



BUILDING 1200 TABLE OF CONTENTS

| | | |
|------------|---|-----------|
| 1.0 | INTRODUCTION | 1 |
| 1.1 | PURPOSE AND SCOPE | 1 |
| 1.2 | BACKGROUND INFORMATION | 1 |
| 1.2.1 | <i>AOC Description and History</i> | 1 |
| 1.2.2 | <i>Previous Investigation</i> | 2 |
| 1.2.3 | <i>Regulatory Authorities</i> | 3 |
| 1.2.4 | <i>Regulatory Status of Building 1200</i> | 3 |
| 2.0 | ENVIRONMENTAL SETTING AT BUILDING 1200 | 4 |
| 2.1 | SURFACE FEATURES | 4 |
| 2.2 | METEOROLOGY AND CLIMATE | 4 |
| 2.3 | SURFACE WATER HYDROLOGY | 4 |
| 2.4 | GEOLOGY | 4 |
| 2.4.1 | <i>Glacial Deposits</i> | 4 |
| 2.4.2 | <i>Sedimentary Rocks and Bedrock</i> | 5 |
| 2.5 | SOIL | 5 |
| 2.6 | HYDROGEOLOGY | 5 |
| 2.7 | DEMOGRAPHY AND LAND USE | 5 |
| 2.8 | ECOLOGY | 5 |
| 3.0 | BUILDING 1200 CHARACTERIZATION ACTIVITIES | 6 |
| 3.1 | FIELD ACTIVITIES | 6 |
| 3.1.1 | <i>MI Surface Soil (0-1 ft) Sampling</i> | 6 |
| 3.1.2 | <i>Trenching Activities</i> | 7 |
| 3.1.3 | <i>Groundwater Investigation Activities</i> | 7 |
| 3.1.4 | <i>Surface Water Sampling</i> | 9 |
| 3.1.5 | <i>MI Sediment Sampling</i> | 10 |
| 3.1.6 | <i>Sampling Location and Monitoring Well Survey</i> | 10 |
| 3.2 | DEVIATIONS FROM THE WORK PLAN | 10 |
| 4.0 | NATURE OF CONTAMINATION AT BUILDING 1200 | 12 |
| 4.1 | MI SURFACE SOIL (0-1 FT) | 12 |
| 4.2 | SEDIMENTS | 13 |
| 4.3 | SURFACE WATER | 14 |
| 4.4 | GROUNDWATER | 15 |
| 4.5 | GEOTECHNICAL | 16 |
| 4.6 | IN SITU PERMEABILITY TESTING RESULTS | 16 |
| 5.0 | HUMAN HEALTH AND ECOLOGICAL RISK SCREENING FOR BUILDING 1200 | 18 |
| 5.1 | HUMAN HEALTH RISK SCREENING | 18 |
| 5.1.1 | <i>Surface Soil (0-1 ft)</i> | 18 |
| 5.1.2 | <i>Sediment</i> | 18 |
| 5.1.3 | <i>Surface Water</i> | 19 |
| 5.1.4 | <i>Groundwater</i> | 19 |
| 5.2 | ECOLOGICAL RISK SCREENING | 19 |



| | | |
|------------|---|-----------|
| 5.2.1 | Surface Soil (0-1 ft)..... | 19 |
| 5.2.2 | Sediment..... | 20 |
| 5.2.3 | Surface Water..... | 20 |
| 6.0 | SUMMARY AND CONCLUSIONS FOR THE CHARACTERIZATION OF BUILDING 1200..... | 21 |
| 6.1 | NATURE OF CONTAMINATION..... | 21 |
| 6.2 | HUMAN HEALTH RISK SCREENING..... | 21 |
| 6.3 | ECOLOGICAL RISK SCREENING..... | 22 |
| 6.4 | CONCLUSION..... | 23 |



BUILDING 1200 FIGURES

| | |
|---------------|--|
| Figure B12-1 | Building 1200 Geologic Cross Section |
| Figure B12-2 | Building 1200 Geologic Cross Section A |
| Figure B12-3 | Building 1200 Geologic Cross Section B |
| Figure B12-4 | Building 1200 Geologic Cross Section C |
| Figure B12-5 | Building 1200 Area Monitoring Well Locations |
| Figure B12-6 | Building 1200 Sampling Locations |
| Figure B12-7 | Building 1200 Soil, Sediment and Surface Water Sample Location Exceedences |
| Figure B12-8 | Building 1200 Groundwater Sample Location Exceedences |
| Figure B12-9 | Building 1200 Potentiometric Surface Map A |
| Figure B12-10 | Building 1200 Potentiometric Surface Map B |
| Figure B12-11 | Building 1200 Potentiometric Surface Map C |

BUILDING 1200 TABLES

| | |
|--------------|--|
| Table B12-1 | Building 1200 Summary of Sampling and Analysis |
| Table B12-2 | Building 1200 Summary of Surface Soil (0-1 ft) Detections |
| Table B12-3 | Building 1200 Summary of Sediment Detections |
| Table B12-4 | Building 1200 Summary of Surface Water Detections |
| Table B12-5 | Building 1200 Summary of Groundwater Detections |
| Table B12-6 | Building 1200 Summary of All Surface Soil (0-1 ft) Results |
| Table B12-7 | Building 1200 Summary of All Sediment Results |
| Table B12-8 | Building 1200 Summary of All Surface Water Results |
| Table B12-9 | Building 1200 Summary of All Groundwater Results |
| Table B12-10 | Building 1200 Human Health Risk Screening Tables for Surface Soil (0-1 ft) |
| Table B12-11 | Building 1200 Human Health Risk Screening Tables for Sediment |
| Table B12-12 | Building 1200 Human Health Risk Screening Tables for Surface Water |
| Table B12-13 | Building 1200 Human Health Risk Screening Tables for Groundwater |
| Table B12-14 | Building 1200 Ecological Risk Screening Tables for Surface Soil (0-1 ft) |
| Table B12-15 | Building 1200 Ecological Risk Screening Tables for Sediment |
| Table B12-16 | Building 1200 Ecological Risk Screening Tables for Surface Water |
| Table B12-17 | Building 1200 Ecological Risk Summary of Quantitative and Qualitative COPECs for Environmental Media |
| Table B12-18 | Building 1200 Human Chemical of Potential Concern – All Media (in text) |
| Table B12-19 | Building 1200 Chemical of Potential Ecological Concern – All Media (in text) |



1.0 INTRODUCTION

This report documents the results of Building 1200 (B12) (AOC-13) sampling effort which was completed during the activities conducted from October 2004 to May 2005 to characterization of the 14 Ravenna Army Ammunition Plant (RVAAP) Areas of Concern (AOCs).

1.1 PURPOSE AND SCOPE

Characterization activities were conducted at B12 to collect sufficient data for all applicable media to allow efficient planning and execution of future environmental actions.

The characterization effort for the B12 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 B12 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 B12, previous studies and the regulatory status of B12 at RVAAP.

1.2.1 AOC Description and History

B12 was the Ammunition Sectioning Area. Half of the building is constructed of reinforced concrete and half is constructed of transite siding. The dimensions of the building are approximately 30 by 20 ft with a 12 ft peak. Currently, the roof is partially collapsed and the AOC is slightly overgrown with brush and small trees. The B12 AOC includes the surrounding land, sedimentation pond and the ditches as shown



in Figure B12-6. Figure 1-2 shows the location of the B12 site in relation to the RVAAP facility. From approximately 1941 to 1971, ammunition was sectioned and checked for flaws and then demilled at this building by steaming munitions rounds. The pink water effluent, which was generated by the steam decontamination process, drained to a man-made crushed slag gravel bed. The gravel bed discharged into a 0.5-acre sedimentation pond located approximately 415 ft northeast of B12. The overflow from this pond discharged into Eagle Creek.

1.2.2 Previous Investigation

The following studies have been conducted at B12:

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 nitro bodies 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 1989 Preliminary Review and Visual Site Inspection conducted as a part of RCRA Facility Assessment

This document could not be located.

1.2.2.3 Preliminary Assessment for RVAAP (February, 1996)

This assessment identified the following conditions at RVAAP:

- Potential chemicals of concern (PCOCs) at RVAAP sites were identified explosives (TNT, RDX, HMX, RDXX, composition B, and lead azide) and heavy metals (lead and mercury).
- The primary sources of potential contamination at RVAAP were identified as wastewater effluent from munitions assembly and demilitarization process, open burning and detonation of explosives, and landfill operations.



- Primary contaminant release mechanisms from load lines were process effluent discharges to surface water (drainage ditches, settling ponds, and streams) and process building wastewater wash-out on to surface soils. Media of concern were identified as a soil, sediment, groundwater and surface water.
- The greatest potential for release of contaminants to groundwater from load lines likely was identified as wastewater effluent discharge to unlined earthen settling ponds. Concrete settling tanks, open drainage ditches, and storm sewers were also identified as a concern relative to groundwater.
- The primary contaminant release mechanism from open burning and detonation areas resulted from the burning and detonation of off-specification explosives on the ground surface. Media of concern was identified as soils, groundwater, surface water and sediment.
- The primary release mechanism at landfills was identified as a result of potential leaching of contaminants from buried/disposal materials. Groundwater and soils were selected as media of concern.
- Known releases of contamination to surface water and soils have occurred from load line (assembly and demilitarization) operations, and from open burning and detonation operations.
- Known releases of contamination to groundwater were noted to have occurred from quarry landfill operations.
- The greatest potential for off-site migration of contaminants during load line operations was identified as surface water. The greatest potential for current off-site migration of contaminants was identified as groundwater and surface water.

Based on qualitative assessment of the potential hazards, release mechanisms, and environmental conditions at RVAAP, LL-12, Building 1200 and the Landfill N. of Winklepeck Burning Grounds were considered among the higher priority sites in this assessment.

1.2.2.4 Phase I Remedial Investigation for High-Priority Areas of Concern at the Ravenna Army Ammunition Plant (SAIC 1998).

No widespread contamination was detected in soil at Building 1200. No inorganics were detected above background values, and no explosives were detected in soils. PAHs were detected in one soil sample analyzed for organics adjacent to Building 1200. Low concentrations (<1 mg/kg) of explosives were detected in the drainage sediments leading from Building 1200. Inorganics were below USGS values in the sediments. Low levels of explosives were observed in the settling pond sediments.

