediment Background Criteria	Units					
	8260B	Ethylbenzene	395	sat	--	mg/kg	0.0031 U	0.00305 U			
	8260B	m&p-Xylenes	27	nc	--	mg/kg	0.006 U	0.006 U			
	8260B	Methylene chloride	9.1	ca	--	mg/kg	0.006 U	0.006 U			
	8260B	o-Xylene	27	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Styrene	1700	sat	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Tetrachloroethene	0.48	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Toluene	520	sat	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Total Xylenes	27	nc	--	mg/kg	0.006 U	0.006 U			
	8260B	trans-1,2-Dichloroethene	6.9	nc	--	mg/kg	0.0031 U	0.00305 U			
	8260B	trans-1,3-Dichloropropene	0.78	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Trichloroethene	0.053	ca	--	mg/kg	0.0031 U	0.00305 U			
	8260B	Vinyl chloride	0.079	ca	--	mg/kg	0.0031 U	0.00305 U			
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2	nc	--	mg/kg			0.145 U	0.145 U	
	8270C	1,2-Dichlorobenzene	600	sat	--	mg/kg			0.145 U	0.145 U	
	8270C	1,3-Dichlorobenzene	53	nc	--	mg/kg			0.145 U	0.145 U	
	8270C	1,4-Dichlorobenzene	3.4	ca	--	mg/kg			0.145 U	0.145 U	
	8270C	2,2-oxybis (1-chloropropane)	2.9	ca	--	mg/kg			0.145 U	0.145 U	
	8270C	2,4,5-Trichlorophenol	611	nc	--	mg/kg			0.285 U	0.285 U	
	8270C	2,4,6-Trichlorophenol	0.61	nc	--	mg/kg			0.145 U	0.145 U	
	8270C	2,4-Dichlorophenol	18	nc	--	mg/kg			0.285 U	0.285 U	
	8270C	2,4-Dimethylphenol	122	nc	--	mg/kg			0.285 U	0.285 U	
	8270C	2,4-Dinitrophenol	12	nc	--	mg/kg			- R	- R	
	8270C	2,4-Dinitrotoluene	12	nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	2,6-Dinitrotoluene	6.1	nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	2-Chloronaphthalene	494	nc	--	mg/kg			0.145 U	0.145 U	
	8270C	2-Chlorophenol	6.3	nc	--	mg/kg			0.145 U	0.145 U	
	8270C	2-Methylnaphthalene	--		--	mg/kg			0.0285 U	0.0285 U	
	8270C	2-Methylphenol	306	nc	--	mg/kg			0.06 U	0.06 U	
	8270C	2-Nitroaniline	18.3	nc	--	mg/kg			0.145 U	0.145 U	
	8270C	2-Nitrophenol	--		--	mg/kg			0.285 U	0.285 U	
	8270C	3,3'-Dichlorobenzidine	1.1	ca	--	mg/kg			0.145 U	0.145 U	
	8270C	3-Nitroaniline	1.8	nc	--	mg/kg			0.6 U	0.6 U	
	8270C	4,6-Dinitro-2-methylphenol	0.61	nc	--	mg/kg			- R	- R	
	8270C	4-Bromophenyl phenyl ether	--		--	mg/kg			0.145 U	0.145 U	
	8270C	4-Chloro-3-methylphenol	--		--	mg/kg			0.285 U	0.285 U	
	8270C	4-Chloroaniline	24	nc	--	mg/kg			0.6 U	0.6 U	
	8270C	4-Chlorophenyl phenyl ether	--		--	mg/kg			0.145 U	0.145 U	
	8270C	4-Methylphenol	31	nc	--	mg/kg			0.06 U	0.06 U	
	8270C	4-Nitroaniline	23	ca	--	mg/kg			0.6 U	0.6 U	

Table PIR-6
Pistol Range Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRsd-001D-DUP	PIRsd-001D-SD	PIRsd-001M-DUP	PIRsd-001M-SD	PIRsd-002M-SD
					Sample Date:	11/17/2004	11/17/2004	11/17/2004	11/17/2004	11/17/2004
					Sample Depth:	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Sediment Background Criteria	Units					
	8270C	4-Nitrophenol	--	--	mg/kg			0.6 U	0.6 U	
	8270C	Acenaphthene	368 nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Acenaphthylene	--	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Anthracene	2189 nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Benzo(a)anthracene	0.62 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Benzo(a)pyrene	0.062 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Benzo(b)fluoranthene	0.62 ca	--	mg/kg			0.017 J	0.023 J	
	8270C	Benzo(g,h,i)perylene	--	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Benzo(k)fluoranthene	6.2 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Benzoic acid	100000 max	--	mg/kg			- R	- R	
	8270C	Benzyl alcohol	1833 nc	--	mg/kg			0.6 U	0.6 U	
	8270C	Bis(2-chloroethoxy)methane	--	--	mg/kg			0.06 U	0.06 U	
	8270C	Bis(2-chloroethyl) ether	0.22 ca	--	mg/kg			0.06 U	0.06 U	
	8270C	Bis(2-ethylhexyl) phthalate	35 ca	--	mg/kg			0.145 U	0.145 U	
	8270C	Butylbenzyl phthalate	1222 nc	--	mg/kg			0.06 U	0.06 U	
	8270C	Carbazole	24 ca	--	mg/kg			0.145 U	0.145 U	
	8270C	Chrysene	62 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Dibenzo(a,h)anthracene	0.062 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Dibenzofuran	15 nc	--	mg/kg			0.06 U	0.06 U	
	8270C	Diethyl phthalate	4888 nc	--	mg/kg			0.06 U	0.06 U	
	8270C	Dimethyl phthalate	100000 max	--	mg/kg			0.06 U	0.06 U	
	8270C	Di-n-butyl phthalate	611 nc	--	mg/kg			0.145 U	0.145 U	
	8270C	Di-n-octyl phthalate	244 nc	--	mg/kg			0.285 U	0.285 U	
	8270C	Fluoranthene	229 nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Fluorene	275 nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Hexachlorobenzene	0.30 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Hexachlorobutadiene	6.2 ca	--	mg/kg			0.145 U	0.145 U	
	8270C	Hexachlorocyclopentadiene	37 nc	--	mg/kg			0.85 UJ	0.85 U	
	8270C	Hexachloroethane	35 ca	--	mg/kg			0.145 U	0.145 U	
	8270C	Indeno(1,2,3-cd)pyrene	0.62 ca	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Isophorone	512 ca	--	mg/kg			0.145 U	0.145 U	
	8270C	Naphthalene	5.6 nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	Nitrobenzene	2 nc	--	mg/kg			0.0285 U	0.0285 U	
	8270C	n-Nitroso-di-n-propylamine	0.069 ca	--	mg/kg			0.06 U	0.06 U	
	8270C	n-Nitrosodiphenylamine	99 ca	--	mg/kg			0.0285 UJ	0.0285 UJ	
	8270C	Pentachlorophenol	3.0 ca	--	mg/kg			0.285 U	0.285 U	
	8270C	Phenanthrene	--	--	mg/kg			0.0435 U	0.0435 U	
	8270C	Phenol	1833 nc	--	mg/kg			0.145 U	0.145 U	
	8270C	Pyrene	232 nc	--	mg/kg			0.0435 U	0.0435 U	

Table PIR-6
Pistol Range Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							PIRsd-001D-DUP	PIRsd-001D-SD	PIRsd-001M-DUP	PIRsd-001M-SD	PIRsd-002M-SD
						Sample Date:	11/17/2004	11/17/2004	11/17/2004	11/17/2004	11/17/2004
						Sample Depth:	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Sediment Background Criteria	Units					
Explosives	8330	1,3,5-Trinitrobenzene	183	nc	--	mg/kg			0.0495 U	0.05 U	0.05 U
	8330	1,3-Dinitrobenzene	0.61	nc	--	mg/kg			0.0495 U	0.05 U	0.05 U
	8330	2,4,6-TNT	16	ca	--	mg/kg			0.0495 U	0.05 U	0.05 U
	8330	2,4-Dinitrotoluene	12	nc	--	mg/kg			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
	8330	2-Amino-4,6-Dinitrotoluene	--		--	mg/kg			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
	8330	3-Nitrotoluene	73	nc	--	mg/kg			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
	8330	4-Nitrotoluene	12	ca	--	mg/kg			0.1 U	0.1 U	0.1 U
	8330	HMX	306	nc	--	mg/kg			0.1 U	0.1 U	0.1 U
	8330	Nitrobenzene	2	nc	--	mg/kg			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
	8330	Tetryl	61	nc	--	mg/kg			0.2 U	0.2 U	0.2 U
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg			0.65 U	0.47 U	
	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	

Notes:
-- - no background/PRG value ia 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 PIR-7
Pistol Range Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							PIRsw-001-SW
						Sample Date:	11/17/2004
						Sample Depth:	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)		Surface Water Background Criteria	Units	
Metals	6010B	Aluminum	36499	nc	3370	ug/l	58
	6010B	Barium	2555	nc	47.5	ug/l	30
	6010B	Beryllium	73	nc	0.00	ug/l	1 U
	6010B	Cadmium	18	nc	0.00	ug/l	1 U
	6010B	Calcium	--[n]		41400	ug/l	35000
	6010B	Chromium	109	nc	0.00	ug/l	5 U
	6010B	Cobalt	730	nc	0.00	ug/l	2.5 U
	6010B	Copper	1460	nc	7.9	ug/l	5 U
	6010B	Iron	10950	nc	2560	ug/l	1500
	6010B	Magnesium	--[n]		10800	ug/l	9000
	6010B	Manganese	876	nc	391	ug/l	190
	6010B	Nickel	730	nc	0.00	ug/l	5 U
	6010B	Potassium	--[n]		3170	ug/l	1400
	6010B	Selenium	182	nc	0.00	ug/l	7.5 U
	6010B	Silver	182	nc	0.00	ug/l	5 U
	6010B	Sodium	--[n]		21300	ug/l	4000
	6010B	Vanadium	36	nc	0.00	ug/l	5 U
	6010B	Zinc	10950	nc	42	ug/l	5.2
	7041	Antimony	15	nc	0.00	ug/l	3.75 U
	7060A	Arsenic	0.045	ca	3.2	ug/l	**0.69**
	7421	Lead	15	mcl	0.00	ug/l	1.5 U
	7470A	Mercury	11	nc	0.00	ug/l	0.1 U
	7841	Thallium	2.4	nc	0.00	ug/l	2 U
Pesticides	8081A	4,4'-DDD	0.28	ca	--	ug/l	0.055 U
	8081A	4,4'-DDE	0.20	ca	--	ug/l	0.049 U
	8081A	4,4'-DDT	0.20	ca	--	ug/l	0.075 U
	8081A	Aldrin	0.0040	ca	--	ug/l	0.049 U
	8081A	alpha-BHC	0.011	nc	--	ug/l	0.075 U
	8081A	alpha-Chlordane	0.19	ca	--	ug/l	0.0245 U
	8081A	beta-BHC	0.037	ca	--	ug/l	0.049 U
	8081A	delta-BHC	--		--	ug/l	0.049 U
	8081A	Dieldrin	0.0042	ca	--	ug/l	0.049 U
	8081A	Endosulfan I	220	nc	--	ug/l	0.049 U
	8081A	Endosulfan II	220	nc	--	ug/l	0.075 U
	8081A	Endosulfan sulfate	220	nc	--	ug/l	0.075 U
	8081A	Endrin	11	nc	--	ug/l	0.049 U
	8081A	Endrin aldehyde	--		--	ug/l	0.075 U
	8081A	Endrin ketone	--		--	ug/l	0.049 U
	8081A	gamma-BHC	0.052	ca	--	ug/l	0.075 U
	8081A	gamma-Chlordane	0.19	ca	--	ug/l	0.049 U
	8081A	Heptachlor	0.015	ca	--	ug/l	0.075 U
	8081A	Heptachlor epoxide	0.0074	ca	--	ug/l	0.075 U
	8081A	Methoxychlor	182	nc	--	ug/l	0.295 U

Table PIR-7
Pistol Range Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRsw-001-SW
					Sample Date:	11/17/2004
					Sample Depth:	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units	
	8081A	Toxaphene	0.061 ca	--	ug/l	0.245 U
PCBs	8082	Aroclor 1016	0.96 ca	--	ug/l	0.295 U
	8082	Aroclor 1221	0.034 ca	--	ug/l	0.65 U
	8082	Aroclor 1232	0.034 ca	--	ug/l	0.65 U
	8082	Aroclor 1242	0.034 ca	--	ug/l	0.65 U
	8082	Aroclor 1248	0.034 ca	--	ug/l	0.75 U
	8082	Aroclor 1254	0.034 ca	--	ug/l	0.65 U
	8082	Aroclor 1260	0.034 ca	--	ug/l	0.295 U
VOCs	8260B	1,1,1-Trichloroethane	3172 nc	--	ug/l	0.5 U
	8260B	1,1,2,2-Tetrachloroethane	0.055 ca	--	ug/l	0.5 U
	8260B	1,1,2-Trichloroethane	0.20 ca	--	ug/l	0.5 U
	8260B	1,1-Dichloroethane	811 nc	--	ug/l	0.5 U
	8260B	1,1-Dichloroethene	339 nc	--	ug/l	0.5 U
	8260B	1,2-Dibromoethane	0.0056 ca	--	ug/l	0.5 U
	8260B	1,2-Dichloroethane	0.12 ca	--	ug/l	0.5 U
	8260B	1,2-Dichloroethene (total)	120 nc	--	ug/l	0.5 U
	8260B	1,2-Dichloropropane	0.16 ca	--	ug/l	0.5 U
	8260B	2-Butanone	6968 nc	--	ug/l	5 U
	8260B	2-Hexanone	2000 nc	--	ug/l	5 U
	8260B	4-Methyl-2-pentanone	1993 nc	--	ug/l	5 U
	8260B	Acetone	5475 nc	--	ug/l	5 U
	8260B	Benzene	0.35 ca	--	ug/l	0.5 U
	8260B	Bromochloromethane	--	--	ug/l	0.5 U
	8260B	Bromodichloromethane	0.18 ca	--	ug/l	0.5 U
	8260B	Bromoform	8.5 ca	--	ug/l	0.5 U
	8260B	Bromomethane	8.7 nc	--	ug/l	0.5 U
	8260B	Carbon disulfide	1043 nc	--	ug/l	2.5 U
	8260B	Carbon tetrachloride	0.17 ca	--	ug/l	0.5 U
	8260B	Chlorobenzene	106 nc	--	ug/l	0.5 U
	8260B	Chloroethane	4.6 ca	--	ug/l	0.5 U
	8260B	Chloroform	0.17 ca	--	ug/l	0.5 U
	8260B	Chloromethane	158 nc	--	ug/l	0.5 U
	8260B	cis-1,2-Dichloroethene	61 nc	--	ug/l	0.5 U
	8260B	cis-1,3-Dichloropropene	0.40 ca	--	ug/l	0.5 U
	8260B	Dibromochloromethane	0.13 ca	--	ug/l	0.5 U
	8260B	Ethylbenzene	1340 nc	--	ug/l	0.5 U
	8260B	m&p-Xylenes	206 nc	--	ug/l	1 U
	8260B	Methylene chloride	4.3 ca	--	ug/l	0.75 U
	8260B	o-Xylene	206 nc	--	ug/l	0.5 U
	8260B	Styrene	1641 nc	--	ug/l	0.5 U
	8260B	Tetrachloroethene	0.10 ca	--	ug/l	0.5 U
	8260B	Toluene	723 nc	--	ug/l	0.5 U
	8260B	Total Xylenes	206 nc	--	ug/l	0.5 U

Table PIR-7
Pistol Range Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRsw-001-SW
					Sample Date:	11/17/2004
					Sample Depth:	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units	
	8260B	trans-1,2-Dichloroethene	122 nc	--	ug/l	0.5 U
	8260B	trans-1,3-Dichloropropene	0.40 ca	--	ug/l	0.5 U
	8260B	Trichloroethene	0.028 ca	--	ug/l	0.5 U
	8260B	Vinyl chloride	0.020 ca	--	ug/l	0.5 U
SVOCs	8270C	1,2,4-Trichlorobenzene	7.2 nc	--	ug/l	0.95 U
	8270C	1,2-Dichlorobenzene	370 nc	--	ug/l	0.95 U
	8270C	1,3-Dichlorobenzene	182 nc	--	ug/l	0.95 U
	8270C	1,4-Dichlorobenzene	0.50 ca	--	ug/l	0.95 U
	8270C	2,2-oxybis (1-chloropropane)	0.27 ca	--	ug/l	0.95 U
	8270C	2,4,5-Trichlorophenol	3650 nc	--	ug/l	4.8 U
	8270C	2,4,6-Trichlorophenol	3.6 nc	--	ug/l	2.4 U
	8270C	2,4-Dichlorophenol	109 nc	--	ug/l	4.8 U
	8270C	2,4-Dimethylphenol	730 nc	--	ug/l	4.8 U
	8270C	2,4-Dinitrophenol	73 nc	--	ug/l	9.5 U
	8270C	2,4-Dinitrotoluene	73 nc	--	ug/l	0.48 U
	8270C	2,6-Dinitrotoluene	36 nc	--	ug/l	0.24 U
	8270C	2-Chloronaphthalene	487 nc	--	ug/l	0.95 U
	8270C	2-Chlorophenol	30 nc	--	ug/l	2.4 U
	8270C	2-Methylnaphthalene	--	--	ug/l	0.24 U
	8270C	2-Methylphenol	1825 nc	--	ug/l	0.95 U
	8270C	2-Nitroaniline	109 nc	--	ug/l	2.4 U
	8270C	2-Nitrophenol	--	--	ug/l	4.8 U
	8270C	3,3'-Dichlorobenzidine	0.15 ca	--	ug/l	2.4 U
	8270C	3-Nitroaniline	3.2 ca	--	ug/l	4.8 U
	8270C	4,6-Dinitro-2-methylphenol	3.6 nc	--	ug/l	9.5 UJ
	8270C	4-Bromophenyl phenyl ether	--	--	ug/l	2.4 U
	8270C	4-Chloro-3-methylphenol	--	--	ug/l	4.8 U
	8270C	4-Chloroaniline	146 nc	--	ug/l	4.8 U
	8270C	4-Chlorophenyl phenyl ether	--	--	ug/l	2.4 U
	8270C	4-Methylphenol	182 nc	--	ug/l	0.95 U
	8270C	4-Nitroaniline	3.2 ca	--	ug/l	4.8 U
	8270C	4-Nitrophenol	--	--	ug/l	9.5 U
	8270C	Acenaphthene	365 nc	--	ug/l	0.48 U
	8270C	Acenaphthylene	--	--	ug/l	0.48 U
	8270C	Anthracene	1825 nc	--	ug/l	0.48 U
	8270C	Benzo(a)anthracene	0.092 ca	--	ug/l	0.095 U
	8270C	Benzo(a)pyrene	0.0092 ca	--	ug/l	0.19 U
	8270C	Benzo(b)fluoranthene	0.092 ca	--	ug/l	0.19 U
	8270C	Benzo(g,h,i)perylene	--	--	ug/l	0.48 U
	8270C	Benzo(k)fluoranthene	0.92 ca	--	ug/l	0.19 U
	8270C	Benzoic acid	145979 nc	--	ug/l	9.5 U
	8270C	Benzyl alcohol	10950 nc	--	ug/l	9.5 U
	8270C	Bis(2-chloroethoxy)methane	--	--	ug/l	0.95 U
	8270C	Bis(2-chloroethyl) ether	0.010 ca	--	ug/l	0.95 UJ

Table PIR-7
Pistol Range Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRsw-001-SW
					Sample Date:	11/17/2004
					Sample Depth:	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units	
	8270C	Bis(2-ethylhexyl) phthalate	4.8 ca	--	ug/l	7 UJ
	8270C	Butylbenzyl phthalate	7300 nc	--	ug/l	0.95 U
	8270C	Carbazole	3.4 ca	--	ug/l	2.4 U
	8270C	Chrysene	9.2 ca	--	ug/l	0.24 U
	8270C	Dibenzo(a,h)anthracene	0.0092 ca	--	ug/l	0.19 U
	8270C	Dibenzofuran	12 nc	--	ug/l	0.95 U
	8270C	Diethyl phthalate	29199 nc	--	ug/l	0.95 U
	8270C	Dimethyl phthalate	364867 nc	--	ug/l	0.95 U
	8270C	Di-n-butyl phthalate	3650 nc	--	ug/l	2.4 U
	8270C	Di-n-octyl phthalate	1460 nc	--	ug/l	4.8 U
	8270C	Fluoranthene	1460 nc	--	ug/l	0.48 U
	8270C	Fluorene	243 nc	--	ug/l	0.48 U
	8270C	Hexachlorobenzene	0.042 ca	--	ug/l	0.24 U
	8270C	Hexachlorobutadiene	0.86 ca	--	ug/l	2.4 U
	8270C	Hexachlorocyclopentadiene	219 nc	--	ug/l	- R
	8270C	Hexachloroethane	4.8 ca	--	ug/l	2.4 U
	8270C	Indeno(1,2,3-cd)pyrene	0.092 ca	--	ug/l	0.19 U
	8270C	Isophorone	71 ca	--	ug/l	0.95 U
	8270C	Naphthalene	6.2 nc	--	ug/l	0.48 U
	8270C	Nitrobenzene	3.4 nc	--	ug/l	0.48 U
	8270C	n-Nitroso-di-n-propylamine	0.0096 ca	--	ug/l	0.24 U
	8270C	n-Nitrosodiphenylamine	14 ca	--	ug/l	0.48 U
	8270C	Pentachlorophenol	0.56 ca	--	ug/l	4.8 U
	8270C	Phenanthrene	--	--	ug/l	0.48 U
	8270C	Phenol	10950 nc	--	ug/l	2.4 U
	8270C	Pyrene	182 nc	--	ug/l	0.48 U
Explosives	8330	1,3,5-Trinitrobenzene	1095 nc	--	ug/l	0.1 U
	8330	1,3-Dinitrobenzene	3.6 nc	--	ug/l	0.1 U
	8330	2,4,6-TNT	2.2 ca	--	ug/l	0.125 U
	8330	2,4-Dinitrotoluene	73 nc	--	ug/l	0.18 U
	8330	2,6-Dinitrotoluene	36 nc	--	ug/l	0.215 U
	8330	2-Amino-4,6-Dinitrotoluene	--	--	ug/l	0.18 U
	8330	2-Nitrotoluene	0.049 ca	--	ug/l	0.155 U
	8330	3-Nitrotoluene	122 nc	--	ug/l	0.155 U
	8330	4-Amino-2,6-Dinitrotoluene	--	--	ug/l	0.165 U
	8330	4-Nitrotoluene	0.66 ca	--	ug/l	0.155 U
	8330	HMX	1825 nc	--	ug/l	0.155 U
	8330	Nitrobenzene	3.4 nc	--	ug/l	0.08 U
	8330	RDX	0.61 ca	--	ug/l	0.1 U
	8330	Tetryl	365 nc	--	ug/l	0.39 U
Propellants	353.2 Modified	Nitrocellulose	--	--	ug/l	250 U
	8332	Nitroglycerine	4.8 ca	--	ug/l	0.5 U
	SW8330 Modified	Nitroguanidine	3650 nc	--	ug/l	10 U

Table PIR-7
Pistol Range Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						PIRsw-001-SW
					Sample Date:	11/17/2004
					Sample Depth:	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units	

Notes:
-- - no background/PRG value ia available for this analyte
blank cell indicates that the analysis was not performed
ug/l - means micrograms per Liter (parts per billion - ppb)
PRG - preliminary remediation goals
nc - non-cancer basis
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 PIR-10
Pistol Range Human Health Risk Screening Tables for Surface Water
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	Region 9 PRG (Tap Water)		Surface Water Background	Maximum Detected	Frequency of Detection	COPC
Aluminum	36499	nc	3370	58	1 / 1	No
Barium	2555	nc	47.5	30	1 / 1	No
Calcium	--[n]		41400	35000	1 / 1	No
Iron	10950	nc	2560	1500	1 / 1	No
Magnesium	--[n]		10800	9000	1 / 1	No
Manganese	876	nc	391	190	1 / 1	No
Potassium	--[n]		3170	1400	1 / 1	No
Sodium	--[n]		21300	4000	1 / 1	No
Zinc	10950	nc	42	5.2	1 / 1	No
Arsenic	0.045	ca	3.2	0.69	1 / 1	No

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
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 ug/L

Table PIR-9
Pistol Range Human Health Risk Screening Tables for Sediment
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	Region 9 PRG (Res Soil)		Sediment Background	Maximum Detected	Frequency of Detection	COPC
Aluminum	7614	nc	13900	4500	3 / 3	No
Arsenic	0.39	ca	19.5	12	3 / 3	No
Barium	538	nc	123	56	3 / 3	No
Beryllium	15	nc	0.38	0.48	3 / 3	No
Cadmium	3.7	nc	0.00	0.086	2 / 3	No
Calcium	--[n]		5510	4000	3 / 3	No
Chromium	30	ca	18.1	7.1	3 / 3	No
Cobalt	30	ca	9.1	4.9	3 / 3	No
Copper	313	nc	27.6	9	3 / 3	No
Iron	2346	nc	28200	15000	3 / 3	No
Lead	400	pbk	27.4	12	3 / 3	No
Magnesium	--[n]		2760	1900	3 / 3	No
Manganese	176	nc	1950	590	3 / 3	No
Nickel	156	nc	17.7	11	3 / 3	No
Potassium	--[n]		1950	450	3 / 3	No
Sodium	--[n]		112	200	3 / 3	No
Vanadium	7.8	nc	26.1	9.9	3 / 3	No
Zinc	2346	nc	532	45	3 / 3	No
Mercury	2.3	nc	0.06	0.024	3 / 3	No
Benzo(b)fluoranthene	0.62	ca	--	0.023	2 / 2	No

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
max - ceiling limit
sat - soil saturation
[n] - nutrient
*Concentration Units mg/kg

Table PIR-8
Pistol Range 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	9000	7 / 7	No
Arsenic	0.39	ca	15.4	16	7 / 7	Yes, > BKG & PRG
Barium	538	nc	88.4	87	7 / 7	No
Beryllium	15	nc	0.88	0.6	7 / 7	No
Cadmium	3.7	nc	0.00	0.12	1 / 7	No
Calcium	--[n]		15800	2800	7 / 7	No
Chromium	30	ca	17.4	28	7 / 7	No
Cobalt	30	ca	10.4	8.4	7 / 7	No
Copper	313	nc	17.7	150	7 / 7	No
Iron	2346	nc	23100	21000	7 / 7	No
Lead	400	pbk	26.1	1300	7 / 7	Yes, > BKG & PRG
Magnesium	--[n]		3030	1900	7 / 7	No
Manganese	176	nc	1450	750	7 / 7	No
Nickel	156	nc	21.1	21	7 / 7	No
Potassium	--[n]		927	770	7 / 7	No
Selenium	39	nc	1.4	0.96	7 / 7	No
Sodium	--[n]		123	300	7 / 7	No
Vanadium	7.8	nc	31.1	16	7 / 7	No
Zinc	2346	nc	61.8	73	7 / 7	No
Antimony	3.1	nc	0.96	0.89	2 / 7	No
Mercury	2.3	nc	0.04	0.053	7 / 7	No
Benzo(a)anthracene	0.62	ca	--	0.019	1 / 1	No
Benzo(b)fluoranthene	0.62	ca	--	0.029	1 / 1	No
Benzo(k)fluoranthene	6.2	ca	--	0.011	1 / 1	No
Chrysene	62	ca	--	0.018	1 / 1	No
Fluoranthene	229	nc	--	0.032	1 / 1	No
Pyrene	232	nc	--	0.028	1 / 1	No
Nitroglycerine	35	ca	--	0.3	1 / 1	No

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
max - ceiling limit
sat - soil saturation
[n] - nutrient
*Concentration Units mg/kg

Table PIR-11
Pistol Range Ecological Risk Screening Tables for Surface 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	7 / 7	7857	9000	mg/kg	17700	No	600 ss2	Yes	No	No	BLBKG
	Arsenic	7 / 7	13	16	mg/kg	15.4	Yes	9.9 ss1	Yes	No	Yes	ASL
	Barium	7 / 7	57	87	mg/kg	88.4	No	283 ss1	No	No	No	BLBKG
	Beryllium	7 / 7	0.56	0.6	mg/kg	0.88	No	10 ss1	No	No	No	BLBKG
	Cadmium	1 / 7	0.13	0.12	mg/kg	0.00	Yes	4 ss1	No	No	No	BSL
	Calcium	7 / 7	1336	2800	mg/kg	15800	No	NUT	No	No	No	BLBKG
	Chromium	7 / 7	18	28	mg/kg	17.4	Yes	0.4 ss1	Yes	No	Yes	ASL
	Cobalt	7 / 7	7.3	8.4	mg/kg	10.4	No	20 ss1	No	No	No	BLBKG
	Copper	7 / 7	58	150	mg/kg	17.7	Yes	60 ss1	Yes	No	Yes	ASL
	Iron	7 / 7	18429	21000	mg/kg	23100	No	200 ss2	Yes	No	No	BLBKG
	Lead	7 / 7	386	1300	mg/kg	26.1	Yes	40.5 ss1	Yes	No	Yes	ASL
	Magnesium	7 / 7	1743	1900	mg/kg	3030	No	NUT	No	No	No	BLBKG
	Manganese	7 / 7	513	750	mg/kg	1450	No	100 ss2	Yes	No	No	BLBKG
	Nickel	7 / 7	17	21	mg/kg	21.1	No	30 ss1	No	No	No	BLBKG
	Potassium	7 / 7	646	770	mg/kg	927	No	NUT	No	No	No	BLBKG
	Selenium	7 / 7	0.69	0.96	mg/kg	1.4	No	0.21 ss1	Yes	No	No	BLBKG
	Sodium	7 / 7	274	300	mg/kg	123	Yes	NUT	No	No	No	BSL
	Vanadium	7 / 7	15	16	mg/kg	31.1	No	2 ss1	Yes	No	No	BLBKG
	Zinc	7 / 7	65	73	mg/kg	61.8	Yes	8.5 ss1	Yes	No	Yes	ASL
	Antimony	2 / 7	0.71	0.89	mg/kg	0.96	No	5 ss1	No	No	No	BLBKG
	Mercury	7 / 7	0.042	0.053	mg/kg	0.04	Yes	0.00051 ss1	Yes	Yes	Yes	ASL
SVOCs	Benzo(a)anthracene	1 / 1	0.019	0.019	mg/kg	--	NA	5.21 ss4	No	No	No	BSL
	Benzo(b)fluoranthene	1 / 1	0.029	0.029	mg/kg	--	NA	59.8 ss4	No	No	No	BSL
	Benzo(k)fluoranthene	1 / 1	0.011	0.011	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Chrysene	1 / 1	0.018	0.018	mg/kg	--	NA	4.73 ss4	No	No	No	BSL
	Fluoranthene	1 / 1	0.032	0.032	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Pyrene	1 / 1	0.028	0.028	mg/kg	--	NA	78.5 ss4	No	No	No	BSL
Propellants	Nitroglycerine	1 / 1	0.30	0.3	mg/kg	--	NA	--	NSL	No	Yes	NSL