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 Building 1200

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



2.0 ENVIRONMENTAL SETTING AT BUILDING 1200

This section describes the physical characteristics of Building 1200 (B12) 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 B 12 is forested except for the clearing immediately adjacent to the AOC. The AOC is located on a topographic high. The surface water flows to the east from the facility. A sedimentation basin area is located approximately 500 feet to the southeast. The effluent from building 1200 flowed to the basin through a ditch. The AOC is isolated from other areas due to the nature of the energetic materials handled during operation. Ramalia Road is located approximately 2000 feet to the southeast. Randall Road is located approximately 1500 feet to the east.

2.1 SURFACE FEATURES

The topography at B12 is flat and slopes radially in all directions. The AOC is characterized by elevation contours that range in elevation from 930 ft above mean sea level (amsl) to 1004 ft amsl. The elevation decreases gently on the eastern side of the AOC and sharper to west to a low point of approximately 930 ft amsl (USGS Topographic Map, Windham Quadrangle, 1994). At the time of this characterization, there were three building structures located within the AOC, B12, Building T-4602 and Building F-4605, as well as a small blast wall. These buildings and structures were demolished and removed in August 2005 by MKM under a separate contract.

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 south. Intermittent surface water flows in several drainage ditches located on site. 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 three borings, advanced during the characterization activities and completed as monitoring wells and logs from one pre-existing background monitoring well, were used to characterize the surface and subsurface geology at B12. The boring logs, which detail the vertical lithologic sequences, are found in Appendix H.

2.4.1 Glacial Deposits

Subsurface lithology at this AOC 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 ranging from 12 to 20 ft bgs during drilling of the groundwater monitoring wells. Cross-sections of the subsurface at B12 illustrate the lateral distribution and variation of these discontinuous glaciated sediments (Figures B12-1 to B12-4).

2.4.2 Sedimentary Rocks and Bedrock

Fine grained sandstone with thin interbedded shale was encountered at depths ranging from 2 to 4 ft when installing the B12 monitoring wells.

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. Two soils are found at B12 and adjacent areas: Mahoning silt loam (0 to 2 percent slopes) and Mitiwanga silt loam (2 to 6 percent slopes). The Mitiwanga silt loam is mainly found in a small area on the northern portion of the AOC. The Mahoning silt loam covers the remainder of the AOC. Mahoning silt loam is characterized by nearly level to more gently sloped areas between drainage ways, slow to ponded runoff, severe seasonal wetness and slow permeability.

2.6 HYDROGEOLOGY

Volume I, Section 2.6 describes the unconsolidated sediments and bedrock which influence the hydrogeological characteristics of RVAAP.

2.7 DEMOGRAPHY AND LAND USE

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

2.8 ECOLOGY

Ecology is discussed in Volume 1, Section 2.8.



3.0 BUILDING 1200 CHARACTERIZATION ACTIVITIES

This section describes the field and analytical methods identified during the RVAAP 14 AOC Characterization at B12. The field and analytical programs were conducted in accordance with (IAW) the RVAAP Facility Wide Sampling and Analysis Plan (FWSAP) (USACE, 2001) and the RVAAP 14 AOC FWSAP Addendum (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 February 2005 included:

- Collecting MI surface soil (0-1 ft) samples (11-04-04 – 12-01-04);
- Excavating one test trench (10-11-04);
- Installing three groundwater monitoring wells (11-17-04 – 11-22-04);
- Collecting a geotechnical sample from a boring (11-05-04 – 11-19-04);
- Conducting well slug tests (02-01-05);
- Collecting groundwater samples from monitoring wells (12-09-04 – 01-21-05);
- Collecting surface water samples from drainage pathways (11-05-04);
- Collecting MI sediment samples from drainage pathways (11-05-04); and
- Conducting a sample location and monitoring well survey (12-13-04 – 01-28-05).

Information from previous studies plus institutional knowledge about the demilling and steam decontamination operations were used to determine the sampling locations, type of media collected, analyses run and numbers of samples for this characterization activity. Sampling points were located to assess the impact that B12 demilling (steam decontamination) operations and associated pink water may have had on soil, sediment, surface water, and groundwater. In addition, the sampling locations evaluated where contaminants related to the former operations may have impacted the AOC.

Table B12-1 summarizes the types and numbers of samples that were collected and the analyses performed on the samples. A photolog of the investigation activities is provided in Appendix C. Figure B12-5 shows the monitoring well locations and Figure B12-6 shows the sampling locations for all other 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 B12 demilling (steam decontamination) operations and associated pink water on the soils within the AOC; and
- Determine the nature of identified contamination.

The B12 AOC was divided into ten MI grids, surrounding the process buildings. One MI sample was collected from each grid. Analysis of MI surface soils (0-1 ft) for B12 included the following parameters:



TAL Metals and Explosives. MI samples were collected in accordance with Section 4.2.1.2 of the FWSAP Addendum.

One split sample was collected and submitted for analysis by an independent USACE approved laboratory. 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. VOC samples, as part of the surface soil (0-1 ft) MI sample, were collected as a discrete sample to fulfill the 10 percent full suite requirement and the FWSAP approved VOC collection methods. The discrete surface soil (0-1 ft) samples were using a stainless steel push probe. Volume 1, Section 3.1.9.3 of the main text describes the procedure used to collect discrete surface soil (0-1 ft) samples using a push probe. Samples were prepared, packaged and shipped in accordance with Section 6.0 of the RVAAP 14 AOC FWSAP Addendum. Discrete VOC samples were not subjected to MI sample drying or processing.

3.1.2 Trenching Activities

Before initiating drilling operations, one test trench was excavated in a strategic location within 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. The test trench depth at B12 did not exceed 3.5 ft bgs. Bedrock was encountered in B12tr-027 at 3.5 ft. No suspect soil or MEC was encountered during the trenching operation. Trenching activities were conducted in accordance with Section 4.4.2.1.3 of the FWSAP. Refer to Volume 1, Section 3.1.5 for trenching procedures.

3.1.3 Groundwater Investigation Activities

All three boreholes were advanced into weathered or competent bedrock with borehole termination depth ranging from 21.0 to 24.7 ft bgs at B12. Groundwater was encountered at depths ranging from 12 to 20 ft bgs. One pre-existing groundwater monitoring background well is located within the AOC (BKGmw-010).

The groundwater activities were conducted at this AOC to:

- Determine whether contaminants from the demilling operations and associated pink water had adversely impacted groundwater quality underlying the AOC;
- Evaluate the quality of groundwater upgradient of B12; and
- Collect data pertaining to the groundwater flow regime at B12.

The placement of the monitoring wells provided one upgradient well (B12mw-010) and two wells in downgradient locations (B12mw-011 and B12mw-012). Additionally, an existing background well (BKGmw-010) was included in the investigation of this AOC and is in an upgradient location. One round of groundwater sampling and slug tests were conducted, and three rounds of water level data were collected.



3.1.3.1 Monitoring Well Installation and Development

An 11.25 in. OD, hollow-stem auger was used to advance each borehole through unconsolidated material. Upon encountering bedrock, a 6 in. OD air rotary hammer and 3.95 in. core barrel were used to advance the boring. The average total depth of the boreholes was 6.91 m (22.67 ft). Bedrock was encountered in all three boring locations at depths of 3.0 ft bgs (B12mw-010 cored from 5.0 to 21.0 ft bgs), 2.0 ft bgs (B12mw-011) and 2.5 ft. bgs (B12mw-012 cored from 7.0 to 22.2 ft bgs).

The installation, development, and sampling of monitoring wells were conducted in accordance with Section 4.3.2 of the FWSAP. Well construction diagrams and well development records are provided as part of Appendix H. Well development was conducted in accordance with the FWSAP Section 4.3.2.3.11.

3.1.3.2 Geotechnical Sample Collection

Soils for geotechnical analyses were collected during groundwater monitoring well installation. One Shelby tube was collected at monitoring well location B12mw-011 from the 0 to 2 ft interval and sent to the laboratory for analysis. Geotechnical Analysis of Shelby tubes included the following parameters: Atterberg Limits, moisture content, total organic content, specific gravity and pH.

Geotechnical sample collection was conducted in accordance with Section 4.4.2.4.1 of the FWSAP. The geotechnical analytical results can be found in Appendix J.

3.1.3.3 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 B12. 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. Analysis of groundwater at B12 included the following parameters: TAL Metals, Explosives, Propellants, VOCs, SVOCs, Pesticides and PCBs.

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. 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.

One split sample was 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.



3.1.3.4 In-Situ Permeability Testing

Slug tests were performed at the four B12 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. The testing results are included in section 4.5.

3.1.3.5 Water Level Measurements

Static water level and total depth were measured and recorded at each monitoring well on three separate occasions to provide data on the groundwater flow regime underlying the B12. 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. Well survey information is included in Appendix N.

3.1.4 Surface Water Sampling

Surface water samples were collected at this AOC to:

- Evaluate whether surface water is being impacted by runoff from B12; and
- Identify the migration pathways for contaminated runoff from B12.

Two surface water sample locations were selected to evaluate whether contaminants could be impacting surface water within the AOC boundary. One discrete surface water sample was collected from the dry drainage ditch and a second discrete surface water sample was collected from the sedimentation pond. To collect the surface water samples, sampling containers were hand-held and submerged beneath the water surface. Water quality measurements (pH, conductivity, dissolved oxygen content, and temperature) were recorded just prior to sample collection. After the samples were containerized, they were immediately placed into a cooler containing ice and submitted to the laboratory under a completed chain-of-custody. Analysis of surface water at B12 included the following parameters: TAL Metals, Explosives, Propellants, VOCs, SVOCs, Pesticides and PCBs. Surface water samples were collected in accordance with Section 4.6.2.1.1 of the FWSAP.

One split sample was collected and submitted for analysis by an independent, USACE-approved laboratory. Samples were prepared, packaged and shipped in accordance with 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.