Notes:
-- - no value available
mg/kg means milligrams per Kilogram (parts per million - ppm)
ss1 - Preliminary Remediation Goals (Efroymson et al , 1997a)
ss2 - Toxiclogolgical Benchmarks for Soil and Litter Invertebrates (Efrymonson et al 1997b)
ss3 - Toxiclogolgical Benchmarks for Terrestrial Plants (Efrymonson et al 1997c)
ss4- Ecological Data Quality Level (USEPA Region 5, 1999)
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 PIR-12
Pistol Range Ecological Risk Screening Tables for Sediment
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Frequency of Detection	Average Concentration	Maximum Detected Concentration	Units	Sediment Background Concentration	Maximum Concentration > Background	SRV	Maximum Concentration > SRV	Screening Value	Maximum Concentration > Screening value	PBT	COPC	COPC Rationale
Metals	Aluminum	3 / 3	3633	4500	mg/kg	13900	No	29000	No	--	NSL	No	No	BLBKG
	Arsenic	3 / 3	10	12	mg/kg	19.5	No	25	No	9.79 sd1	Yes	No	No	BLBKG
	Barium	3 / 3	44	56	mg/kg	123	No	190	No	--	NSL	No	No	BLBKG
	Beryllium	3 / 3	0.40	0.48	mg/kg	0.38	Yes	0.8	No	--	NSL	No	No	BLSRV
	Cadmium	2 / 3	0.10	0.086	mg/kg	0.00	Yes	0.79	No	0.99 sd1	No	No	No	BLSRV
	Calcium	3 / 3	2300	4000	mg/kg	5510	No	21000	No	NUT	No	No	No	BLBKG
	Chromium	3 / 3	6.6	7.1	mg/kg	18.1	No	29	No	43.4 sd1	No	No	No	BLBKG
	Cobalt	3 / 3	4.4	4.9	mg/kg	9.1	No	12	No	50 sd2	No	No	No	BLBKG
	Copper	3 / 3	8.5	9	mg/kg	27.6	No	32	No	31.6 sd1	No	No	No	BLBKG
	Iron	3 / 3	13667	15000	mg/kg	28200	No	41000	No	--	NSL	No	No	BLBKG
	Lead	3 / 3	9.9	12	mg/kg	27.4	No	47	No	35.8 sd1	No	No	No	BLBKG
	Magnesium	3 / 3	1350	1900	mg/kg	2760	No	7100	No	NUT	No	No	No	BLBKG
	Manganese	3 / 3	540	590	mg/kg	1950	No	1500	No	--	NSL	No	No	BLBKG
	Nickel	3 / 3	9.4	11	mg/kg	17.7	No	33	No	22.7 sd1	No	No	No	BLBKG
	Potassium	3 / 3	393	450	mg/kg	1950	No	6800	No	NUT	No	No	No	BLBKG
	Sodium	3 / 3	180	200	mg/kg	112	Yes	--	NA	NUT	No	No	No	BSL
	Vanadium	3 / 3	8.3	9.9	mg/kg	26.1	No	40	No	--	NSL	No	No	BLBKG
	Zinc	3 / 3	41	45	mg/kg	532	No	160	No	121 sd1	No	No	No	BLBKG
	Mercury	3 / 3	0.019	0.024	mg/kg	0.06	No	0.12	No	0.18 sd1	No	Yes	No	BLBKG
SVOCs	Benzo(b)fluoranthene	2 / 2	0.020	0.023	mg/kg	--	NA	--	NA	10.4 sd2	No	No	No	BSL
	Total PAHs (1)	2 / 2	0.48	0.023	mg/kg	--	NA	--	NA	1.610 sd1	No	No	No	BSL

Notes:
-- - no value available
mg/kg means milligrams per Kilogram (parts per million - ppm)
sd1 - Threshold Effects Concentration from McDonald et al , (2000)
sd2 - Ecological Data Quality Level (USEPA Region 5, 1999)
NUT - nutrient
NA - not applicable
BLBKG - below background concentration
PBT- persistent, bioaccumulative and toxic
NSL - no screening level
ASL- above screening level
BSL - below screening level
SRV-Sediment Reference Value
BLSRV-Below Sediment Reference Value

Table PIR-13
Pistol Range Ecological Risk Screening Tables for Surface Water
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Frequency of Detection	Average Concentration	Maximum Detected Concentration	Units	Surface Water Background Concentration	Maximum Concentration > Background	Screening Value	Maximum Concentration > Screening value	PBT	COPC	COPC Rationale
Metals	Aluminum	1 / 1	58	58	ug/l	3370	No	--	NSL	No	No	BLBKG
	Barium	1 / 1	30	30	ug/l	47.5	No	2000 sw1	No	No	No	BLBKG
	Calcium	1 / 1	35000	35000	ug/l	41400	No	NUT	No	No	No	BLBKG
	Iron	1 / 1	1500	1500	ug/l	2560	No	--	NSL	No	No	BLBKG
	Magnesium	1 / 1	9000	9000	ug/l	10800	No	NUT	No	No	No	BLBKG
	Manganese	1 / 1	190	190	ug/l	391	No	--	NSL	No	No	BLBKG
	Potassium	1 / 1	1400	1400	ug/l	3170	No	NUT	No	No	No	BLBKG
	Sodium	1 / 1	4000	4000	ug/l	21300	No	NUT	No	No	No	BLBKG
	Zinc	1 / 1	5.2	5.2	ug/l	42	No	144 sw1[H]	No	No	No	BLBKG
	Arsenic	1 / 1	0.69	0.69	ug/l	3.2	No	340 sw1	No	No	No	BLBKG

Notes:
-- - no value available
ug/l - means micrograms per Liter (parts per billion - ppb)
sw1 - Ohio Water Quality Criteria (Reg 3745-1-07)
sw1[H] - Ohio Water Quality Criteria (Reg 3745-1-07) based on a site specific hardness of 124 (mg/l)
NA - not applicable
ID - insufficient data to calculate screening value
NUT - nutrient
BLBKG - below background concentration
PBT - persistent, bioaccumulative and toxic
NSL - no screening level
ASL- above screening level

Table PIR-14
Pistol Range Ecological Risk Summary of Quantitative and Qualitative COPECs for Environmental Media
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Shallow Soil	Sediment	Surface Water
Metals	Beryllium			
	Chromium	X		
	Zinc	X		
	Mercury	X		
Propellants	Nitroglycerine	Q		

Notes
blank cell indicates that the analyte was not identified as a COPEC for the media
COPEC - chemical of potential ecological concern
X - quantitative COPEC
Q - qualitatative COPEC

NACA TEST AREA TABLE OF CONTENTS

NACA TEST AREA FIGURES

NACA TEST AREA TABLES

1.0 INTRODUCTION

This report documents the results of NACA Test Area (NTA) (AOC-38) 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 NTA to collect sufficient data for all applicable media to allow efficient planning and execution of future environmental actions.

The characterization effort for the NTA 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, sediment, surface and groundwater 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 NTA 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), soil boring and sampling, surface water, monitoring well installation and development, groundwater sampling, sample and monitoring well location survey, and aquifer testing. 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 the NTA AOC and previous investigations conducted at this AOC.

1.2.1 AOC Description and History

The NTA is an approximately 5 ha (12.4 acre) AOC located west of Greenleaf Road at the end of Demolition Road. The test area was originally designed by the National Advisory Committee for Aeronautics (NACA) to field test explosion-proof fuel tanks and fuel for aircraft during the 1960s. During testing, airplanes were equipped with the test tanks that were loaded with fuel and attached to catapult system. The planes were sent down the crash strip and intentionally crashed into an obstacle that

sheared off the left side landing gear. Figure 2-1 of Volume I shows the location of NTA within the RVAAP.

1.2.2 Previous Investigation

The following investigations have been conducted at the NTA:

1.2.2.1 USATHAMA's 1978 installation assessment

This document could not be found.

1.2.2.2 1996 USACHPPM Relative Risk Site Evaluation

This evaluation identified sediment and surface soil as a possible media of concern and identified a potential for contaminate migration. The evaluation also identified the potential for exposure because the site is not restricted. The final score for the RRSE at NACA was "Medium."

1.2.2.3 Preliminary Assessment for the Ravenna Army Ammunition Plant (USACE 1996)

This document could not be found at the time that the Preliminary was written.

1.2.2.4 Phase I Remedial Investigation for Demolition Area 1 at the Ravenna Army Ammunition Plant (SAIC 1999)

This document could not be found at the time that the Preliminary was written.

1.2.2.5 OD-1 OE/UXO Removal and Interim Removal Action (MKM 2001)

This document reports the process and findings of the interim removal action and OE/UXO screening and removal. A grid of soils established at the site was used to clear and excavate the area of OD-1. There is a notation of visible OE/OES observed outside the interim removal area.

1.2.3 Regulatory Authorities

Volume 1, Section 1.2.3 identifies the regulatory authorities that oversee remedial activities for this AOC.

1.2.4 Regulatory Status of NACA Test Area

The Phase I Remedial Investigation was completed by SAIC in 1999. .The groundwater data collected during this characterization effort will be used to provide data of sufficient quality such that the planned feasibility study and remedial action can be and accomplished. This AOC is inactive, but has not achieved response completed status.

2.0 ENVIRONMENTAL SETTING AT NACA

This section describes the physical characteristics of NTA and its adjacent environment 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 NTA is forested except for the clearing that defines the AOC and the wet land which is located several hundred feet to the north. An unnamed stream flows along the southern boundary of the AOC from LL8. Hinkley Creek flows along the southwest border of the AOC southeast. Hinkley Creek flows to the West Branch Reservoir southwest of Charlestown. This AOC is approximately 1000 feet west Greenleaf Road.

2.1 SURFACE FEATURES

The topography at NTA is characterized by gently undulating contours that show a range of elevation between 1072 ft amsl to 1091.5 ft amsl. Open Demolition Area # 1 (OD-1) is incorporated in the NTA AOC and is located south of the central portion of the catapult and crash strip. Bare areas of ground, fragments of metal, small arms primers and fuzes have been found outside the perimeter of the OD-1 berm in a previous survey. A UXO clearance and sifting operation was conducted at OD-1 which was completed in July 2001. Details for the UXO work conducted at OD-1 can be found in OD-1 OE/UXO Removal and Interim Removal Action (MKM 2001).

Other surface features at NTA consist of a dual-lane concrete paved catapult and crash strip bisecting the central part of the AOC. Airplanes were catapulted down the crash strip and crashed into at the hill at the eastern end of the crash strip. Small pieces of airplane parts can be found protruding from the ground in the location of the crash area. An unpaved road runs around the eastern part of the AOC in the location of a former airplane staging area. There currently are no structures at this AOC (Figure NTA-6).

2.2 METEOROLOGY AND CLIMATE

Meteorology and climate are addressed in Volume 1, Section 2.2.

2.3 SURFACE WATER HYDROLOGY

Surface water drainage generally follows the topography of the site toward the center of the AOC then flows to Hinkley Creek located on the south side of the AOC. Intermittent surface water flows in several drainage ditches located on site (Figure NTA-6). These ditches are fed by surface runoff from precipitation events. The ditches tend to hold water for extended periods of time due to the low permeability of soils.

2.4 GEOLOGY

Lithologic logs from 12 borings, advanced during the characterization activities and completed as monitoring wells, were used to characterize the surface and subsurface geology at NTA. Bedrock was not encountered at NTA when installing the monitoring wells. The boring logs, which detail the vertical lithologic sequences, are found in Appendix H.

2.4.1 Glacial Deposits

Subsurface lithology at NTA consists mostly of clay to sand-rich silt tills with interbedded sands scattered throughout. These deposits are generally firm, moderately plastic, and tend to hold water where encountered. Groundwater was encountered at depths varying from 5.5 to 23 ft bgs during drilling of the groundwater monitoring wells. Deposits with higher concentrations of sand and gravel generally control the elevation of the shallow water table zone, and bio-turbation has been observed to act as a conduit for the local shallow water table at various locations at NTA. Cross-sections of the subsurface at illustrate the lateral distribution and variation of these discontinuous glaciated sediments (Figures NTA-1 to NTA-5).

2.5 SOIL

According to the Soil Survey of Portage County, Ohio (USDASCS, 1978) RVAAP soils are described as being nearly level to gently sloping, and are poor to moderately well drained. Four soils are found at NTA and adjacent areas: Mahoning silt loam (2 to 6 percent slopes) can be found in much of the eastern portion of the AOC, Fitchville silt loam areas (0 to 2 and 2 to 6 percent) located in the central and western portion-and Trumbull silt loam (0 to 2 percent) can be found along ditches. Mahoning silt loam is characterized with more gently sloped land with medium to rapid runoff with severe seasonal wetness and slow permeability. Trumbull Silt Loam is characterized by nearly level, poorly drained, seasonally wet and slow permeability soils. Fitchville Silt Loam (0 to 2 percent) is characterized by nearly level to more gently sloped somewhat poorly drained soils with slow runoff to ponded areas. These soils also display seasonal wetness, low stability and slow permeability. Fitchville silt loam (2 to 6 percent) is characterized by nearly level to more gently sloped somewhat poorly drained soils with medium to rapid runoff. These soils also display seasonal wetness, low stability and moderately slow permeability.

2.6 HYDROGEOLOGY

All monitoring wells were located in a manner that would allow stratigraphic correlation across the site. Potentiometric maps were drawn from the groundwater level information from the newly installed wells. Groundwater flow is slightly varied at this site with a northeast to southwest flow in the eastern half and a more south to southwesterly direction in the western half of the site. There is one anomalous potentiometric high at NTAmw-111.

2.6.1 Unconsolidated Sediments

Topsoil is underlain primarily by silty soils, containing varying percentages of clay and sand, to a depth of approximately 15 ft bgs except at NTAmw-109 and NTAmw-116 where sand is encountered 6ft bgs and 3 ft bgs, respectively. Ten of the 12 monitoring wells encountered a significant water bearing sand layer of 2 ft thickness or greater. Only NTAmw-111 and NTAmw-115 did not encounter a water bearing sandy layer. Sand and gravel deposits were encountered in soil borings at NTAmw-107, NTAmw-108, and NTAmw-112 from depths 16.5 to 22.0 feet below ground surface. The thickness of the sand and gravel deposits was not determined due to saturated conditions encountered within the top few feet of the deposits.

2.6.2 Bedrock

Bedrock was not encountered when installing the NTA monitoring wells.

2.7 DEMOGRAPHY AND LAND USE

Demography and land use is discussed in Volume 1, Section 2.7. The AOC is currently not being used.

2.8 ECOLOGY

Ecology is discussed in Volume 1, Section 2.8.

3.0 CHARACTERIZATION ACTIVITIES AT NACA

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

3.1 FIELD ACTIVITIES

Field activities conducted from October 2004 thru May 2005 included:

- Excavating of seven test trenches (10-05-04 – 10-06-04);
- Installing twelve groundwater monitoring wells (11-18-04 – 12-03-04);
- Collecting geotechnical samples from the borings (12-02-04 – 01-03-04);
- Conducting well slug tests (01-24-05);
- Collecting groundwater samples from monitoring wells (12-01-04 – 01-18-05); and
- Conducting a monitoring well survey (01-17-05 – 01-28-05).

Monitoring well locations for the characterization of this AOC were located to assess the impact that NTA operations may have had on groundwater and to evaluate where contaminants related to the former operations may have impacted the AOC. The following sections describe the rationale for groundwater monitoring well installation and development and methods of sample collection employed during the characterization. Information from previous assessments, evaluations and investigations, plus institutional knowledge about the operations that occurred at NTA, were used to determine the monitoring well locations. Table NTA-1 summarizes the types and numbers of samples that were collected and the analyses conducted on the samples. A photo log of the characterization activities is provided in Appendix C. Figure NTA-6 shows the monitoring well locations at this AOC.

3.1.1 Test Trenches

Before initiating drilling activities, seven test trenches were excavated in near monitoring well locations located throughout the AOC. The trenching activities provided information about the soil stratification profile, depth to groundwater and depth to bedrock.

Trenching was halted upon encountering bedrock, saturation or to a maximum depth of approximately 12 ft, whichever came first. Bedrock was not encountered at the NTA during trenching operations. The trench depths were based on visual estimate during excavation; actual depths were measured and recorded after excavation was completed. Test trenches at NTA did not exceed 13 ft bgs. Saturation was encountered in NTAtr-119 at 13.0 ft bgs, NTAtr-120 at 11.5 ft bgs, NTAtr-121 at 10.5 ft bgs, NTAtr-122 at 10.0 ft bgs, NTAtr-123 at 11.0 ft bgs, NTAtr-124 at 12.5 ft bgs and NTAtr-125 at 9.5 ft bgs. No suspect soil or MEC was encountered during the trenching operation. Trenching activities were conducted as specified in Section 4.4.2.1.3 of the FWSAP. Refer to Volume 1, Section 3.1.5 for more details on trenching procedures.