3.1.5 MI Sediment Sampling

MI sediment samples were collected at this AOC to:

- Evaluate whether sediments are being impacted via surface water runoff at the B12;
- 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 locations were selected to evaluate whether the B12 drainage system allowed contaminants to migrate beyond the site boundary. The first MI sediment sample was collected from the sedimentation pond itself and the second MI sediment sample was collected from the wet drainage ditch that empties into the sedimentation pond. The sediment sample locations were collected as MI samples. All surface water samples were collected prior to sediment sample collection from a discrete point within the MI grid. Sediment samples were collected from downstream to upstream locations to avoid any cross contamination due to suspended sediments settling in downstream locations.

All MI sediment samples were collected from 0 to 0.15 m (0 to 0.5 ft) below the sediment-water interface within the grid area. B12 sediment samples from B12 were collected and placed into a plastic lined 5-gallon bucket, sealed and transported to Building 1036 for processing. The homogenized samples were immediately placed into a cooler containing ice and submitted to the laboratory under a completed chain-of-custody. MI samples were collected in accordance with Section 4.2.1.2 of the FWSAP Addendum. Analysis of sediment for B12 included the following parameters: TAL Metals, Explosives, TOC and grain size.

One split sample was collected and submitted for analysis by an independent, USACE-approved laboratory. Samples were prepared, packaged and shipped in accordance with 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.

3.1.6 Sampling Location and 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. Corners of multi-incremental sampling grids, discrete soil, and sewer locations were surveyed using a sub-meter GPS unit (Trimble). Surveying was conducted in accordance with Section 4.3.2.3.12 of the FWSAP. The monitoring well survey report can be found in Appendix N and 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 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 B12 investigation are noted below.



- To access several MI sampling grids, railroad ballast was removed from the dry drainage ditch leading to the sedimentation pond to access the underlying native surface soil (0-1 ft) MI samples (B12ss-019M-SO and B12ss-020M-SO).
- Saturated MI sediment samples were not dried or sifted. Saturated MI sediments were homogenized in their saturated state and placed incrementally into the appropriate pre-cleaned sample containers.
- Although the FWSAP specifies that 3 ft of sand be placed above the screen, the depth of sand in two 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.
- B12mw-010 was constructed with 2 ft of sand above the screen
- B12mw-011 was constructed with 4 ft of sand above the screen
- 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.
- B12mw-010 was constructed with a 7 ft long surface casing.
- B12mw-011 was constructed with a 7 ft long surface casing.

Although deviations were identified, the objectives of the B12 AOC characterization were still achieved.



4.0 NATURE OF CONTAMINATION AT BUILDING 1200

This section summarizes the surface soil (0-1 ft), groundwater, surface water and sediment analytical results obtained from the environmental sampling conducted at B12. The results are organized by media: surface soil (0-1 ft), groundwater, 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 is 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. The risk screening, presented later in this report, further discusses and evaluates the contaminants detected during this AOC characterization. The following sections present a summation and initial screening of the analytical data for samples collected during the AOC characterization.

4.1 MI SURFACE SOIL (0-1 FT)

Eleven MI surface soil (0-1 ft) samples (10 regular and one QC) were collected from various locations during the AOC characterization at B12. 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 B12-2. All surface soil (0-1 ft) analytical results are presented in Table B12-6. Locations where surface soil (0-1 ft) analytes were detected at or above background levels and Region 9 residential PRGs are illustrated on figure B12-7. Laboratory analytical reports are provided in Appendix F.

The surface soil (0-1 ft) analytical results are summarized as follows:

- **Aluminum** exceeded the Region 9 residential PRG in ten samples and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 30000 mg/kg.**
- **Arsenic** exceeded the Region 9 residential PRG in six samples with a **maximum concentration of 14 mg/kg.**
- **Barium** exceeded background in eight samples with a **maximum concentration of 320 mg/kg.**
- **Beryllium** exceeded background in six samples with a **maximum concentration of 5.9 mg/kg.**
- **Cadmium** exceeded background in five samples with a **maximum concentration of 3.3 mg/kg.**
- **Calcium** exceeded background in four samples with a **maximum concentration of 79000 mg/kg.**
- **Chromium** exceeded background in ten samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 33 mg/kg.**
- **Cobalt** exceeded background in three samples with a **maximum concentration of 15 mg/kg.**
- **Copper** exceeded background in three samples with a **maximum concentration of 71 mg/kg.**
- **Iron** exceeded the Region 9 residential PRG in eight samples, and exceeded background and the Region 9 residential PRG in three samples with a **maximum concentration of 28000 mg/kg.**
- **Lead** exceeded background in five samples with a **maximum concentration of 86 mg/kg.**
- **Magnesium** exceeded background in five samples with a **maximum concentration of 21000 mg/kg.**



- **Manganese** exceeded the Region 9 residential PRG in eight samples, and exceeded background and the Region 9 residential PRG in three samples with a **maximum concentration of 4100 mg/kg.**
- **Potassium** exceeded background in ten samples with a **maximum concentration of 2300 mg/kg.**
- **Selenium** exceeded background in one sample with a **maximum concentration of 1.6 mg/kg.**
- **Sodium** exceeded background in 11 samples with a **maximum concentration of 1200 mg/kg.**
- **Vanadium** exceeded the Region 9 residential PRG in ten samples with a **maximum concentration of 29 mg/kg.**
- **Zinc** exceeded background in ten samples with a **maximum concentration of 180 mg/kg.**
- **Mercury** exceeded background in five samples with a **maximum concentration of 0.097 mg/kg.**
- **Benzo(g,h,i)perylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.021 J mg/kg.** J values are estimated results.
- **RDX** exceeded the Region 9 residential PRG in one sample with a **maximum concentration of 13 mg/kg.**
- **Nitrocellulose** exceeded laboratory detection limit in one sample with a **maximum concentration of 0.87 mg/kg.**
- **VOCs, SVOCs, pesticides and PCBs** were below Region 9 residential PRGs and/or laboratory detection limits.

4.2 SEDIMENTS

Three sediment samples (two regular and one QC) were collected during the AOC characterization at B12. Additionally, one discrete sediment sample was collected for VOC analysis. Results from the sediment samples were compared to facility-wide background concentrations for sediments and/or Region 9 residential PRGs for residential soil.

Sediment results at or above detection limits are presented in Table B12-3. All sediment analytical results are presented in Table B12-7. Locations where sediment analytes were detected at or above background levels and Region 9 residential PRGs are illustrated in Figure B12-7. Laboratory analytical reports are provided in Appendix R.

The sediment analytical results are as follows:

- **Aluminum** exceeded the Region 9 residential PRG in two samples and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 15000 mg/kg.**
- **Arsenic** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 11 mg/kg.**
- **Beryllium** exceeded background in three samples with a **maximum concentration of 0.86 mg/kg.**
- **Cadmium** exceeded background in one sample with a **maximum concentration of 0.19 mg/kg.**
- **Cobalt** exceeded background in one sample with a **maximum concentration of 11 mg/kg.**
- **Iron** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 23000 mg/kg.**
- **Magnesium** exceeded background in one sample with a **maximum concentration of 2900 mg/kg.**
- **Manganese** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 390 mg/kg.**



- **Nickel** exceeded background in three samples with a **maximum concentration of 24 mg/kg.**
- **Sodium** exceeded background in three samples with a **maximum concentration of 370 mg/kg.**
- **Vanadium** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 26 mg/kg.**
- **Mercury** exceeded background in two samples with a **maximum concentration of 0.2 mg/kg.**
- **Benzo(g,h,i)perylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.16 J mg/kg.** J values are estimated results.
- **Nitrocellulose** exceeded laboratory detection limit in one sample with a **maximum concentration of 1.7 mg/kg.**
- **VOCs, pesticides, PCBs and explosives** were below Region 9 residential PRGs and/or laboratory detection limits.

4.3 SURFACE WATER

Three surface water samples (two regular and one QC) were collected during the AOC characterization at B12. 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 B12-4. All surface water analytical results are presented in Table B12-8. Locations where surface water analytes were detected at or above background levels and Region 9 tap water PRGs are illustrated on figure B12-7. Tabulated analytical results and laboratory analytical reports are provided in Appendix P.

The surface water analytical results are summarized as follows:

- **Barium** exceeded background in two samples with a **maximum concentration of 91 µg/L.**
- **Calcium** exceeded background in two samples with a **maximum concentration of 49000 µg/L.**
- **Chromium** exceeded background in three samples with a **maximum concentration of 2.8 µg/L.**
- **Iron** exceeded background in two samples with a **maximum concentration of 3900 µg/L.**
- **Manganese** exceeded the background in one sample, and exceeded background and the Region 9 tap water PRG in two samples with a **maximum concentration of 4500 µg/L.**
- **Nickel** exceeded background in three samples with a **maximum concentration of 2.9 µg/L.**
- **Potassium** exceeded background in three samples with a **maximum concentration of 6700 µg/L.**
- **Vanadium** exceeded background in one sample with a **maximum concentration of 2.8 µg/L.**
- **Arsenic** exceeded the Region 9 tap water PRG in two samples with a **maximum concentration of 3.0 µg/L.**
- **Lead** exceeded background in one sample with a **maximum concentration of 1.2 µg/L.**
- **Mercury** exceeded background in one sample with a **maximum concentration of 0.051 µg/L.**
- **Thallium** exceeded background in one sample with a **maximum concentration of 1.5 µg/L.**
- **RDX** exceeded the Region 9 tap water PRG in three samples with a **maximum concentration of 42 µg/L.**
- **Nitroglycerine** exceeded the Region 9 tap water PRG in two samples with a **maximum concentration of 5.9 J µg/L.** J values are estimated results.



- **VOCs, SVOCs, pesticides and PCBs** were below Region 9 tap water PRGs and/or laboratory detection limits.

4.4 GROUNDWATER

Five groundwater samples (four regular and one QC) were collected from newly installed monitoring wells (MW-001 through MW-003) during the AOC characterization at CBL. 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 B12-5. All groundwater analytical results are presented in Table B12-9. Locations of groundwater analytes that were detected at or above background levels and Region 9 tap water PRGs are illustrated on figure B12-8. Laboratory analytical reports are provided in Appendix L.

The groundwater analytical results are summarized as follows:

- **Cadmium** exceeded background in one sample with a **maximum concentration of 0.25 µg/L**.
- **Calcium** exceeded background in one sample with a **maximum concentration of 56000 µg/L**.
- **Chromium** exceeded background in one sample with a **maximum concentration of 4.8 µg/L**.
- **Cobalt** exceeded background in two samples with a **maximum concentration of 9.4 µg/L**.
- **Copper** exceeded background in one sample with a **maximum concentration of 2.7 µg/L**.
- **Iron** exceeded background in one sample with a **maximum concentration of 4400 µg/L**.
- **Magnesium** exceeded background in one sample with a **maximum concentration of 37000 µg/L**.
- **Manganese** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 1100 µg/L**.
- **Selenium** exceeded background in one sample with a **maximum concentration of 3.7 µg/L**.
- **Vanadium** exceeded background in one sample with a **maximum concentration of 3.7 µg/L**.
- **Zinc** exceeded background in one sample with a **maximum concentration of 110 µg/L**.
- **Arsenic** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 2.2 µg/L**.
- **Lead** exceeded background in one sample with a **maximum concentration of 2.7 µg/L**.
- **VOCs, SVOCs, pesticides, PCBs, explosives and propellants** were below Region 9 tap water PRGs and/or laboratory detection limits.



4.5 GEOTECHNICAL

Geotechnical analysis was conducted on three Shelby tube samples collected during this investigation. The results of the geotechnical analysis are summarized in the following table.

| Sample Number | Sample Depth (feet) | Moisture Content (%) | Liquid Limit (%) | Plastic Limit (%) | Plastic Index | Agg. (%) | C Sand (%) | M Sand (%) | F Sand (%) | Silt & Clay (%) | Soil Description. | USCS Classification | pH | Specific Gravity |
|---------------|---------------------|----------------------|------------------|-------------------|---------------|----------|------------|------------|------------|-----------------|---|---------------------|-----|------------------|
| L12mw-242 | 8-10 | 19.1 | NP | NP | NP | 0 | 0 | 0 | 0 | 99.3 | Gray SILT, trace sand | ML | 8.0 | 2.748 |
| L12mw-242 | 12-14 | 27.5 | NP | NP | NP | 0 | 0 | 0 | 0 | 100 | Grey SILT | ML | 7.9 | 2.780 |
| L12mw-246 | 6-8 | 17.1 | 33 | 22 | 11 | 0.3 | 1.9 | 4.9 | 12.8 | 80.1 | Brown LEAN CLAY with sand, trace gravel | CL | 8.2 | 2.780 |

4.6 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 B12. The following table shows the results of the slug tests performed in January to February 2005.

Hydraulic Conductivities in Building 1200 Monitoring Wells

| Monitoring Well ID | Screened Interval Depth (ft) | Total Borehole Depth (ft) | Geologic Material Adjacent to Screen | Hydraulic conductivity (cm/s) |
|--------------------|------------------------------|---------------------------|--------------------------------------|-------------------------------|
| MW-010 | 10-20 | 21 | sandstone w/shale interbeds | 4.48 E-5 |
| MW-011 | 14-24 | 24.7 | sandstone w/shale interbeds | 6.33 E-5 |
| MW-012 | 12-22 | 22.3 | sandstone w/shale interbeds | 6.63 E-5 |
| BKG-010 | ≈12-22 | ≈23 | sandstone w/shale interbeds | |

Based on the results of the slug tests, hydraulic conductivities arithmetic average is 5.71×10^{-5} cm/s in the soil underlying B12. 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 B12 (Figures B12-9 through B12-11). The water level data suggests that groundwater flows to the northeast at a gradient of approximately 0.018 ft/ft.



5.0 HUMAN HEALTH AND ECOLOGICAL RISK SCREENING FOR BUILDING 1200

This section details both the human health and ecological risk screening performed at B12.

5.1 HUMAN HEALTH RISK SCREENING

Volume 1, Section 5.1 explains how the B12 data were screened to determine human health contaminants of concern (COPCs). Total chromium analytical results were conservatively screened against $1/10^{\text{th}}$ 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 B12-10 presents the human health screening data for surface soil (0-1 ft) in B12. A total of 33 constituents were detected including metals and semi-volatile organic compounds (SVOCs).

- Fourteen constituents had detections greater than background concentrations: barium, beryllium, cadmium, calcium, chromium, cobalt, copper, lead, magnesium, potassium, selenium, sodium, zinc, and mercury.
- Six constituents had detections above the adjusted Region 9 residential PRGs: aluminum, arsenic, iron, manganese, and vanadium and RDX.
- Of these constituents, aluminum, chromium, iron, and manganese also had detected concentrations above both background and Region 9 residential PRGs.
- Two constituents have no established background value or Region 9 residential PRG: benzo (g,h,i)- perylene, and nitrocellulose

Based on these comparisons, seven chemicals of potential concern (COPC) were identified in surface soil (0-1 ft) in B12 including aluminum, chromium, iron, manganese, benzo(g,h,i)perylene, RDX, and nitrocellulose. Of these COPC aluminum, chromium, iron, manganese, and RDX were above either background concentrations or Region 9 residential PRGs. All other COPC were identified as COPC due to the lack of appropriate screening criteria.

5.1.2 Sediment

Table B12-11 presents the human health screening data for sediment at B12. Twenty-six constituents were detected in sediment. These constituents included mostly metals and a few volatile organic compounds (VOCs), and SVOCs.

- Seven constituents had detected concentrations greater than background values: beryllium, cadmium, cobalt, magnesium, nickel, sodium, and mercury.
- Five constituents had detections above the adjusted Region 9 residential PRGs: aluminum, arsenic, iron, manganese, and vanadium.
- Of these constituents, aluminum also had detected concentrations above both background and the Region 9 residential PRG.



Based on these comparisons, aluminum, benzo(g,h,i)perylene, and nitrocellulose were identified as COPC. Benzo(g,h,i)perylene, and nitrocellulose were identified due to the lack of appropriate screening criteria.

5.1.3 Surface Water

Table B12-12 presents the human health screening data for surface water at B12. Three surface water samples were collected from B12 resulting in a total of 28 detected constituents.

- Eleven constituents had detections greater than background concentrations: barium, calcium, chromium, iron, manganese, nickel, potassium, vanadium, lead, mercury, and thallium.
- Three constituents had detections above the Region 9 tap water PRGs: arsenic, RDX, and nitroglycerine.
- Of these constituents, manganese also had detected concentrations above both background and Region 9 tap water PRGs.

Based on these comparisons, three COPC were identified in surface water at B12: manganese, RDX, and nitroglycerine. All COPC were either above Region 9 tap water PRGs or both background and Region 9 tap water PRGs.

5.1.4 Groundwater

Table B12-13 presents the human health screening data for groundwater at B12. A total of 18 metals were detected in groundwater.

- Twelve constituents had detections greater than background concentrations: arsenic, cadmium, calcium, chromium, cobalt, copper, iron, magnesium, selenium, vanadium, zinc and lead.
- Two constituents, manganese, and arsenic, were detected above the Region 9 tap water PRGs.
- Arsenic was the only constituent detected above both background and Region 9 tap water PRGs.

Based on these comparisons, only arsenic was identified as a COPC in groundwater.

5.2 ECOLOGICAL RISK SCREENING

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

5.2.1 Surface Soil (0-1 ft)

Table B12-14 presents the ecological screening data for surface soil (0-1 ft) at B12. A total of 33 constituents were detected.

- Fourteen constituents had detections greater than background concentrations: aluminum, barium, beryllium, cadmium, calcium, chromium, copper, lead, magnesium, potassium, selenium, sodium, zinc, and mercury.
- Ten constituents had detections above ecological screening values: aluminum, chromium, copper, iron, lead, magnesium, selenium, vanadium, zinc, and mercury.



Based on these comparisons, 12 constituents were identified as chemicals of potential ecological concern (COPECs) in surface soil (0-1 ft) at B12: aluminum, chromium, copper, lead, magnesium, selenium, zinc, mercury, 2,4,6-TNT, HDX, RMX, and nitrocellulose. Of these COPECs, magnesium, 2,4,6-TNT, HDX, RMX, and nitrocellulose were identified due to the lack of screening criteria.

5.2.2 Sediment

Table B12-15 presents the ecological screening data for sediment at B12. Twenty-seven constituents were detected in sediment.

- Seven constituents had detected concentrations greater than background values: aluminum, beryllium, cadmium, magnesium, nickel, sodium, and mercury.
- Four constituents had detections above ecological screening values: nickel, mercury, gamma-BHC, and acetone.

Based on these comparisons, eight constituents were identified as COPECs: aluminum, beryllium, magnesium, nickel, mercury, gamma-BHC, acetone, and nitrocellulose. Of these COPECs, aluminum, beryllium, magnesium, and nitrocellulose were identified due to the lack of screening criteria.

5.2.3 Surface Water

Table B12-16 presents the ecological screening data for surface water at B12. Twenty-eight constituents were detected in surface water.

- Eleven had detections greater than background values: barium, calcium, chromium, iron, manganese, nickel, potassium, vanadium, lead, mercury, and thallium.
- None of the constituents were detected above ecological screening values.

Based on these comparisons, six constituents were identified as COPECs in surface water at B12: iron, manganese, mercury, acetone, benzoic acid, and benzyl alcohol. All of these COPECs, except mercury, were identified due to the lack of screening criteria. Mercury was identified as a COPEC in surface water because it is considered persistent, bioaccumulative, and toxic.



6.0 SUMMARY AND CONCLUSIONS FOR THE CHARACTERIZATION OF BUILDING 1200

This section briefly summarizes the existing conditions that were found during the AOC characterization at B12 and the risk screening tasks that were completed.

6.1 NATURE OF CONTAMINATION

The nature and extent of contamination is examined in four media: surface soil (0-1 ft), sediment, surface water and groundwater. Contaminants were detected above screening criteria in all environmental media sampled. Although there were relatively few organics detected above screening criteria, the location and concentration of the explosives detections and their relationship to historic operational areas may warrant further investigation.