3.1.2 Groundwater Investigation Activities

Twelve boreholes were advanced into unconsolidated materials with borehole termination depth ranging from 19.0 to 28.0 ft bgs at NTA (Figure 3-3). Saturation was encountered during the drilling at depths ranging from 8 to 23 ft bgs. Confining soils resulted in increased hydrostatic pressure causing groundwater in monitoring wells to rise in the well. Static water levels collected after the drilling ranged from 1 foot to 13 ft bgs.

The groundwater activities at this AOC were conducted to:

- Determine whether contaminates from the previous operations at NTA had adversely impacted groundwater quality underlying the AOC;
- Evaluate the quality of groundwater upgradient of NTA; and
- Collect additional data pertaining to the groundwater flow regime at NTA.

The monitoring wells were installed in potential source area locations where historical operations and testing may have impacted the groundwater. The following list identifies the groundwater monitoring well locations:

- NTAmw-107 was located in the airplane staging/fueling area;
- NTAmw-108 was located upgradient of Open Demolition Area #1 (OD-1) and the staging area;
- NTAmw-109 was located in the OD-1 area;
- NTAmw-110 was located downgradient of OD-1;
- NTAmw-111 was located adjacent to the catapult area to the south;
- NTAmw-112 was located adjacent to the catapult area to the north;
- NTAmw-113 was located downgradient of the airplane crash area;
- NTAmw-114 was located within the airplane crash area;
- NTAmw-115 was located to the north of the airplane crash area;
- NTAmw-116 was located in the airplane push-out area;
- NTAmw-117 was located downgradient of the airplane push-out area; and
- NTAmw-118 was located downgradient to the south of the push-out area.

One round of groundwater sampling and slug tests were conducted and three rounds of water level data were collected.

3.1.2.1 Monitoring Well Installation and Development

An 11.25 in. OD, hollow-stem auger was used to advance the borehole through unconsolidated material to an average depth of 7.06 m (23.16 ft) bgs. Bedrock was not encountered in any of the boring locations. Section 4.4.2.4 and 4.4.2.5 of the FWSAP describe the HSA drilling method.

Monitoring wells were constructed in each borehole, following termination of drilling at the appropriate depth. A 3.05 m (10 ft) section of new, pre-cleaned 5.0 cm (2.0 inch) Schedule 40 polyvinyl chloride (PVC) 0.010 slot screen was set to straddle the static water level determined during drilling activities. The well was completed to the surface using new, schedule 40 PVC riser. The screen and riser were placed into the borehole through the drill stem augers during well construction. Placement of clean

Global No. 5 sand filter pack was tremied in place from the bottom of the boring to approximately 0.6 m (2 ft) above the top of the well screen. The filter pack was sealed with 0.6 m (2 ft) of bentonite pellets. A Type 1 Portland cement with 7 percent bentonite grout was tremied to complete the remainder of annular space to the surface. Each well was finished at the surface with protective steel surface casing. Three steel posts were installed around each well. At least five borehole volumes (maximum of seven borehole volumes) and five times any hydration volume were removed from each well using a submersible pump. Pre-existing monitoring wells were gauged to determine whether re-development was required. One pre-existing monitoring well (NTAmw-113-GW) required re-development prior to sample collection. The installation, development, and sampling of monitoring wells were conducted in accordance with the Section 4.3.2 of the FWSAP. Well construction diagrams are provided in Appendix H. Well development was conducted in accordance with the FWSAP Section 4.3.2.3.11. Well development records are also provided in Appendix H.

3.1.2.2 Geotechnical Sample Collection

Geotechnical samples were collected during well construction. Three Shelby tubes were collected at monitoring well locations NTAmw-111 (4- to 6 ft), NTAmw-112 (10 to 12 ft) and NTAmw-113 (6 to 8 ft) and sent to the laboratory for analysis. Geotechnical sample collection was conducted in accordance with Section 4.4.2.4.1 of the FWSAP. The analytical data can be found in Appendix J.

3.1.2.3 In-Situ Permeability Testing

Slug tests were performed at the 12 newly installed NTA monitoring wells to estimate the hydraulic conductivity of the media surrounding each well screen. A transducer was used to collect the falling and rising head data. First, the rising head was conducted by inserting a stainless steel slug into the well and recording water levels until the groundwater returned to static levels. After it was determined that the groundwater elevations had stabilized, the falling head test was conducted by removing the slug and collecting data until static conditions were achieved. The slug testing of monitoring wells was conducted in accordance with the Characterization of 14 RVAAP AOCs SOW (May 2004). Slug test data records are provided in Appendix K.

3.1.2.4 Groundwater Sampling

Before collecting groundwater samples, each newly installed monitoring well's condition was evaluated and noted in accordance with Sections 4.3.2.3.11.4 and 4.3.2.3.13 of the FWSAP. Casing headspace was field screened at each well using a handheld PID. No detections were observed in the PID readings for the wells at NTA. This information is provided on the field forms located in Appendix H. Specific information related to the type of PID used and calibration is included in Section 3.1.5 of Volume 1. The depth to water and depth to the bottom of the well casing were measured and recorded. Each well was purged using micropurge technology. Purging continued until measurements of water quality indicators (pH, temperature, dissolved oxygen, and conductivity) were within 10 percent of each other for three consecutive readings.

Samples were collected within 24 hours of purging each monitoring well and placed into pre-cleaned bottles. Samples that were to be analyzed for TAL dissolved metals were field-filtered during collection.

Once they were containerized, samples were immediately placed into a cooler containing ice and submitted to the laboratory under a completed chain of custody. Analysis of groundwater at NTA included the following parameters: TAL Metals, Explosives, Propellants, VOCs, SVOCs, Pesticides and PCBs. All groundwater sampling was conducted in accordance with the procedures provided in Section 4.3.4 and 4.3.5 of the FWSAP. Section 3.1.10.11 of Volume 1 also discusses the groundwater sampling procedures used for this project.

Two split samples were collected and submitted for analysis to an independent, USACE-approved laboratory. Well purging and sampling records are provided in Appendix H and analytical results from the samples are presented in Appendix L.

3.1.2.5 Water Level Measurements

Static water level and total depth were measured and recorded at each monitoring well (pre-existing and newly installed) on three separate occasions to provide data on the groundwater flow regime underlying the NTA. These water level readings were collected during February, March, and May 2005. Water level measurements were collected in accordance with Section 4.3.2.6 of the FWSAP. Groundwater elevation data are included in Appendix M.

3.1.3 Monitoring Well Survey

Monitoring well survey vertical control was within 0.01 ft accuracy and horizontal control was within 1 ft accuracy. Vertical datum was in 1929 NGVD and Ohio State plane coordinates were in NAD83. Surveying was conducted in accordance with Section 4.3.2.3.12 of the FWSAP. The survey report and sample location survey maps can be found in Appendix N.

3.2 DEVIATIONS FROM THE WORK PLAN

Every effort was made to complete the field activities in accordance with 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 NTA characterization activities are noted below.

- Although the FWSAP specifies that 3 ft of sand be placed above the screen, the depth of sand in six wells deviated from that depth. The deviations were due to the shallow total depth of the wells that limit the ability to abide by the specified well construction in the FWSAP.
- MW-109 was constructed with 2 ft of sand above the screen;
- MW-111 was constructed with 2.5 ft of sand above the screen;
- MW-112 was constructed with 2.9 ft of sand above the screen;
- MW-114 was constructed with 2 ft of sand above the screen;
- MW-116 was constructed with 2.5 ft of sand above the screen; and
- MW-117 was constructed with 3.5 ft of sand above the screen.
- The depth of bentonite deviated from the depth specified in the FWSAP (3 ft) in three groundwater monitoring wells. The deviations were due the shallow total depth of the wells that limit the ability to abide by the specified well construction in the FWSAP.
- MW-109 was constructed with 2 ft of bentonite grout;

- MW-111 with 2 ft of bentonite grout; and
- MW-114 was constructed with 2 ft of bentonite grout.
- The casing length deviated from the length specified in the FWSAP (8 ft) in two groundwater monitoring wells. The deviations were due the shallow total depth of the wells that limit the ability to abide by the specified well construction in the FWSAP.
- MW-111 was reduced from 8 ft to 7 ft; and
- MW-116 was reduced from 8 ft to 6.5 ft.
- Development start times deviated from the time specified in the FWSAP (no sooner than 24 hrs. and no later than 7 days) in two groundwater monitoring wells. Delay was due to weather delays.
- Development began 8 days after grout was set at MW-107
- Development began 8 days after grout was set at MW-109

Although deviations occurred, the objectives of the NTA AOC characterization were still achieved.

4.0 NATURE OF CONTAMINATION AT NACA

This section summarizes the groundwater analytical results obtained from the environmental sampling conducted at the NTA. Groundwater was the only media evaluated at this AOC. 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. The evaluation completed in this section is a preliminary comparison and is not intended to be used alone for making risk management decisions.

4.1 GROUNDWATER

Fourteen groundwater samples (12 regular and two QC) were collected from the 12, newly installed monitoring wells (MW-107 through MW-118). Groundwater samples were collected to identify any subsurface contamination of the shallow water table. The groundwater analytical results were compared to background values and USEPA Region 9 tap water PRGs.

Groundwater results at or above detection limits are presented in Table NTA-2. All groundwater analytical results are presented in Table NTA-3. The location of groundwater analytes detected at or above background levels and Region 9 tap water PRGs are illustrated in Figure NTA-7. Laboratory analytical reports are provided in Appendix L.

Other details pertinent to the groundwater analytical results:

- **Barium** exceeded background in six samples with a **maximum concentration of 130 µg/L.**
- **Beryllium** exceeded background in one sample with a **maximum concentration of 0.38 µg/L.**
- **Cadmium** exceeded background in two samples with a **maximum concentration of 0.32 µg/L.**
- **Calcium** exceeded background in one sample with a **maximum concentration of 130000 µg/L.**
- **Chromium** exceeded background in two samples with a **maximum concentration of 83 µg/L.**
- **Cobalt** exceeded background in four samples with a **maximum concentration of 6.0 µg/L.**
- **Copper** exceeded background in five samples with a **maximum concentration of 17 µg/L.**
- **Iron** exceeded background in nine samples, and exceeded background and the Region 9 tap water PRG in one sample with a **maximum concentration of 15000 mg/kg.**
- **Nickel** exceeded background in four samples with a **maximum concentration of 62 mg/kg.**
- **Potassium** exceeded background in three samples with a **maximum concentration of 14000 mg/kg**.
- **Silver** exceeded background in one sample with a **maximum concentration of 0.97 mg/kg.**
- **Vanadium** exceeded background in one sample with a **maximum concentration of 12 mg/kg.**
- **Antimony** exceeded background in six samples with a **maximum concentration of 7.6 mg/kg.**
- **Arsenic** exceeded the Region 9 tap water PRG in eight samples, and exceeded background and the Region 9 tap water PRG in one sample with a **maximum concentration of 18 mg/kg.**
- **Lead** exceeded background in six samples with a **maximum concentration of 12 mg/kg.**
- **Mercury** exceeded background in one sample with a **maximum concentration of 0.4 mg/kg.**

- **Benzo(a)anthracene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.14 J µg/L.** J value indicates an estimated result.
- **Benzo(a)pyrene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.12 J µg/L.** J value indicates an estimated result.
- **Benzo(b)fluoranthene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.1 J µg/L.** J value indicates an estimated result.
- **Benzo(g,h,i)perylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.25 J.** J value indicates an estimated result.
- **Bis(2-ethylhexyl)phthalate** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 6.1 J µg/L.** J value indicates an estimated result.
- **Dibenzo(a,h)anthracene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.24 J µg/L.** J value indicates an estimated result.
- **Indeno(1,2,3-cd)pyrene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.21 J µg/L.** J value indicates an estimated result.
- **Nitrocellulose** exceeded the laboratory detection limit in two samples with a **maximum concentration of 0.17 J µg/L.** J value indicates an estimated result.
- **VOCs, pesticides, PCBs and explosives** were below Region 9 tap water PRGs and/or laboratory detection limits.

4.2 IN SITU PERMEABILITY TESTING RESULTS

Following installation of the monitoring wells a slug test was completed to determine the in-situ permeability of the aquifer underlying the NTA. The following table shows the results of the slug tests performed in January - March 2005.

Hydraulic Conductivity in NACA Test Area Monitoring Wells

Monitoring Well ID	Screened Interval Depth (ft)	Total Borehole Depth (ft)	Geologic Material Adjacent to Screen	Hydraulic conductivity (cm/s)
MW-107	12-22	23	Sand , Clayey Silt	1.69×10^{-3}
MW-108	12-22	23	Sand , Sandy Silt	2.64×10^{-4}
MW-109	8-18	19	Sand , Silty Sand	1.01×10^{-3}
MW-110	17-27	28	Silt, Silty Sand	6.41×10^{-5}
MW-111	9.5-19.5	20	Clayey Silt	2.30×10^{-4}
MW-112	13.9-23.9	24.5	Sand, Sandy Silt	4.66×10^{-4}
MW-113	17-27	27.5	Sandy Silt	3.19×10^{-4}
MW-114	9.5-19.5	20	Sand, Silt	2.13×10^{-4}
MW-115	12.5-22.5	24	Clayey Silt	1.37×10^{-4}
MW-116	10-20	22	Clayey Silt	2.76×10^{-4}
MW-117	14.5-24.5	25	Sandy Silt	1.54×10^{-4}
MW-118	12-22	22.5	Sand, Sandy Silt	1.37×10^{-4}

Based on the results of the slug tests, hydraulic conductivities arithmetic average is 4.96×10^{-3} cm/s in the soil underlying NTA. The field measurements and test data are provided in Appendix K along with the calculation worksheets for the tests. Previous slug tests performed at wells located at other sites within RVAAP indicate average hydraulic conductivities between 3.87×10^{-2} cm/s to 4.46×10^{-6} cm/s (USACE, 1999).

Data from the three rounds of well gauging were used to produce potentiometric surface maps for this AOC (Figures NTA-8 through NTA-10). The water level data suggests that groundwater flows to the southwest at a gradient of approximately 0.012 ft/ft.

5.0 HUMAN HEALTH AND ECOLOGICAL RISK SCREENING FOR NACA

A Phase I RI was completed previously at NTA, therefore risk screening was not included in the SOW for this AOC. Groundwater was the only media sampled for analysis at this AOC.

6.0 SUMMARY AND CONCLUSION FOR THE CHARACTERIZATION OF NACA TEST AREA

This section briefly summarizes the existing conditions that were found during the AOC characterization at the NTA. A Phase I was completed previously at NTA. Therefore risk screening was not included in the May 2004 SOW for this AOC. Section 6 does not provide any conclusions or recommendations because risk screening was not performed.

6.1 NATURE OF CONTAMINATION

This characterization examined the nature of contamination in groundwater. Contaminants, mostly inorganics, were detected above screening criteria in all the groundwater samples. Very few constituents other than inorganics were detected above screening criteria in the groundwater samples collected. Organic contaminants were detected in very few samples. For example, SVOCs were detected above screening criteria in two groundwater sample locations (NTAmw-113-GW and NTAmw-116GW). Therefore, few inferences can be made regarding contaminant distribution in groundwater because of the low frequency of detection.

Elevated concentrations of lead and arsenic were observed around the crash/impact area on the eastern end of the NTA. One VOC (2-Butanone) and few SVOCs (with J qualifier) were also detected around the crash area.

Contaminants detected in groundwater above background and/or Region 9 tap water PRG screening values included metals and SVOCs.

6.2 CONCLUSION

Based on the COPECs presented in Section 6.1, a full risk evaluation should be considered in the overall risk management decisions that are made for the NTA.