- Contaminants detected in soil above background and/or Region 9 residential PRG screening values included metals, SVOCs, explosives and one propellant (nitrocellulose).
- In sediment, metals, one pesticide (gamma-BHC), two VOCs, two SVOCs and nitrocellulose were detected at concentrations above background and/or Region 9 residential PRG screening values.
- In surface water, several metals were detected above background and/or Region 9 tap water PRG screening values as well as VOCs, SVOCs, explosives and one propellant (nitroglycerine).
- In groundwater, metals were the only parameter with analytes that were detected at concentrations above background and/or Region 9 tap water PRG screening values.
- Explosives were detected in concentrations exceeding screening criteria for soil samples (B12ss-017 & B12ss-019) adjacent to the washout ditch for B12 and in the surface water in the ditch leading to the sedimentation pond (B12sws-025) as well as the sedimentation pond itself (B12sw-026).

6.2 HUMAN HEALTH RISK SCREENING

A Human Health Risk Screening (HHRS) was conducted to compare the concentrations detected in the B12 samples to RVAAP-specific background values and U.S. EPA Region 9 tap water PRGs. This preliminary screen was conducted to identify potential COPCs. The following table identifies the COPCs by media.



| Table B12-18 | | | |
|--|----------------------|----------------------|--------------------|
| Chemical of Potential Concern – All Media | | | |
| Soils | Sediment | Surface Water | Groundwater |
| Aluminum | Aluminum | Manganese | Arsenic |
| Chromium | Benzo(g,h,i)perylene | RDX | |
| Iron | Nitrocellulose | Nitroglycerine | |
| Manganese | | | |
| Benzo(g,h,i)perylene | | | |
| RDX | | | |
| Nitrocellulose | | | |

6.3 ECOLOGICAL RISK SCREENING

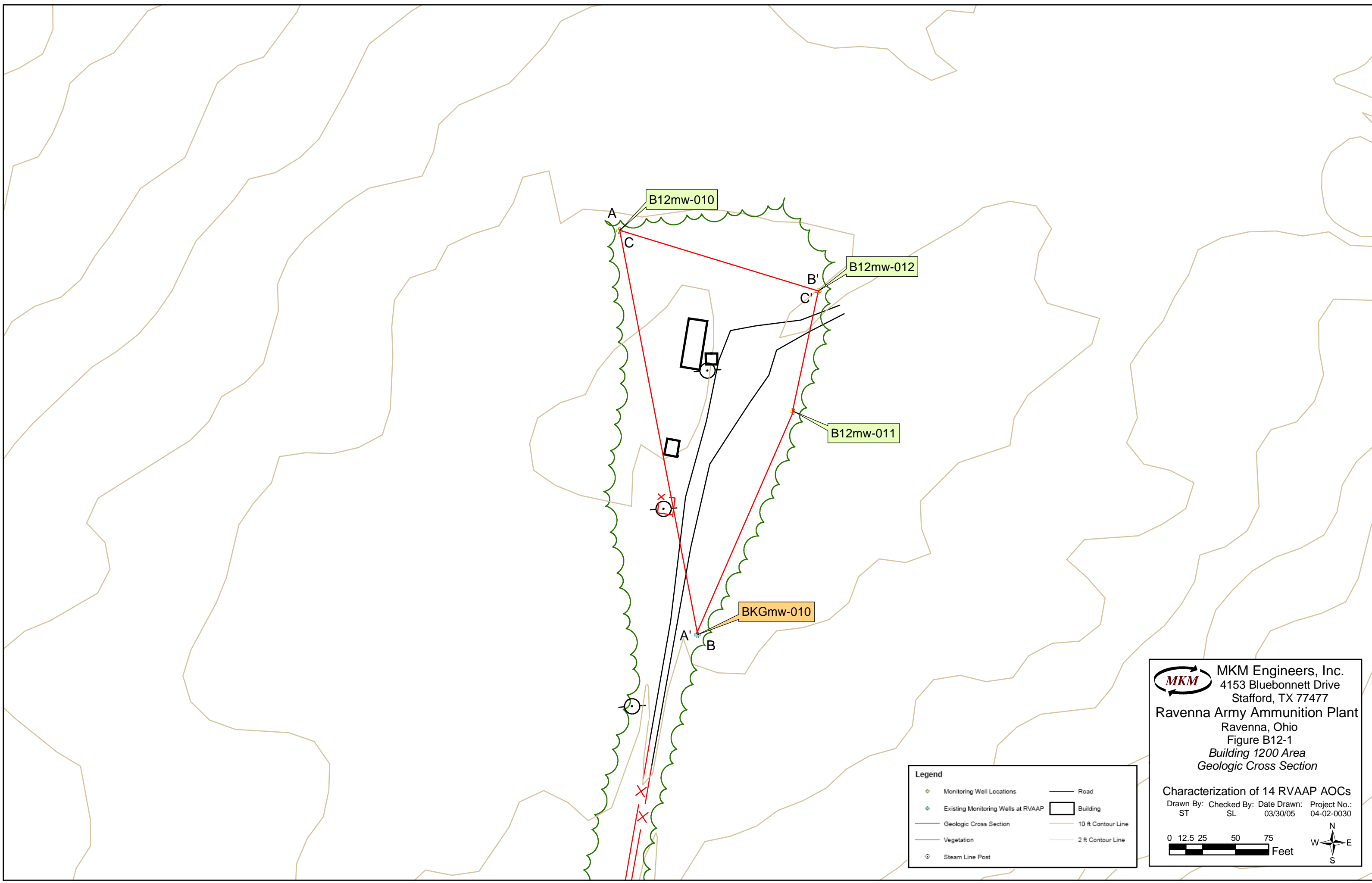
An Ecological Risk Screening (ERS) was performed to compare contaminant concentrations detected in B12 to RVAAP-specific background values and ecological screening values. The ERS was conducted as outlined in Volume 1, Section 5.2. The ERS identified COPECs for B12. The following table summarizes those COPECs by media.

| Table B12-19 | | | |
|---|-----------------|----------------------|-----------------------------------|
| Chemical of Potential Ecological Concern – All Media | | | |
| Soils | Sediment | Surface Water | Groundwater |
| Aluminum | Beryllium | Iron | Groundwater not evaluated for ERS |
| Barium | Mercury | Manganese | |
| Chromium | Gamma-BHC | Mercury | |
| Copper | Acetone | Acetone | |
| Iron | Nitrocellulose | Benzoic Acid | |
| Lead | | Benzyl alcohol | |
| Manganese | | | |
| Selenium | | | |
| Zinc | | | |
| Mercury | | | |
| 2,4,6-TNT | | | |
| HMX | | | |
| RDX | | | |
| Nitrocellulose | | | |



6.4 CONCLUSION

Based on COPCs identified in Section 6.2 and COPECs identified in Section 6.3 it is recommended that a full risk assessment be completed to evaluate whether the contaminants impact the AOC. The full risk assessment along with an evaluation of uncertainties should be considered in the overall risk management decisions that are made for B12.



B12mw-010

B12mw-012

B12mw-011

BKGmw-010

A

C

B'

C'

A'

B

Legend

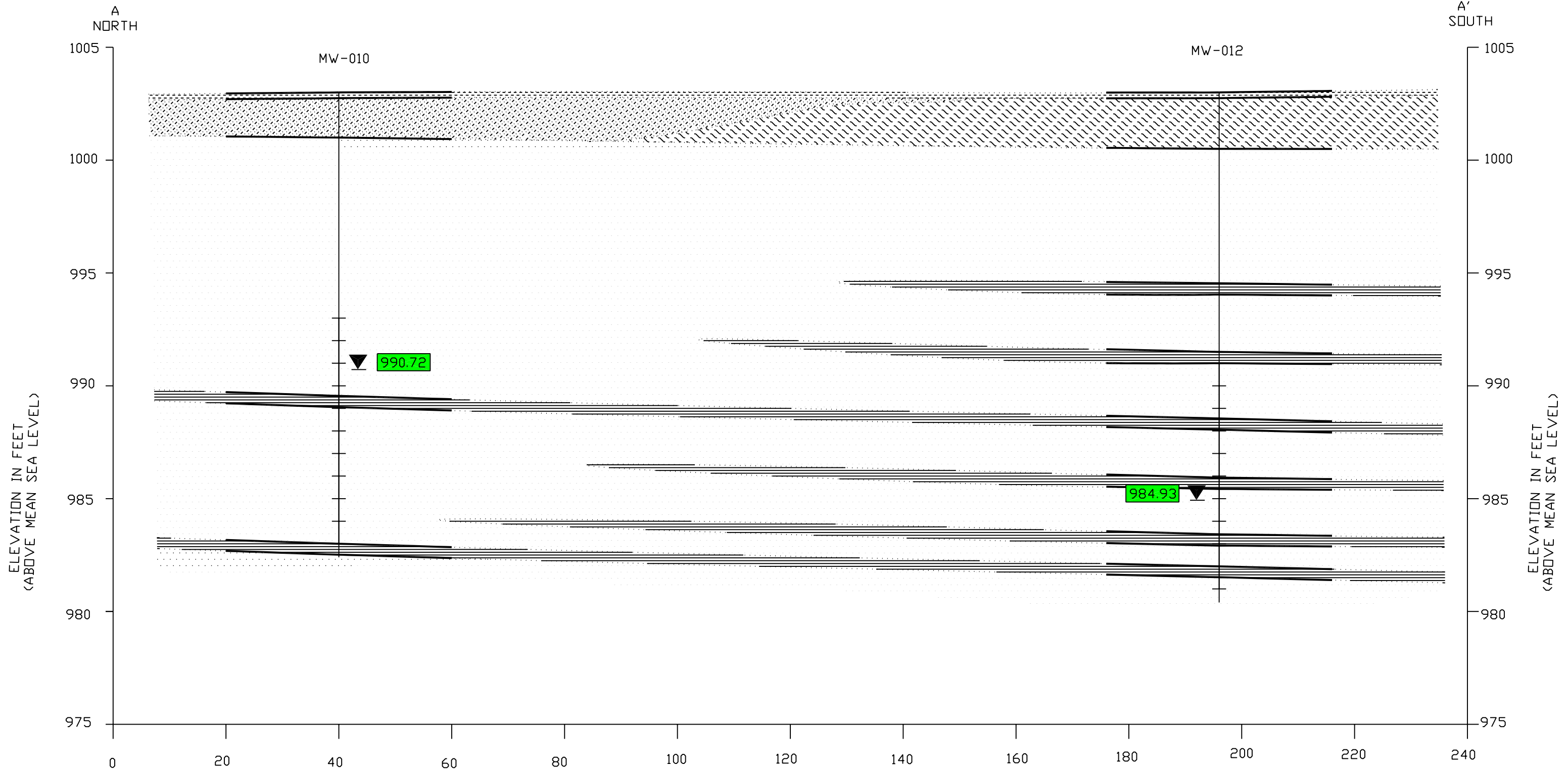
| | |
|--------------------------------------|----------------------|
| ◆ Monitoring Well Locations | — Road |
| ◆ Existing Monitoring Wells at RVAAP | ▭ Building |
| — Geologic Cross Section | — 10 ft Contour Line |
| — Vegetation | — 2 ft Contour Line |
| ⊙ Steam Line Post | |

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

Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-1
Building 1200 Area
 Geologic Cross Section

Characterization of 14 RVAAP AOCs
 Drawn By: ST Checked By: SL Date Drawn: 03/30/05 Project No.: 04-02-0030

0 12.5 25 50 75 Feet



LEGEND

| | | | | | | | |
|--|-------------|--|-----------------|--|-------------------------------|--|-------------------------------------|
| | TOP SOIL | | SAND STONE | | DEPTH GROUNDWATER ENCOUNTERED | | KNOWN SUBSURFACE SOIL CONDITIONS |
| | CLAYEY SILT | | SHALE | | GROUNDWATER ELEVATION (ft) | | EXPECTED SUBSURFACE SOIL CONDITIONS |
| | SANDY SILT | | SCREEN INTERVAL | | | | |

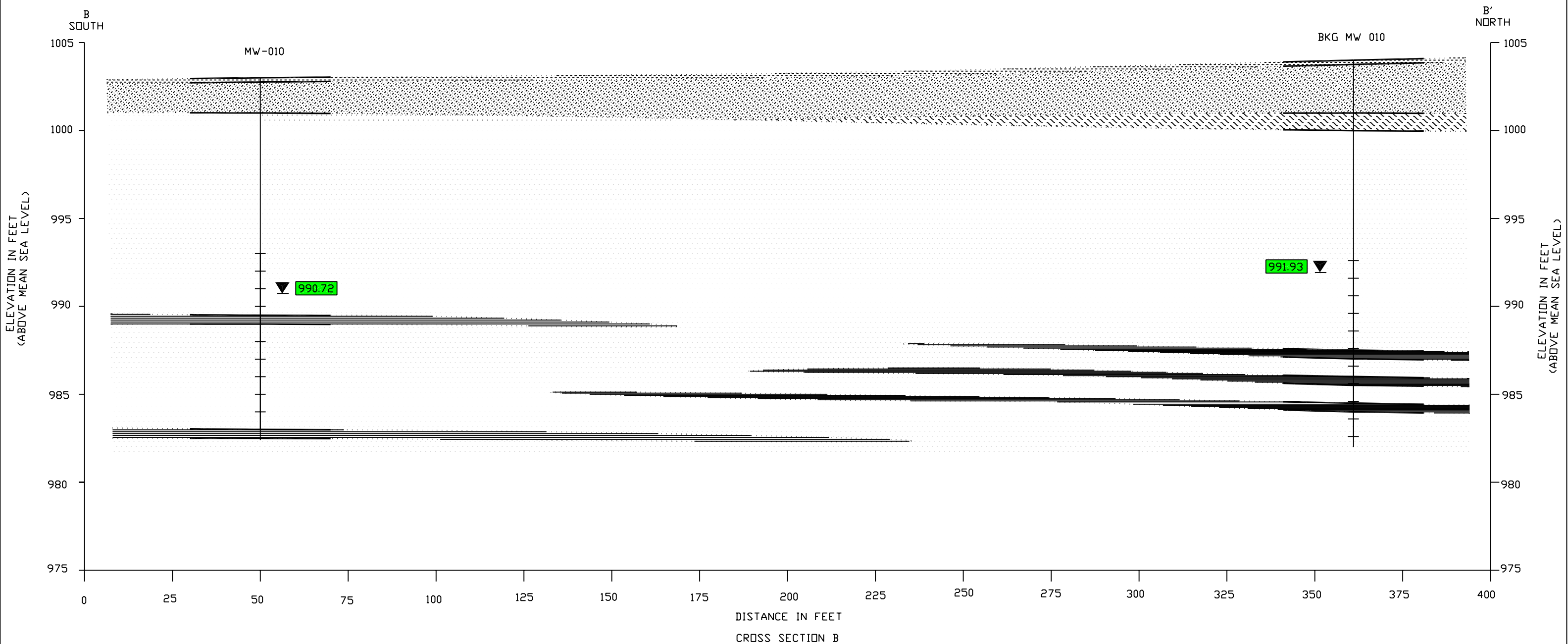
| REVISIONS | | | | |
|-----------|-----|-------------|----------|----------|
| ZONE | REV | DESCRIPTION | DATE | APPROVED |
| | | | 05/25/06 | MS |

MKM ENGINEERS, INC.

DATE DRAWN 04/18/05

FIGURE B12-2
BUILDING 1200
GEOLOGIC CROSS SECTION A
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

| | | | |
|-------------|--------------|---------------|-----|
| SIZE D | PROJECT NO. | DWG NO. B12-2 | REV |
| DRAWN BY ST | APPR. BY SRL | | |



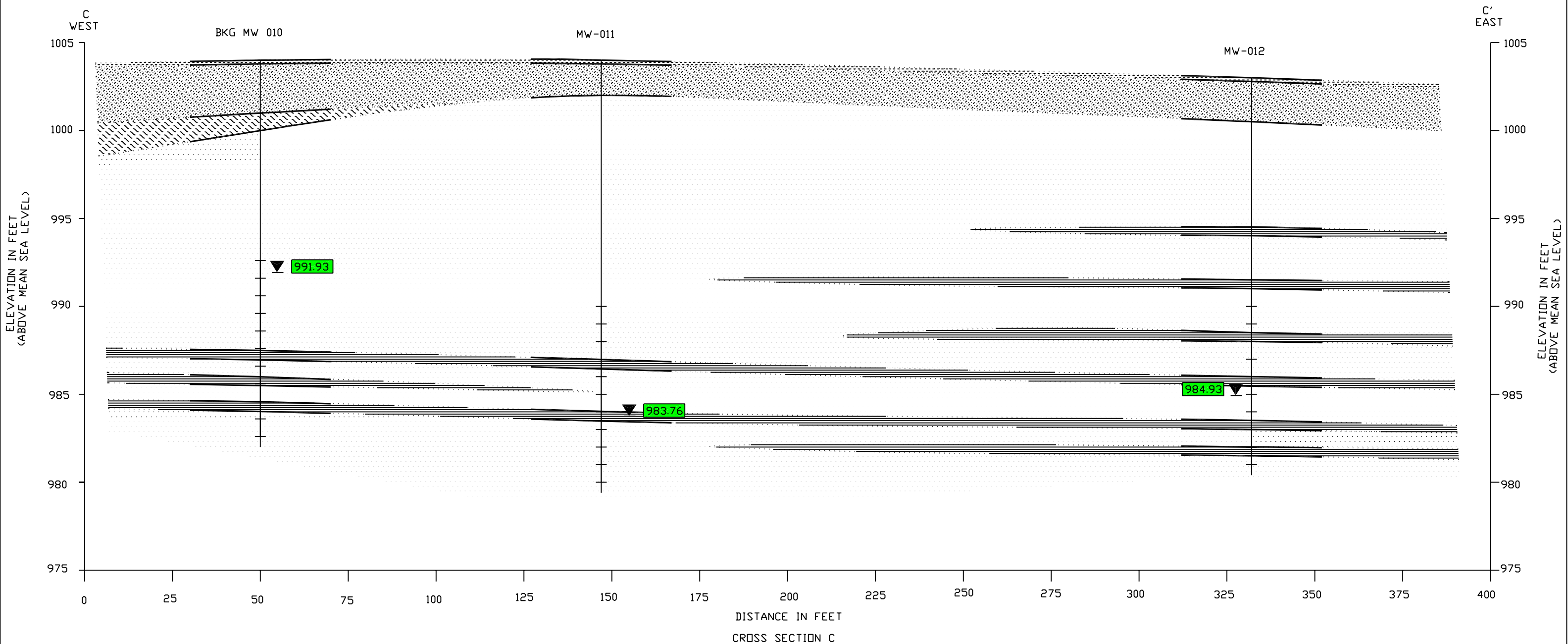
| LEGEND | |
|--------|-------------------------------------|
| | TOP SOIL |
| | SAND STONE |
| | CLAYEY SILT |
| | SANDY SILT |
| | SHALE |
| | SCREEN INTERVAL |
| | DEPTH GROUNDWATER ENCOUNTERED |
| | GROUNDWATER ELEVATION (ft) |
| | KNOWN SUBSURFACE SOIL CONDITIONS |
| | EXPECTED SUBSURFACE SOIL CONDITIONS |

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

MKM ENGINEERS, INC.