NTAmw-108
NTAmw-107
A
B
NTAmw-112
D'
NTAmw-115
C
NTAmw-116
A'
B'
NTAmw-114
NTAmw-111
NTAmw-117
NTAmw-113
NTAmw-110
NTAmw-118
C'
D
NTAmw-109

Legend

- Monitoring Well Locations
- Geologic Cross Section
- Vegetation
- Streams/Ditches/Surface Water
- Road
- 10 ft Contour Line
- 2 ft Contour Line

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

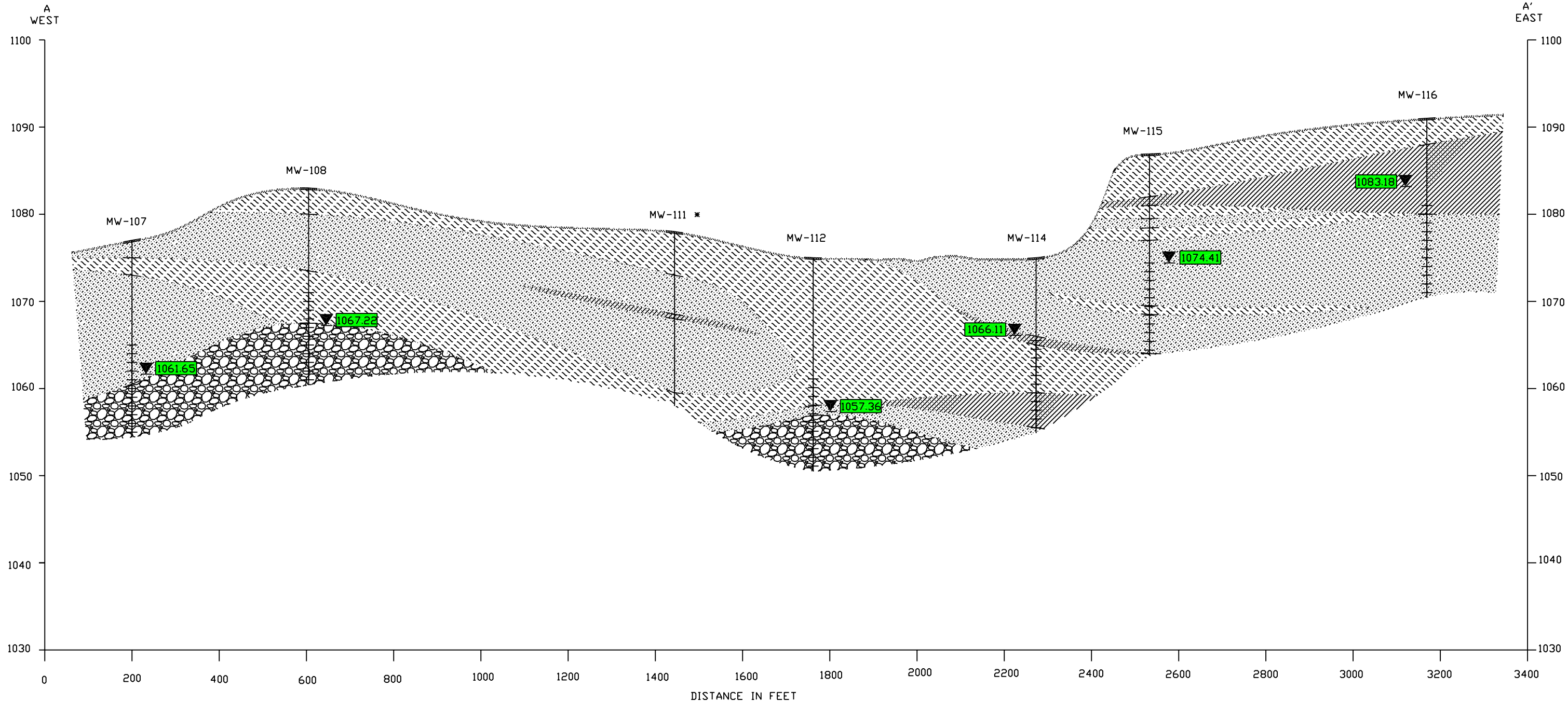
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure NTA-1
NACA Test Area
Geologic Cross Section

Characterization of 14 RVAAP AOCs

Drawn By:	Checked By:	Date Drawn:	Project No.:
ST	SL	03/30/05	04-02-0030

0 45 90 180 270 Feet

N W E S



VERTICAL EXAGGERATION = 10X

LEGEND

- TOP SOIL
- SAND
- SAND & GRAVEL
- 1140.64 GROUNDWATER ELEVATION (ft)
- WATER LEVEL FOR WELL MW-111 IS NOT INCLUDED ON THE CROSS SECTION DUE TO SIGNIFICANT DIFFERENCE FROM ADJACENT WELLS
- SILTY SAND
- CLAYEY SILT
- SILT
- SCREEN INTERVAL
- KNOWN SUBSURFACE SOIL CONDITIONS
- SANDY SILT
- SILTY CLAY
- SANDY CLAY
- DEPTH GROUNDWATER ENCOUNTERED
- EXPECTED SUBSURFACE SOIL CONDITIONS

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
			05/25/06	MS

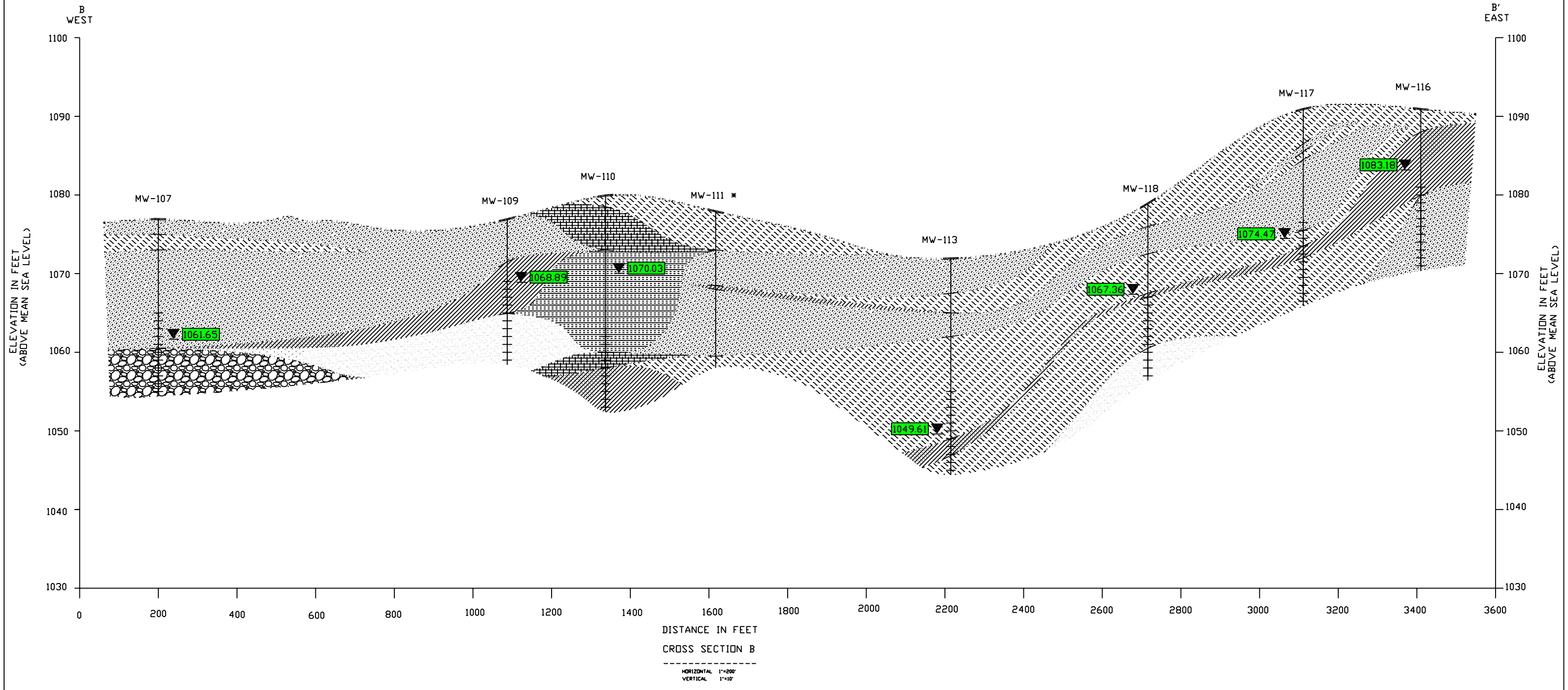
MKM ENGINEERS, INC.

DATE DRAWN 18/03/05

FIGURE NTA-2
NACA TEST AREA GEOLOGIC CROSS SECTION
GEOLOGIC CROSS SECTION A
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		NTA-2	

DRAWN BY	ST	APPR. BY	SRL



VERTICAL EXAGGERATION = 10X

LEGEND

- TOP SOIL
- SAND
- SAND & GRAVEL
- 1140.64 GROUNDWATER ELEVATION (ft)
- * WATER LEVEL FOR WELL MW-111 IS NOT INCLUDED ON THE CROSS SECTION DUE TO SIGNIFICANT DIFFERENCE FROM ADJACENT WELLS
- SILTY SAND
- CLAYEY SILT
- SILT
- SCREEN INTERVAL
- KNOWN SUBSURFACE SOIL CONDITIONS
- SANDY SILT
- SILTY CLAY
- SANDY CLAY
- DEPTH GROUNDWATER ENCOUNTERED
- EXPECTED SUBSURFACE SOIL CONDITIONS

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
			05/25/06	MS

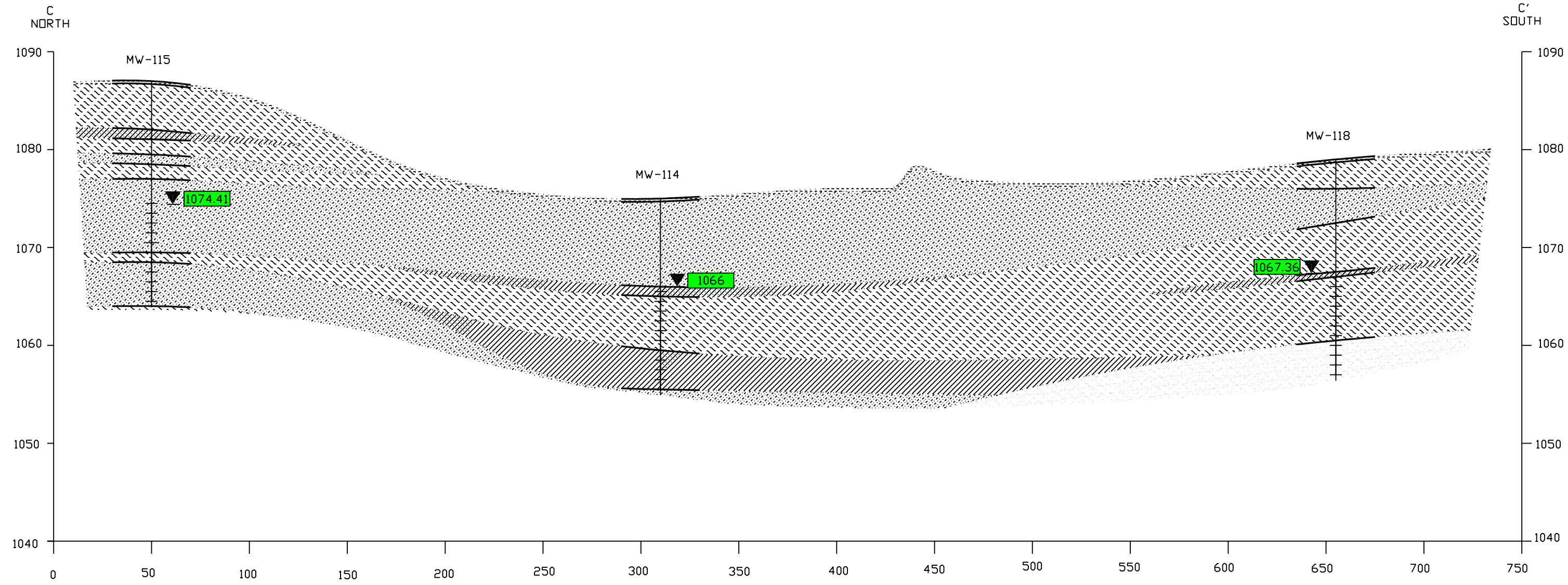
MKM ENGINEERS, INC.

DATE DRAWN 18/03/05

FIGURE NTA-3
NACA TEST AREA GEOLOGIC CROSS SECTION
GEOLOGIC CROSS SECTION B
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		NTA-3	

DRAWN BY	ST	APPR. BY	SRL



CROSS SECTION C

HORIZONTAL 1"=50'
VERTICAL 1"=10'

VERTICAL EXAGGERATION = 10X

LEGEND

- TOP SOIL
- SAND
- SAND & GRAVEL
- 1140.64 GROUNDWATER ELEVATION (ft)
- WATER LEVEL FOR WELL MW-111 IS NOT INCLUDED ON THE CROSS SECTION DUE TO SIGNIFICANT DIFFERENCE FROM ADJACENT WELLS
- SILTY SAND
- CLAYEY SILT
- SILT
- SCREEN INTERVAL
- KNOWN SUBSURFACE SOIL CONDITIONS
- SANDY SILT
- SILTY CLAY
- SANDY CLAY
- DEPTH GROUNDWATER ENCOUNTERED
- EXPECTED SUBSURFACE SOIL CONDITIONS

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
			05/25/06	MS

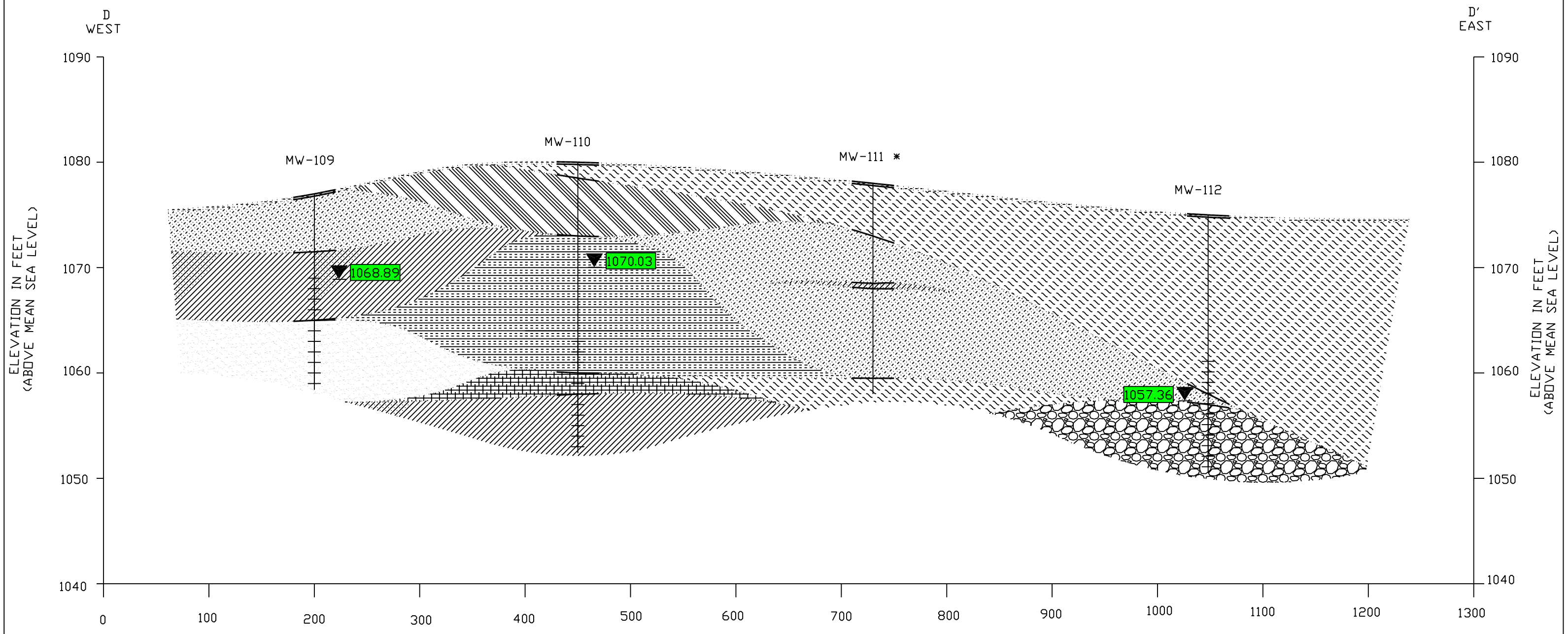
MKM ENGINEERS, INC.

DATE DRAWN 18/03/05

FIGURE NTA-4
NACA TEST AREA GEOLOGIC CROSS SECTION
GEOLOGIC CROSS SECTION C
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		NTA-4	

DRAWN BY	ST	APPR. BY	SRL



VERTICAL EXAGGERATION = 10X

LEGEND

TOP SOIL | SAND | SAND & GRAVEL | 1140.64 GROUNDWATER ELEVATION (ft) | WATER LEVEL FOR WELL MW-111 IS NOT INCLUDED ON THE CROSS SECTION DUE TO SIGNIFICANT DIFFERENCE FROM ADJACENT WELLS

SILTY SAND | CLAYEY SILT | SILT | SCREEN INTERVAL | KNOWN SUBSURFACE SOIL CONDITIONS

SANDY SILT | SILTY CLAY | SANDY CLAY | DEPTH GROUNDWATER ENCOUNTERED | EXPECTED SUBSURFACE SOIL CONDITIONS

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
			05/25/06	MS

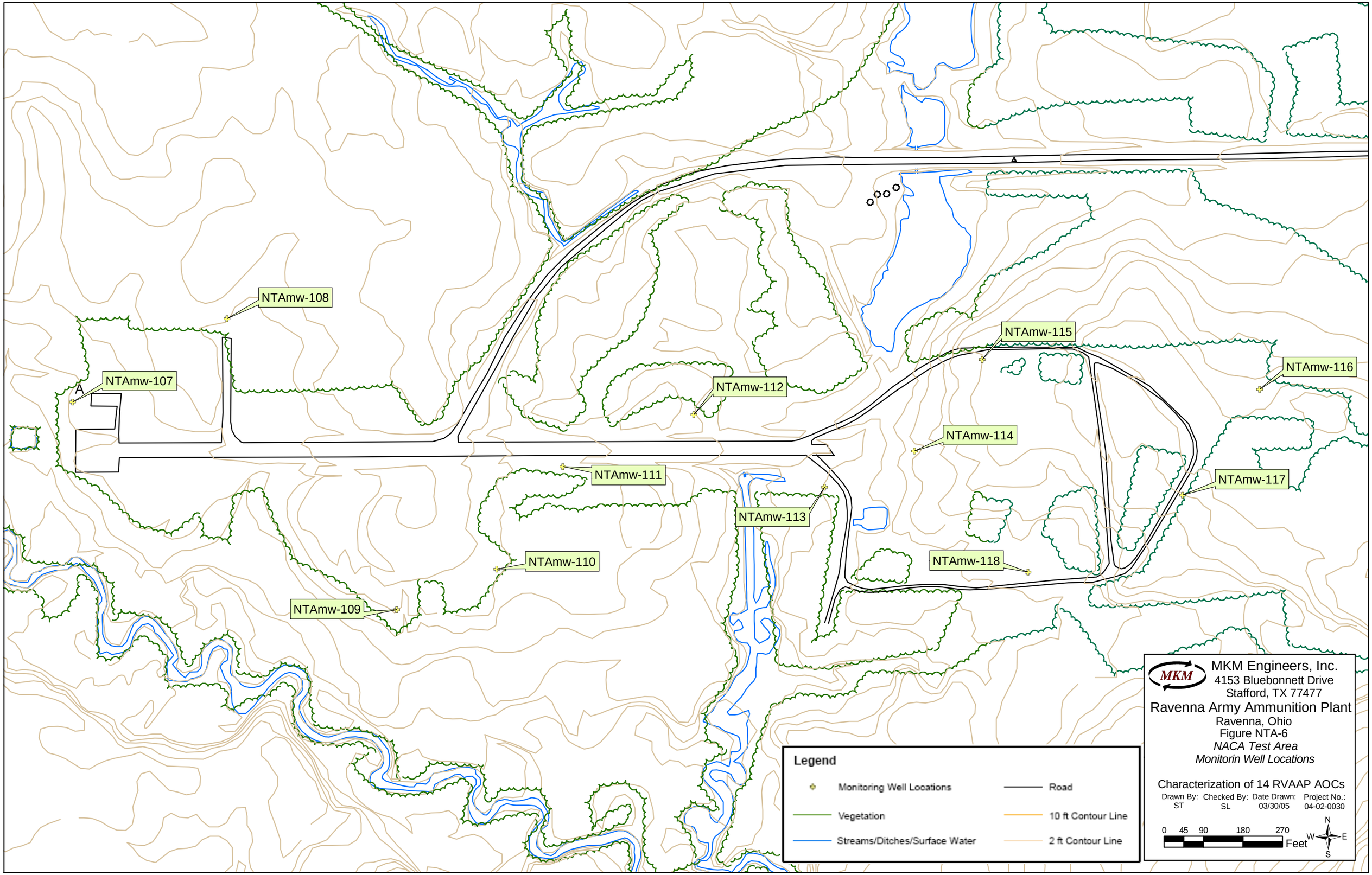
MKM ENGINEERS, INC.

DATE DRAWN 18/03/05

FIGURE NTA-5
NACA TEST AREA GEOLOGIC CROSS SECTION
GEOLOGIC CROSS SECTION D
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		NTA-5	

DRAWN BY	ST	APPR. BY	SRL


NTAmw-108
NTAmw-107
A
NTAmw-112
NTAmw-115
NTAmw-116
NTAmw-114
NTAmw-111
NTAmw-113
NTAmw-117
NTAmw-110
NTAmw-118
NTAmw-109
Legend
Monitoring Well Locations
Road
Vegetation
10 ft Contour Line
Streams/Ditches/Surface Water
2 ft Contour Line
MKM
MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure NTA-6
NACA Test Area
Monitorin Well Locations
Characterization of 14 RVAAP AOCs
Drawn By: ST
Checked By: SL
Date Drawn: 03/30/05
Project No.: 04-02-0030
0 45 90 180 270
Feet
N
W
E
S

NTAmw-108-GW

Analyte	Result	Units	Qualifier
Cobalt	0.85	ug/l	
Copper	2.4	ug/l	
Nickel	2.3	ug/l	
Silver	0.97	ug/l	
Antimony	3.2	ug/l	

NTAmw-112-GW

Analyte	Result	Units	Qualifier
Calcium	130000	ug/l	
Iron	1300	ug/l	
Potassium	6400	ug/l	
Antimony	7.6	ug/l	
Arsenic	**10**	ug/l	

NTAmw-111-GW

Analyte	Result	Units	Qualifier
Antimony	3.1	ug/l	

NTAmw-113-GW

Analyte	Result	Units	Qualifier
Barium	92	ug/l	
Beryllium	0.38	ug/l	
Chromium	12	ug/l	
Cobalt	6	ug/l	
Copper	17	ug/l	
Iron	**15000**	ug/l	
Nickel	15	ug/l	
Potassium	6900	ug/l	
Vanadium	12	ug/l	
Antimony	3.6	ug/l	
Arsenic	**18**	ug/l	
Lead	12	ug/l	
Mercury	0.4	ug/l	

NTAmw-115-GW

Analyte	Result	Units	Qualifier
Lead	7.9	ug/l	

NTAmw-116-GW

Analyte	Result	Units	Qualifier
Bis(2-ethylhexyl) phthalate	**6.1**	ug/l	**J**
Dibenzo(a,h)anthracene	**0.24**	ug/l	**J**
Indeno(1,2,3-cd)pyrene	**0.21**	ug/l	**J**

NTAmw-116-GW

Analyte	Result	Units	Qualifier
Cadmium	0.32	ug/l	
Arsenic	**0.82**	ug/l	
Lead	7.9	ug/l	

NTAmw-116-DUP

Analyte	Result	Units	Qualifier
Cadmium	0.29	ug/l	
Arsenic	**0.54**	ug/l	
Lead	8.6	ug/l	

NTAmw-107-GW

Analyte	Result	Units	Qualifier
Barium	130	ug/l	
Potassium	14000	ug/l	
Antimony	2.5	ug/l	
Arsenic	**8.2**	ug/l	

NTAmw-110-GW

Analyte	Result	Units	Qualifier
Barium	130	ug/l	
Copper	2.5	ug/l	
Arsenic	**4.7**	ug/l	

NTAmw-114-GW

Analyte	Result	Units	Qualifier
Barium	100	ug/l	
Iron	470	ug/l	
Arsenic	**5.7**	ug/l	
Lead	8.8	ug/l	J

NTAmw-114-DUP

Analyte	Result	Units	Qualifier
Barium	100	ug/l	
Iron	500	ug/l	
Arsenic	**5.4**	ug/l	
Lead	9	ug/l	

NTAmw-118-GW

Analyte	Result	Units	Qualifier
Chromium	83	ug/l	
Cobalt	2	ug/l	
Copper	3.5	ug/l	
Iron	350	ug/l	
Nickel	62	ug/l	

NTAmw-117-GW

Analyte	Result	Units	Qualifier
Barium	120	ug/l	
Antimony	4.9	ug/l	

NTAmw-109-GW

Analyte	Result	Units	Qualifier
Cobalt	2.2	ug/l	
Copper	2.2	ug/l	
Iron	2500	ug/l	
Nickel	5.7	ug/l	
Arsenic	**1.6**	ug/l	

Legend

- Vegetation
- Streams/Ditches/ Surface Water
- 10 ft Contour Lines
- 2 ft Contour Lines
- Road
- Monitoring Well Locations

Notes:

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.
Result < PRG & Background, then the value is presented with a normal style.
Ug/L - Micrograms per Liter (parts per billion - ppb)

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure NTA-7

NACA Test Area

Groundwater Sample Location Exceedences

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

0 100 200 400 Feet

N W E S

NTAmw-108
1069.72

NTAmw-107
1069.29

NTAmw-112
1071.13

NTAmw-111 *
1077.30

NTAmw-113
1070.49

NTAmw-110
1066.54

NTAmw-109
1069.46

NTAmw-115
1077.16

NTAmw-114
1074.13

NTAmw-116
1089.65

NTAmw-117
1082.04

NTAmw-118
1074.17

1090
1080
1070
1075
1065
1085

*Well NTAmw-111 is not included in the contour due to a significant difference from the normal gradient.

Mapping Provided By: ARCADIS

Legend

- Monitoring Well Locations
- Potentiometric Surface
- Direction of GW Flow
- Streams/Ditches/Surface Water
- Vegetation
- Road
- 10 ft Contour Line
- 2 ft Contour Line

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure NTA-8

NACA Test Area

Potentiometric Surface Map A

(February 2005)

Drawn By:	Checked By:	Date Drawn:	Project No.:
R. Haverkos	MAL	30 June 05	04-09-0020

0 95 190 380 Feet

N W E S

NTAmw-108
1070.12

NTAmw-107
1069.70

NTAmw-112
1071.43

NTAmw-111 *
1077.76

NTAmw-113
1070.48

NTAmw-110
1070.17

NTAmw-109
1069.84

NTAmw-114
1074.28

NTAmw-115
1077.26

NTAmw-116
1090.26

NTAmw-117
1082.42

NTAmw-118
1074.35

1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090

1080 1090 1070

* Well NTAmw-111 is not included in the contour due to a significant difference from the normal gradient.

Legend

- Monitoring Well Locations
- Potentiometric Surface
- Direction of GW Flow
- Streams/Ditches/Surface Water
- Vegetation
- Road
- 10 ft Contour Line
- 2 ft Contour Line

Mapping Provided By: ARCADIS

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure NTA-9

NACA Test Area

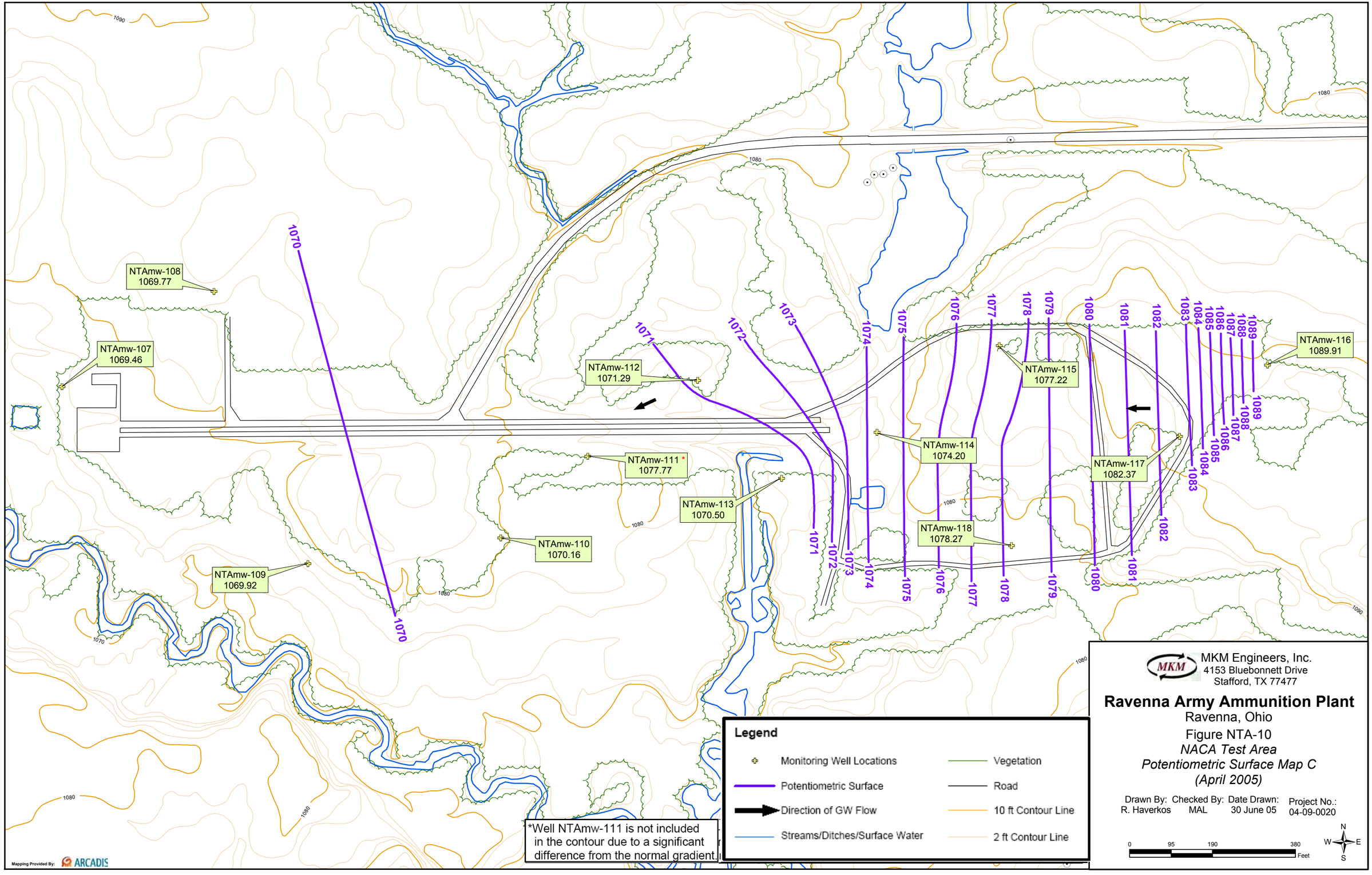
Potentiometric Surface Map B

(March 2005)

Drawn By:	Checked By:	Date Drawn:	Project No.:
R. Haverkos	MAL	30 June 05	04-09-0020

0 95 190 380 Feet

N W E S



MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure NTA-10

NACA Test Area

Potentiometric Surface Map C

(April 2005)