DATE DRAWN 04/18/05

| | | | |
|--|-----------------|------------------|-----|
| FIGURE B12-3 BUILDING 1200 GEOLOGIC CROSS SECTION B RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO | | | |
| SIZE D | PROJECT NO. | DWG NO. B12-3 | REV |
| DRAWN BY ST | APPR. BY SRL | | |



CROSS SECTION C
 HORIZONTAL 1"=25'
 VERTICAL 1"=5'

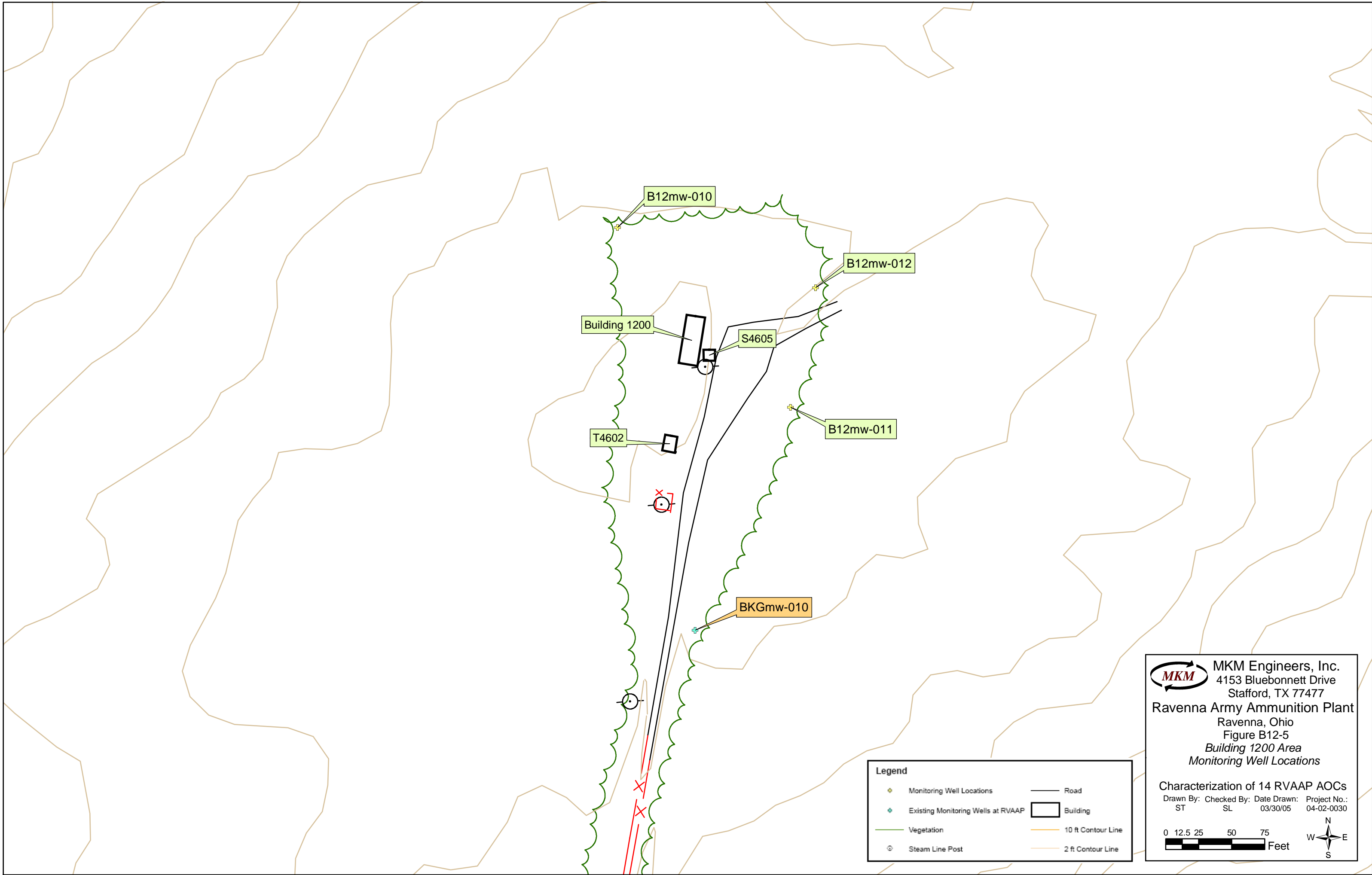
VERTICAL EXAGGERATION = 10X

| LEGEND | |
|--------|-------------------------------------|
| | TOP SOIL |
| | CLAYEY SILT |
| | SANDY SILT |
| | SAND STONE |
| | SHALE |
| | SCREEN INTERVAL |
| | DEPTH GROUNDWATER ENCOUNTERED |
| | GROUNDWATER ELEVATION (ft) |
| | KNOWN SUBSURFACE SOIL CONDITIONS |
| | EXPECTED SUBSURFACE SOIL CONDITIONS |

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

MKM ENGINEERS, INC.
 DATE DRAWN 04/18/05

| FIGURE B12-4 BUILDING 1200 GEOLOGIC CROSS SECTION C RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO | | | |
|--|-------------|----------|-----|
| SIZE D | PROJECT NO. | DWG NO. | REV |
| | | B12-4 | |
| DRAWN BY | ST | APPR. BY | SRL |



B12mw-010

B12mw-012

Building 1200

S4605

T4602

B12mw-011

BKGmw-010

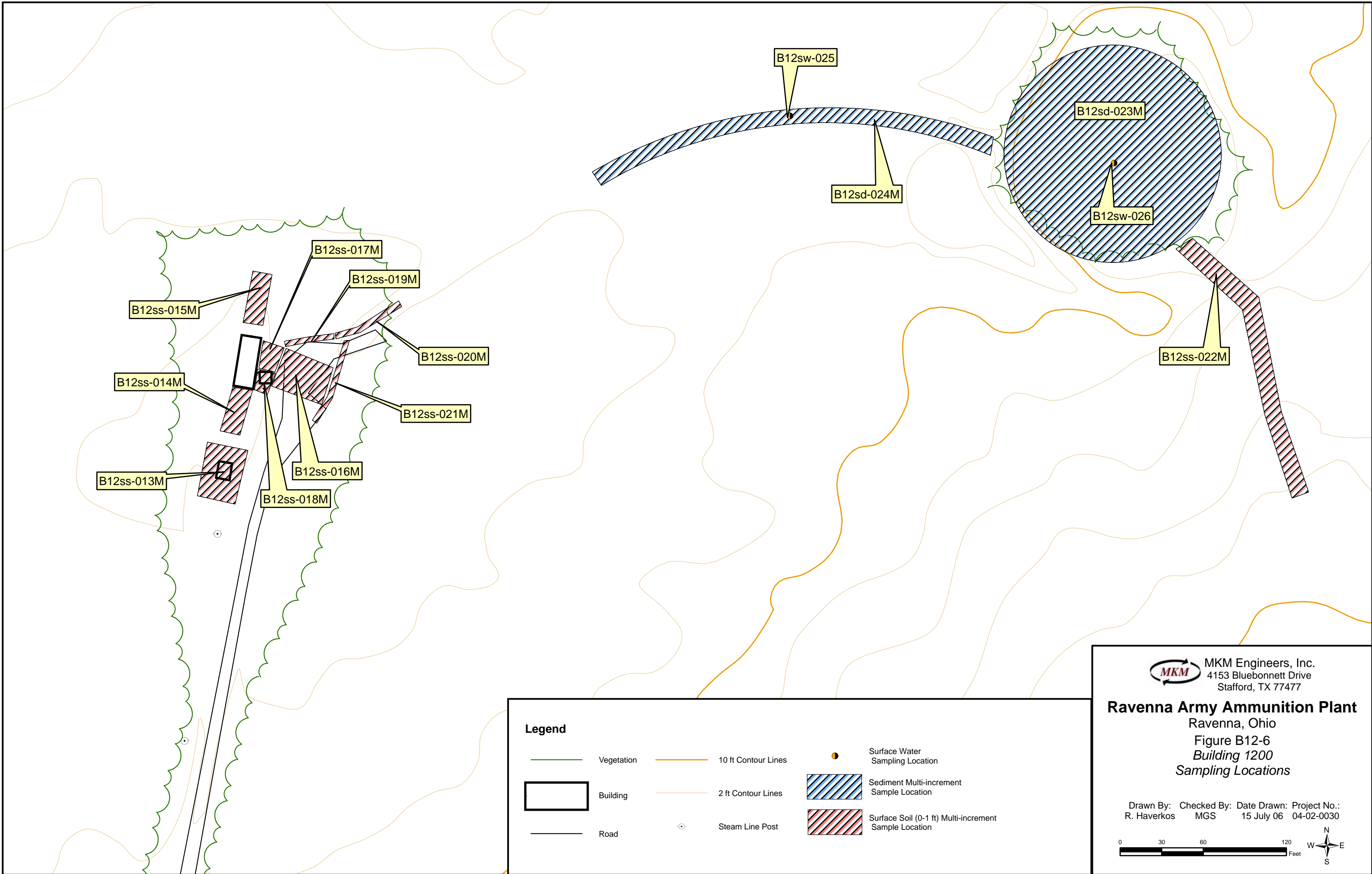
MKM MKM Engineers, Inc.
 4153 Bluebonnet Drive
 Stafford, TX 77477
 Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-5
 Building 1200 Area
 Monitoring Well Locations

Characterization of 14 RVAAP AOCs
 Drawn By: ST Checked By: SL Date Drawn: 03/30/05 Project No.: 04-02-0030

0 12.5 25 50 75 Feet

Legend

| | |
|------------------------------------|--------------------|
| Monitoring Well Locations | Road |
| Existing Monitoring Wells at RVAAP | Building |
| Vegetation | 10 ft Contour Line |
| Steam Line Post | 2 ft Contour Line |



Legend

| | | | | | |
|--|------------|--|---------------------|--|---|
| | Vegetation | | 10 ft Contour Lines | | Surface Water Sampling Location |
| | Building | | 2 ft Contour Lines | | Sediment Multi-increment Sample Location |
| | Road | | Steam Line Post | | Surface Soil (0-1 ft) Multi-increment Sample Location |

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

Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-6
 Building 1200
 Sampling Locations