Drawn By:	Checked By:	Date Drawn:	Project No.:
R. Haverkos	MAL	30 June 05	04-09-0020

0 95 190 380 Feet

N W E S

Table NTA-1
NACA Test 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 Analysis	Grain Size	FIELD QA/QC SAMPLES					
NTA	SAMPLE ID	8260B	8270C	8330	3532/8330	6010/7000	7196A	8081A	8082B	9010A/9012A	EPA 353.2	EPA 415.1	(Various)	ASTM D422	Multi-Incremental QA	Duplicate Sample	Equipment Blank	Trip Blank	MS/MSD	USACE Split
GROUNDWATER	MW-107	1	1	1	1	1		1	1											
	MW-108	1	1	1	1	1		1	1											
	MW-109	1	1	1	1	1		1	1											
	MW-110	1	1	1	1	1		1	1											
	MW-111	1	1	1	1	1		1	1				1	1						
	MW-112	1	1	1	1	1		1	1				1	1						
	MW-113	1	1	1	1	1		1	1				1	1						
	MW-114	1	1	1	1	1		1	1							1			1	1
	MW-115	1	1	1	1	1		1	1											
	MW-116	1	1	1	1	1		1	1							1			1	1
	MW-117	1	1	1	1	1		1	1											
	MW-118	1	1	1	1	1		1	1											
		12	12	12	12	12	0	12	12	0	0	0	3	3	0	2	0	0	2	2

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
Geo-tech analysis consists of Moisture Content (ASTM D2216), Atterburg Limits (ASTM D4318), UCS (ASTM D2487), pH (EPA 150.1) & Specific Gravity (ASTM D854)
Grainsize and TOC are taken at "all major drainageway" sediments
All shelby tubes taken during MW installatinons will have full geo-tech and grainsize analyses

Table NTA-2
NACA Test Area Summary of Groundwater Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						NTAmw-107-GW	NTAmw-108-GW	NTAmw-109-GW	NTAmw-110-GW	NTAmw-111-GW	NTAmw-112-GW	NTAmw-113-GW	NTAmw-114-DUP	NTAmw-114-GW	NTAmw-115-GW	NTAmw-116-DUP	NTAmw-116-GW	NTAmw-117-GW	NTAmw-118-GW
					Sample Date:	12/14/2004	12/21/2004	12/21/2004	1/18/2005	12/16/2004	12/16/2004	12/14/2004	12/2/2004	12/2/2004	12/2/2004	12/1/2004	12/1/2004	12/16/2004	12/13/2004
					Sample Depth:	20 ft	20 ft	17 ft	20 ft	4.6 ft	8.2 ft	26 ft	12 ft	12 ft	16 ft	3.79 ft	3.79 ft	13.45 ft	18 ft
					Description	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered
Group	Method	Parameter	Region 9 PRG (Tap Water)		Unconsolidated Filtered Groundwater Background	Units													
Metals	6010B	Aluminum	36499	nc	--	ug/l							6800				44			
	6010B	Barium	2555	nc	82.1	ug/l	130	54	28	130	67	44	92	100	100	77	37	37	120	35
	6010B	Beryllium	73	nc	0.00	ug/l							0.38							
	6010B	Cadmium	18	nc	0.00	ug/l											0.29	0.32		
	6010B	Calcium	--[n]		115000	ug/l	60000	98000	12000	59000	76000	130000	93000	80000	80000	73000	34000	34000	63000	65000
	6010B	Chromium	109	nc	7.3	ug/l							12							83
	6010B	Cobalt	730	nc	0.00	ug/l		0.85	2.2				6							2
	6010B	Copper	1460	nc	0.00	ug/l		2.4	2.2	2.5			17							3.5
	6010B	Iron	10950	nc	279	ug/l	220		2500			1300	**15000**	500	470					350
	6010B	Magnesium	--[n]		43300	ug/l	16000	25000	5100	15000	35000	38000	34000	26000	26000	18000	4500	4400	15000	30000
	6010B	Manganese	876	nc	1020	ug/l	170	340	260	180	71	600	510	390	380	71	110	110	310	150
	6010B	Nickel	730	nc	0.00	ug/l		2.3	5.7				15							62
	6010B	Potassium	--[n]		2890	ug/l	14000	2000	1400	2300	1700	6400	6900	1900	1900	2700	1200	1100	1700	1600
	6010B	Silver	182	nc	0.00	ug/l		0.97												
	6010B	Sodium	--[n]		45700	ug/l	13000	8400	1900	22000	11000	16000	16000	8300	8400	20000	2300	2200	6800	11000
	6010B	Vanadium	36	nc	0.00	ug/l							12							
	6010B	Zinc	10950	nc	60.9	ug/l		1.7	50	4.9		12	55	14	11	11	20	21		
	7041	Antimony	15	nc	0.00	ug/l	2.5	3.2			3.1	7.6	3.6						4.9	
	7060A	Arsenic	0.045	ca	11.7	ug/l	**8.2**		**1.6**	**4.7**		**10**	**18**	**5.4**	**5.7**		**0.54**	**0.82**		
	7421	Lead	15	mcl	0.00	ug/l							12	9	8.8 J	7.9	8.6	7.9		
	7470A	Mercury	11	nc	0.00	ug/l							0.4							
VOCs	8260B	2-Butanone	6968	nc	--	ug/l						64	38	9.3 J	7.7 J					
SVOCs	8270C	Benzo(a)anthracene	0.092	ca	--	ug/l							**0.14 J**							
	8270C	Benzo(a)pyrene	0.0092	ca	--	ug/l							**0.12 J**							
	8270C	Benzo(b)fluoranthene	0.092	ca	--	ug/l							**0.1 J**							
	8270C	Benzo(g,h,i)perylene	--		--	ug/l												0.25 J		
	8270C	Benzo(k)fluoranthene	0.92	ca	--	ug/l							0.11 J							
	8270C	Bis(2-ethylhexyl) phthalate	4.8	ca	--	ug/l												**6.1 J**		
	8270C	Chrysene	9.2	ca	--	ug/l							0.099 J							
	8270C	Dibenzo(a,h)anthracene	0.0092	ca	--	ug/l												**0.24 J**		
	8270C	Indeno(1,2,3-cd)pyrene	0.092	ca	--	ug/l							0.09 J					**0.21 J**		
Propellants	353.2 Modified	Nitrocellulose	--		--	ug/l					140	130								
	8332	Nitroglycerine	4.8	ca	--	ug/l											0.17 J			

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
ug/l - means micrograms per Liter (parts per billion - ppb)
PRG - preliminary remediation goals
nc - non-cancer basis
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
UC/Filtered – GW sample was filtered for metals and taken from an unconsolidated MW
C/Filtered – GW sample was filtered for metals and taken from a consolidated (bedrock) MW
[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 NTA-3
NACA Test Area Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						NTAmw-107-GW	NTAmw-108-GW	NTAmw-109-GW	NTAmw-110-GW	NTAmw-111-GW	NTAmw-112-GW	NTAmw-113-GW	NTAmw-114-DUP	NTAmw-114-GW	NTAmw-115-GW	NTAmw-116-DUP	NTAmw-116-GW	NTAmw-117-GW	NTAmw-118-GW
					Sample Date:	12/14/2004	12/21/2004	12/21/2004	1/18/2005	12/16/2004	12/16/2004	12/14/2004	12/2/2004	12/2/2004	12/2/2004	12/1/2004	12/1/2004	12/16/2004	12/13/2004
					Sample Depth:	20 ft	20 ft	17 ft	20 ft	4.6 ft	8.2 ft	26 ft	12 ft	12 ft	16 ft	3.79 ft	3.79 ft	13.45 ft	18 ft
					Description	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered
Group	Method	Parameter	Region 9 PRG (Tap Water)		Unconsolidated Filtered Groundwater Background	Units													
Metals	6010B	Aluminum	36499	nc	--	ug/l	75 U	75 U	75 U	75 U	75 U	75 U	6800	75 U	75 U	75 U	44	75 U	75 U	65 U
	7060A	Arsenic	0.045	ca	11.7	ug/l	**8.2**	1 U	**1.6**	**4.7**	1 U	**10**	**18**	**5.4**	**5.7**	1 U	**0.54**	**0.82**	1 U	1 U
	6010B	Barium	2555	nc	82.1	ug/l	130	54	28	130	67	44	92	100	100	77	37	37	120	35
	6010B	Beryllium	73	nc	0.00	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	0.38	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	6010B	Cadmium	18	nc	0.00	ug/l	1 U	0.21 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.29	0.32	1 U	1 U
	6010B	Calcium	--[n]		115000	ug/l	60000	98000	12000	59000	76000	130000	93000	80000	80000	73000	34000	34000	63000	65000
	6010B	Chromium	109	nc	7.3	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	12	5 U	5 U	5 U	5 U	5 U	5 U	83
	6010B	Cobalt	730	nc	0.00	ug/l	2.5 U	0.85	2.2	2.5 U	2.5 U	2.5 U	6	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2
	6010B	Copper	1460	nc	0.00	ug/l	5 U	2.4	2.2	2.5	5 U	5 U	17	5 U	5 U	5 U	5 U	5 U	5 U	3.5
	6010B	Iron	10950	nc	279	ug/l	220	60 U	2500	60 U	60 U	1300	**15000**	500	470	60 U	60 U	60 U	60 U	350
	6010B	Magnesium	--[n]		43300	ug/l	16000	25000	5100	15000	35000	38000	34000	26000	26000	18000	4500	4400	15000	30000
	6010B	Manganese	876	nc	1020	ug/l	170	340	260	180	71	600	510	390	380	71	110	110	310	150
	6010B	Nickel	730	nc	0.00	ug/l	5 U	2.3	5.7	1.1 U	5 U	5 U	15	5 U	5 U	5 U	5 U	5 U	5 U	62
	6010B	Potassium	--[n]		2890	ug/l	14000	2000	1400	2300	1700	6400	6900	1900	1900	2700	1200	1100	1700	1600
	6010B	Selenium	182	nc	0.00	ug/l	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U
	6010B	Silver	182	nc	0.00	ug/l	5 U	0.97	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	6010B	Sodium	--[n]		45700	ug/l	13000	8400	1900	22000	11000	16000	16000	8300	8400	20000	2300	2200	6800	11000
	6010B	Vanadium	36	nc	0.00	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	12	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	6010B	Zinc	10950	nc	60.9	ug/l	11.5 U	1.7	50	4.9	1.65 U	12	55	14	11	11	20	21	2.15 U	6.5 U
	7041	Antimony	15	nc	0.00	ug/l	2.5	3.2	3.75 U	3.75 U	3.1	7.6	3.6	3.75 U	3.75 U	3.75 U	3.75 U	3.75 U	4.9	3.75 U
	7060A	Arsenic	0.045	ca	11.7	ug/l	**8.2**	1 U	**1.6**	**4.7**	1 U	**10**	**18**	**5.4**	**5.7**	1 U	**0.54**	**0.82**	1 U	1 U
	7421	Lead	15	mcl	0.00	ug/l	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	12	9	8.8 J	7.9	8.6	7.9	1.5 U	1.5 U
	7470A	Mercury	11	nc	0.00	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	7841	Thallium	2.4	nc	0.00	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Pesticides	8081A	4,4'-DDD	0.28	ca	--	ug/l	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.05 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U
	8081A	4,4'-DDE	0.20	ca	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 U	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	4,4'-DDT	0.20	ca	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Aldrin	0.0040	ca	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	alpha-BHC	0.011	nc	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 UJ	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	alpha-Chlordane	0.19	ca	--	ug/l	0.025 U	0.0255 U	0.0245 U	0.025 UJ	0.0245 U	0.0245 U	0.025 U	0.0245 U	0.024 U	0.025 U	0.0255 U	0.025 U	0.0245 U	0.024 U
	8081A	beta-BHC	0.037	ca	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	delta-BHC	--		--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	Dieldrin	0.0042	ca	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 U	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	Endosulfan I	220	nc	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	Endosulfan II	220	nc	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Endosulfan sulfate	220	nc	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Endrin	11	nc	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	Endrin aldehyde	--		--	ug/l	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Endrin ketone	--		--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	gamma-BHC	0.052	ca	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 UJ	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	gamma-Chlordane	0.19	ca	--	ug/l	0.05 U	0.05 U	0.049 U	0.0495 UJ	0.0485 U	0.049 U	0.05 U	0.0485 U	0.0475 U	0.05 U	0.05 U	0.05 U	0.049 U	0.048 U
	8081A	Heptachlor	0.015	ca	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 UJ	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U

Table NTA-3
NACA Test Area Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						NTAmw-107-GW	NTAmw-108-GW	NTAmw-109-GW	NTAmw-110-GW	NTAmw-111-GW	NTAmw-112-GW	NTAmw-113-GW	NTAmw-114-DUP	NTAmw-114-GW	NTAmw-115-GW	NTAmw-116-DUP	NTAmw-116-GW	NTAmw-117-GW	NTAmw-118-GW
					Sample Date:	12/14/2004	12/21/2004	12/21/2004	1/18/2005	12/16/2004	12/16/2004	12/14/2004	12/2/2004	12/2/2004	12/2/2004	12/1/2004	12/1/2004	12/16/2004	12/13/2004
					Sample Depth:	20 ft	20 ft	17 ft	20 ft	4.6 ft	8.2 ft	26 ft	12 ft	12 ft	16 ft	3.79 ft	3.79 ft	13.45 ft	18 ft
					Description	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered
Group	Method	Parameter	Region 9 PRG (Tap Water)		Unconsolidated Filtered Groundwater Background	Units													
	8081A	Heptachlor epoxide	0.0074	ca	--	ug/l	0.075 U	0.075 U	0.075 U	0.075 UJ	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Methoxychlor	182	nc	--	ug/l	0.3 U	0.305 U	0.295 U	0.295 U	0.29 U	0.295 U	0.3 U	0.29 U	0.285 U	0.3 U	0.305 U	0.3 U	0.295 U	0.29 U
	8081A	Toxaphene	0.061	ca	--	ug/l	0.25 U	0.255 U	0.245 U	0.25 U	0.245 U	0.245 U	0.25 U	0.245 U	0.24 U	0.25 U	0.255 U	0.25 U	0.245 U	0.24 U
PCBs	8082	Aroclor 1016	0.96	ca	--	ug/l	0.3 U	0.305 U	0.295 U	0.295 U	0.29 U	0.295 U	0.3 U	0.29 U	0.285 U	0.3 U	0.305 U	0.3 U	0.295 U	0.29 U
	8082	Aroclor 1221	0.034	ca	--	ug/l	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1232	0.034	ca	--	ug/l	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1242	0.034	ca	--	ug/l	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1248	0.034	ca	--	ug/l	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.7 U	0.75 U	0.75 U	0.75 U	0.75 U	0.7 U
	8082	Aroclor 1254	0.034	ca	--	ug/l	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1260	0.034	ca	--	ug/l	0.3 U	0.305 U	0.295 U	0.295 U	0.29 U	0.295 U	0.3 U	0.29 U	0.285 U	0.3 U	0.305 U	0.3 U	0.295 U	0.29 U
VOCs	8260B	1,1,1-Trichloroethane	3172	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1,2,2-Tetrachloroethane	0.055	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1,2-Trichloroethane	0.20	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1-Dichloroethane	811	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1-Dichloroethene	339	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dibromoethane	0.0056	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloroethane	0.12	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloroethene (total)	120	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloropropane	0.16	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	2-Butanone	6968	nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	64	38	9.3 J	7.7 J	5 U	5 U	5 U	5 U	5 U
	8260B	2-Hexanone	2000	nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	4-Methyl-2-pentanone	1993	nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	Acetone	5475	nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	Benzene	0.35	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromochloromethane	--		--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromodichloromethane	0.18	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromoform	8.5	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromomethane	8.7	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Carbon disulfide	1043	nc	--	ug/l	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U	2.5 U
	8260B	Carbon tetrachloride	0.17	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chlorobenzene	106	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloroethane	4.6	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloroform	0.17	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloromethane	158	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	cis-1,2-Dichloroethene	61	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	cis-1,3-Dichloropropene	0.40	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Dibromochloromethane	0.13	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Ethylbenzene	1340	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	m&p-Xylenes	206	nc	--	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	8260B	Methylene chloride	4.3	ca	--	ug/l	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
	8260B	o-Xylene	206	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table NTA-3
NACA Test Area Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						Sample Date:	12/14/2004	12/21/2004	12/21/2004	1/18/2005	12/16/2004	12/16/2004	12/14/2004	12/2/2004	12/2/2004	12/2/2004	12/1/2004	12/1/2004	12/16/2004	12/13/2004
						Sample Depth:	20 ft	20 ft	17 ft	20 ft	4.6 ft	8.2 ft	26 ft	12 ft	12 ft	16 ft	3.79 ft	3.79 ft	13.45 ft	18 ft
						Description	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered
Group	Method	Parameter	Region 9 PRG (Tap Water)		Unconsolidated Filtered Groundwater Background	Units	NTAmw-107-GW	NTAmw-108-GW	NTAmw-109-GW	NTAmw-110-GW	NTAmw-111-GW	NTAmw-112-GW	NTAmw-113-GW	NTAmw-114-DUP	NTAmw-114-GW	NTAmw-115-GW	NTAmw-116-DUP	NTAmw-116-GW	NTAmw-117-GW	NTAmw-118-GW
	8260B	Styrene	1641	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Tetrachloroethene	0.10	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Toluene	723	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Total Xylenes	206	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	trans-1,2-Dichloroethene	122	nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	trans-1,3-Dichloropropene	0.40	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Trichloroethene	0.028	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Vinyl chloride	0.020	ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs	8270C	1,2,4-Trichlorobenzene	7.2	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	1,2-Dichlorobenzene	370	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	1,3-Dichlorobenzene	182	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	1,4-Dichlorobenzene	0.50	ca	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	2,2-oxybis (1-chloropropane)	0.27	ca	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	2,4,5-Trichlorophenol	3650	nc	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	2,4,6-Trichlorophenol	3.6	nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	2,4-Dichlorophenol	109	nc	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	2,4-Dimethylphenol	730	nc	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	2,4-Dinitrophenol	73	nc	--	ug/l	9.5 U	10 U	10 U	10 U	9.5 U	9.5 U	10 U	9.5 U	9.5 U	10 U	10 U	10 U	9.5 U	10 U
	8270C	2,4-Dinitrotoluene	73	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	2,6-Dinitrotoluene	36	nc	--	ug/l	0.245 U	0.245 U	0.245 U	0.255 U	0.245 U	0.24 U	0.25 U	0.245 U	0.24 U	0.25 U	0.25 U	0.255 U	0.245 U	0.25 U
	8270C	2-Chloronaphthalene	487	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	2-Chlorophenol	30	nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	2-Methylnaphthalene	--		--	ug/l	0.245 U	0.245 U	0.245 U	0.255 U	0.245 U	0.24 U	0.25 U	0.245 U	0.24 U	0.25 U	0.25 U	0.255 U	0.245 U	0.25 U
	8270C	2-Methylphenol	1825	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	2-Nitroaniline	109	nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 UJ
	8270C	2-Nitrophenol	--		--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	3,3'-Dichlorobenzidine	0.15	ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	3-Nitroaniline	3.2	ca	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	4,6-Dinitro-2-methylphenol	3.6	nc	--	ug/l	9.5 U	10 U	10 U	10 U	9.5 U	9.5 U	10 U	9.5 U	9.5 U	10 U	10 U	10 U	9.5 U	10 U
	8270C	4-Bromophenyl phenyl ether	--		--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	4-Chloro-3-methylphenol	--		--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	4-Chloroaniline	146	nc	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	4-Chlorophenyl phenyl ether	--		--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	4-Methylphenol	182	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	4-Nitroaniline	3.2	ca	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	4-Nitrophenol	--		--	ug/l	9.5 U	10 U	10 U	10 U	9.5 U	9.5 U	10 U	9.5 U	9.5 U	10 U	10 U	10 U	9.5 U	10 U
	8270C	Acenaphthene	365	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Acenaphthylene	--		--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Anthracene	1825	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Benzo(a)anthracene	0.092	ca	--	ug/l	0.095 U	0.1 U	0.1 U	0.1 U	0.095 U	0.095 U	**0.14 J**	0.095 U	0.095 U	0.1 U	0.1 U	0.1 U	0.095 U	0.1 U
	8270C	Benzo(a)pyrene	0.0092	ca	--	ug/l	0.195 U	0.195 U	0.195 U	0.205 U	0.195 U	0.19 U	**0.12 J**	0.195 U	0.19 U	0.2 U	0.2 U	0.2 U	0.195 U	0.2 U
	8270C	Benzo(b)fluoranthene	0.092	ca	--	ug/l	0.195 U	0.195 U	0.195 U	0.205 U	0.195 U	0.19 U	**0.1 J**	0.195 U	0.19 U	0.2 U	0.2 U	0.2 U	0.195 U	0.2 U

Table NTA-3
NACA Test Area Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						NTAmw-107-GW	NTAmw-108-GW	NTAmw-109-GW	NTAmw-110-GW	NTAmw-111-GW	NTAmw-112-GW	NTAmw-113-GW	NTAmw-114-DUP	NTAmw-114-GW	NTAmw-115-GW	NTAmw-116-DUP	NTAmw-116-GW	NTAmw-117-GW	NTAmw-118-GW
					Sample Date:	12/14/2004	12/21/2004	12/21/2004	1/18/2005	12/16/2004	12/16/2004	12/14/2004	12/2/2004	12/2/2004	12/2/2004	12/1/2004	12/1/2004	12/16/2004	12/13/2004
					Sample Depth:	20 ft	20 ft	17 ft	20 ft	4.6 ft	8.2 ft	26 ft	12 ft	12 ft	16 ft	3.79 ft	3.79 ft	13.45 ft	18 ft
					Description	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered
Group	Method	Parameter	Region 9 PRG (Tap Water)		Unconsolidated Filtered Groundwater Background	Units													
	8270C	Benzo(g,h,i)perylene	--		--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.25 J	0.485 U	0.5 U
	8270C	Benzo(k)fluoranthene	0.92	ca	--	ug/l	0.195 U	0.195 U	0.195 U	0.205 U	0.195 U	0.19 U	0.11 J	0.195 U	0.19 U	0.2 U	0.2 U	0.2 U	0.195 U	0.2 U
	8270C	Benzoic acid	145979	nc	--	ug/l	9.5 U	10 U	10 U	10 U	9.5 U	9.5 U	10 U	9.5 U	9.5 U	10 U	10 U	10 U	9.5 U	10 U
	8270C	Benzyl alcohol	10950	nc	--	ug/l	9.5 U	10 U	10 U	10 U	9.5 U	9.5 U	10 U	9.5 U	9.5 U	10 U	10 U	10 U	9.5 U	10 U
	8270C	Bis(2-chloroethoxy)methane	--		--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Bis(2-chloroethyl) ether	0.010	ca	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Bis(2-ethylhexyl) phthalate	4.8	ca	--	ug/l	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7 U	7.5 U	7.5 U	7 U	7.5 U	7.5 U	**6.1 J**	7.5 U	7.5 U
	8270C	Butylbenzyl phthalate	7300	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Carbazole	3.4	ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	Chrysene	9.2	ca	--	ug/l	0.245 U	0.245 U	0.245 U	0.255 U	0.245 U	0.24 U	0.099 J	0.245 U	0.24 U	0.25 U	0.25 U	0.255 U	0.245 U	0.25 U
	8270C	Dibenzo(a,h)anthracene	0.0092	ca	--	ug/l	0.195 U	0.195 U	0.195 U	0.205 U	0.195 U	0.19 U	0.2 U	0.195 U	0.19 U	0.2 U	0.2 U	**0.24 J**	0.195 U	0.2 U
	8270C	Dibenzofuran	12	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Diethyl phthalate	29199	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Dimethyl phthalate	364867	nc	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Di-n-butyl phthalate	3650	nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	Di-n-octyl phthalate	1460	nc	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	Fluoranthene	1460	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Fluorene	243	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Hexachlorobenzene	0.042	ca	--	ug/l	0.245 U	0.245 U	0.245 U	0.255 U	0.245 U	0.24 U	0.25 U	0.245 U	0.24 U	0.25 U	0.25 U	0.255 U	0.245 U	0.25 U
	8270C	Hexachlorobutadiene	0.86	ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	Hexachlorocyclopentadiene	219	nc	--	ug/l	9.5 U	10 U	10 U	10 UJ	9.5 U	9.5 U	10 U	- R	- R	- R	- R	- R	9.5 U	- R
	8270C	Hexachloroethane	4.8	ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	Indeno(1,2,3-cd)pyrene	0.092	ca	--	ug/l	0.195 U	0.195 U	0.195 U	0.205 U	0.195 U	0.19 U	0.09 J	0.195 U	0.19 U	0.2 U	0.2 U	**0.21 J**	0.195 U	0.2 U
	8270C	Isophorone	71	ca	--	ug/l	0.95 U	1 U	1 U	1 U	0.95 U	0.95 U	1 U	0.95 U	0.95 U	1 U	1 U	1 U	0.95 U	1 U
	8270C	Naphthalene	6.2	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Nitrobenzene	3.4	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	n-Nitroso-di-n-propylamine	0.0096	ca	--	ug/l	0.245 U	0.245 U	0.245 U	0.255 U	0.245 U	0.24 U	0.25 U	0.245 U	0.24 U	0.25 U	0.25 U	0.255 U	0.245 U	0.25 U
	8270C	n-Nitrosodiphenylamine	14	ca	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Pentachlorophenol	0.56	ca	--	ug/l	4.85 U	4.9 U	4.9 U	5 U	4.85 U	4.75 U	4.95 U	4.85 U	4.75 U	4.95 U	4.95 U	5 U	4.85 U	5 U
	8270C	Phenanthrene	--		--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
	8270C	Phenol	10950	nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.55 U	2.45 U	2.4 U	2.5 U	2.45 U	2.4 U	2.5 U	2.5 U	2.55 U	2.45 U	2.5 U
	8270C	Pyrene	182	nc	--	ug/l	0.485 U	0.49 U	0.49 U	0.5 U	0.485 U	0.475 U	0.495 U	0.485 U	0.475 U	0.495 U	0.495 U	0.5 U	0.485 U	0.5 U
Explosives	8330	1,3,5-Trinitrobenzene	1095	nc	--	ug/l	0.15 U	0.11 U	0.105 U	0.145 U	0.16 U	0.135 U	0.1 U	0.125 U	0.17 U	0.18 U	0.1 U	0.12 U	0.135 U	0.165 U
	8330	1,3-Dinitrobenzene	3.6	nc	--	ug/l	0.15 U	0.11 U	0.105 U	0.145 U	0.16 U	0.135 U	0.1 U	0.125 U	0.17 U	0.18 U	0.1 U	0.12 U	0.135 U	0.165 U
	8330	2,4,6-TNT	2.2	ca	--	ug/l	0.19 U	0.14 U	0.135 U	0.18 U	0.2 U	0.17 U	0.125 U	0.16 U	0.215 U	0.225 U	0.125 U	0.15 U	0.165 U	0.205 U
	8330	2,4-Dinitrotoluene	73	nc	--	ug/l	0.27 U	0.2 U	0.19 U	0.26 U	0.285 U	0.245 U	0.18 U	0.23 U	0.305 U	0.325 U	0.18 U	0.215 U	0.24 U	0.295 U
	8330	2,6-Dinitrotoluene	36	nc	--	ug/l	0.32 U	0.235 U	0.23 U	0.31 U	0.34 U	0.29 U	0.215 U	0.27 U	0.365 U	0.385 U	0.215 U	0.26 U	0.285 U	0.355 U
	8330	2-Amino-4,6-Dinitrotoluene	--		--	ug/l	0.27 U	0.2 U	0.19 U	0.26 U	0.285 U	0.245 U	0.18 U	0.23 U	0.305 U	0.325 U	0.18 U	0.215 U	0.24 U	0.295 U
	8330	2-Nitrotoluene	0.049	ca	--	ug/l	0.23 U	0.17 U	0.165 U	0.22 U	0.245 U	0.21 U	0.155 U	0.195 U	0.265 U	0.28 U	0.155 U	0.185 U	0.205 U	0.255 U
	8330	3-Nitrotoluene	122	nc	--	ug/l	0.23 U	0.17 U	0.165 U	0.22 U	0.245 U	0.21 U	0.155 U	0.195 U	0.265 U	0.28 U	0.155 U	0.185 U	0.205 U	0.255 U
	8330	4-Amino-2,6-Dinitrotoluene	--		--	ug/l	0.25 U	0.18 U	0.175 U	0.235 U	0.26 U	0.225 U	0.165 U	0.21 U	0.28 U	0.295 U	0.165 U	0.2 U	0.22 U	0.27 U
	8330	4-Nitrotoluene	0.66	ca	--	ug/l	0.23 U	0.17 U	0.165 U	0.22 U	0.245 U	0.21 U	0.155 U	0.195 U	0.265 U	0.28 U	0.155 U	0.185 U	0.205 U	0.255 U

Table NTA-3
NACA Test Area Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						NTAmw-107-GW	NTAmw-108-GW	NTAmw-109-GW	NTAmw-110-GW	NTAmw-111-GW	NTAmw-112-GW	NTAmw-113-GW	NTAmw-114-DUP	NTAmw-114-GW	NTAmw-115-GW	NTAmw-116-DUP	NTAmw-116-GW	NTAmw-117-GW	NTAmw-118-GW
					Sample Date:	12/14/2004	12/21/2004	12/21/2004	1/18/2005	12/16/2004	12/16/2004	12/14/2004	12/2/2004	12/2/2004	12/2/2004	12/1/2004	12/1/2004	12/16/2004	12/13/2004
					Sample Depth:	20 ft	20 ft	17 ft	20 ft	4.6 ft	8.2 ft	26 ft	12 ft	12 ft	16 ft	3.79 ft	3.79 ft	13.45 ft	18 ft
					Description	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered	UC/Filtered
Group	Method	Parameter	Region 9 PRG (Tap Water)		Unconsolidated Filtered Groundwater Background	Units														
	8330	HMX	1825	nc	--	ug/l	0.23 U	0.17 U	0.165 U	0.22 U	0.245 U	0.21 U	0.155 U	0.195 U	0.265 U	0.28 U	0.155 U	0.185 U	0.205 U	0.255 U
	8330	Nitrobenzene	3.4	nc	--	ug/l	0.12 U	0.09 U	0.085 U	0.115 U	0.125 U	0.11 U	0.08 U	0.1 U	0.135 U	0.145 U	0.08 U	0.095 U	0.105 U	0.13 U
	8330	RDX	0.61	ca	--	ug/l	0.15 U	0.11 U	0.105 U	0.145 U	0.16 U	0.135 U	0.1 U	0.125 U	0.17 U	0.18 U	0.1 U	0.12 U	0.135 U	0.165 U
	8330	Tetryl	365	nc	--	ug/l	0.6 U	0.43 U	0.415 U	0.55 U	0.6 U	0.55 U	0.39 U	0.495 U	0.65 U	0.7 U	0.39 U	0.47 U	0.5 U	0.65 U
Propellants	353.2 Modified	Nitrocellulose	--		--	ug/l	250 U	65 U	75 U	70 U	140	130	250 U	250 U	250 UJ	250 U	250 U	250 U	250 U	250 U
	8332	Nitroglycerine	4.8	ca	--	ug/l	0.75 U	0.55 U	0.55 U	0.7 U	0.8 UJ	0.7 UJ	0.5 U	0.65 U	0.85 U	0.9 U	0.17 J	0.6 U	0.65 UJ	0.8 U
	SW8330 Modified	Nitroguanidine	3650	nc	--	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analysis was not performed
ug/l - means micrograms per Liter (parts per billion - ppb)
PRG - preliminary remediation goals (The screeing value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
UC/Filtered – GW sample was filtered for metals and taken from an unconsolidated MW
C/Filtered – GW sample was filtered for metals and taken from a consolidated (bedrock) MW
[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