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

| B12ss-013M-SO | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 12000 | mg/kg | |
| Arsenic | 11 | mg/kg | |
| Chromium | 18 | mg/kg | |
| Iron | 21000 | mg/kg | |
| Lead | 36 | mg/kg | J |
| Manganese | 530 | mg/kg | |
| Potassium | 970 | mg/kg | J |
| Sodium | 300 | mg/kg | |
| Vanadium | 21 | mg/kg | |
| Zinc | 70 | mg/kg | |

| B12ss-013M-DUP | | | |
|----------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 12000 | mg/kg | |
| Arsenic | 11 | mg/kg | |
| Barium | 90 | mg/kg | |
| Chromium | 19 | mg/kg | |
| Cobalt | 11 | mg/kg | |
| Iron | 22000 | mg/kg | |
| Lead | 34 | mg/kg | |
| Manganese | 710 | mg/kg | |
| Potassium | 1000 | mg/kg | |
| Sodium | 330 | mg/kg | |
| Vanadium | 23 | mg/kg | |
| Zinc | 73 | mg/kg | |
| Mercury | 0.047 | mg/kg | |

| B12ss-015M-SO | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 12000 | mg/kg | |
| Arsenic | 10 | mg/kg | |
| Chromium | 18 | mg/kg | |
| Cobalt | 13 | mg/kg | |
| Iron | 21000 | mg/kg | |
| Manganese | 670 | mg/kg | |
| Sodium | 260 | mg/kg | |
| Vanadium | 24 | mg/kg | |
| Mercury | 0.05 | mg/kg | |

| B12ss-021M-SO | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 13000 | mg/kg | |
| Arsenic | 9.5 | mg/kg | |
| Barium | 110 | mg/kg | |
| Beryllium | 1.2 | mg/kg | |
| Cadmium | 0.24 | mg/kg | |
| Chromium | 24 | mg/kg | |
| Iron | 18000 | mg/kg | |
| Lead | 32 | mg/kg | |
| Magnesium | 3200 | mg/kg | |
| Manganese | 910 | mg/kg | |
| Potassium | 980 | mg/kg | |
| Sodium | 390 | mg/kg | |
| Vanadium | 22 | mg/kg | |
| Zinc | 110 | mg/kg | |

| B12ss-014M-SO | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 12000 | mg/kg | |
| Arsenic | 12 | mg/kg | |
| Cadmium | 0.1 | mg/kg | |
| Chromium | 20 | mg/kg | |
| Iron | 23000 | mg/kg | |
| Manganese | 480 | mg/kg | |
| Potassium | 1200 | mg/kg | |
| Sodium | 320 | mg/kg | |
| Vanadium | 22 | mg/kg | |
| Zinc | 72 | mg/kg | |
| Mercury | 0.059 | mg/kg | |

| B12ss-016M-SO | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 30000 | mg/kg | |
| Arsenic | 2.7 | mg/kg | |
| Barium | 320 | mg/kg | |
| Beryllium | 5.9 | mg/kg | |
| Cadmium | 0.46 | mg/kg | |
| Calcium | 190000 | mg/kg | |
| Chromium | 20 | mg/kg | |
| Iron | 9900 | mg/kg | |
| Magnesium | 21000 | mg/kg | |
| Manganese | 4100 | mg/kg | |
| Potassium | 2300 | mg/kg | |
| Selenium | 1.6 | mg/kg | |
| Sodium | 1200 | mg/kg | |
| Zinc | 66 | mg/kg | |

| B12sw-025-DUP | | | |
|---------------|-------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Barium | 91 | ug/l | |
| Calcium | 49000 | ug/l | |
| Chromium | 2.8 | ug/l | |
| Iron | 3900 | ug/l | |
| Manganese | 4500 | ug/l | |
| Nickel | 2.9 | ug/l | |
| Potassium | 6700 | ug/l | |
| Vanadium | 2.8 | ug/l | |
| Arsenic | 3 | ug/l | |
| Lead | 1.2 | ug/l | |
| Thallium | 1.5 | ug/l | |

| B12sw-025-SW | | | |
|--------------|-------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Barium | 86 | ug/l | |
| Calcium | 48000 | ug/l | |
| Chromium | 1.8 | ug/l | |
| Iron | 3100 | ug/l | |
| Manganese | 4500 | ug/l | |
| Nickel | 2.4 | ug/l | |
| Potassium | 6500 | ug/l | |
| Arsenic | 1.7 | ug/l | |

| B12sw-025-SW | | | |
|----------------|------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| RDX | 42 | ug/l | |
| Nitroglycerine | 5.9 | ug/l | J |

| B12sw-025-DUP | | | |
|----------------|------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| RDX | 35 | ug/l | |
| Nitroglycerine | 5.4 | ug/l | |

| B12sd-023M-SD | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 10000 | mg/kg | |
| Arsenic | 9.6 | mg/kg | |
| Beryllium | 0.76 | mg/kg | |
| Iron | 19000 | mg/kg | |
| Manganese | 210 | mg/kg | |
| Nickel | 22 | mg/kg | |
| Sodium | 290 | mg/kg | |
| Vanadium | 19 | mg/kg | |

| B12sd-023M-DUP | | | |
|----------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 11000 | mg/kg | |
| Arsenic | 11 | mg/kg | |
| Beryllium | 0.8 | mg/kg | |
| Cobalt | 11 | mg/kg | |
| Iron | 21000 | mg/kg | |
| Magnesium | 2900 | mg/kg | |
| Manganese | 210 | mg/kg | |
| Nickel | 24 | mg/kg | |
| Sodium | 370 | mg/kg | |
| Vanadium | 19 | mg/kg | |
| Mercury | 0.085 | mg/kg | |

| B12sd-024M-SD | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 15000 | mg/kg | |
| Arsenic | 8 | mg/kg | |
| Beryllium | 0.86 | mg/kg | |
| Cadmium | 0.19 | mg/kg | |
| Iron | 23000 | mg/kg | |
| Manganese | 390 | mg/kg | |
| Nickel | 22 | mg/kg | |
| Sodium | 290 | mg/kg | |
| Vanadium | 26 | mg/kg | |
| Mercury | 0.2 | mg/kg | |

| B12sw-026-SW | | | |
|--------------|--------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Chromium | 1.7 | ug/l | |
| Manganese | 480 | ug/l | |
| Nickel | 2 | ug/l | |
| Potassium | 4600 | ug/l | |
| Mercury | 0.051 | ug/l | |


| B12sw-026-SW | | | |
|--------------|------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| RDX | 2.8 | ug/l | |

| B12ss-022M-SO | | | |
|---------------|--------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Aluminum | 15000 | mg/kg | |
| Arsenic | 14 | mg/kg | |
| Barium | 100 | mg/kg | |
| Beryllium | 0.93 | mg/kg | |
| Chromium | 23 | mg/kg | |
| Cobalt | 15 | mg/kg | |
| Iron | 28000 | mg/kg | |
| Manganese | 1800 | mg/kg | |
| Potassium | 1200 | mg/kg | |
| Sodium | 340 | mg/kg | |
| Vanadium | 29 | mg/kg | |
| Zinc | 67 | mg/kg | |
| Mercury | 0.097 | mg/kg | |


Legend

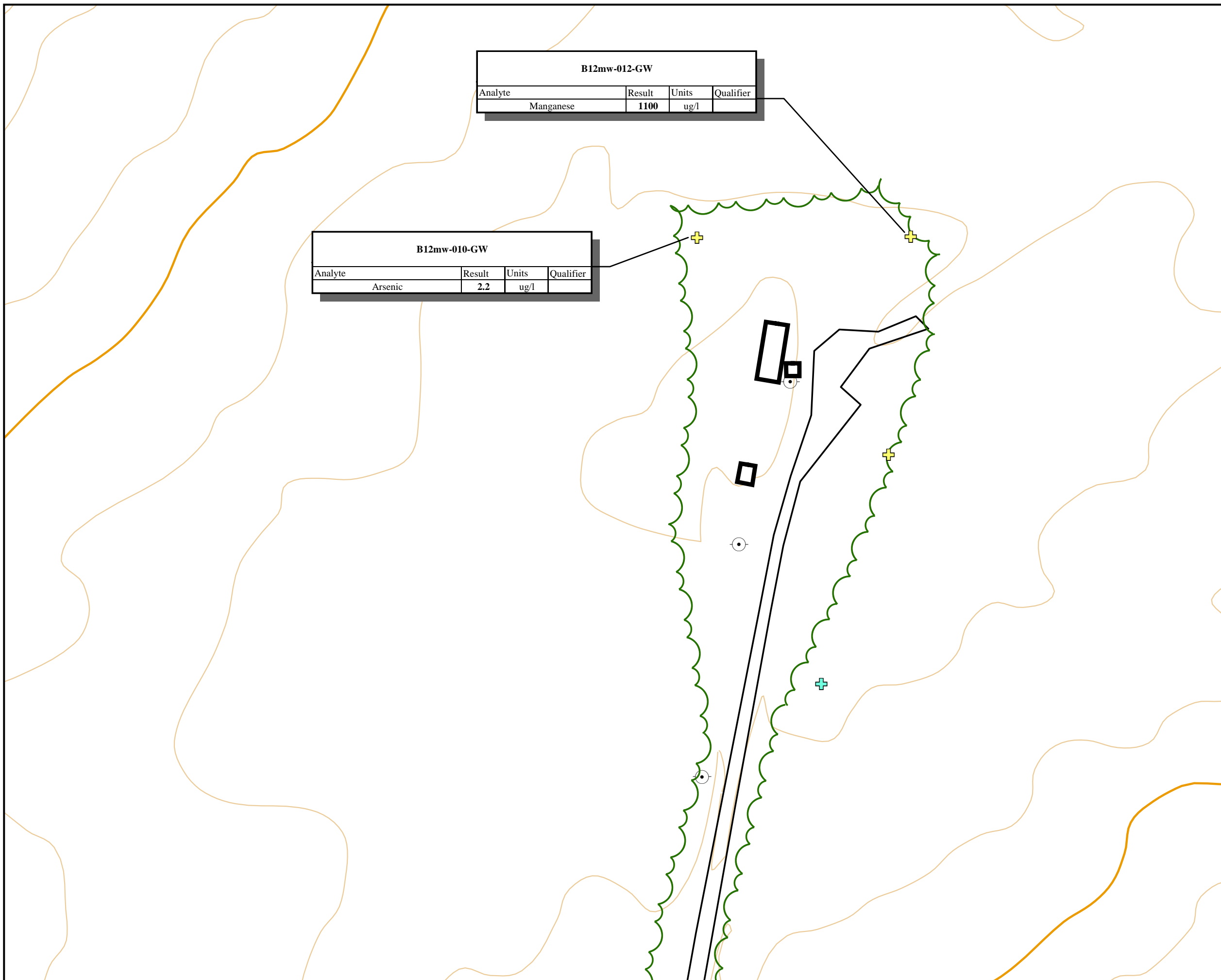
- Surface Water Sampling Location
- Steam Line Post
- Vegetation
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Building
- ▨ Surface Soil (0-1 ft) Multi-increment Sample Location
- ▨ Sediment Multi-increment Sample Location

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 & Background, 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 Bluebonnet Drive
 Stafford, TX 77477
Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-7
 Building 1200
 Soil, Sediment and Surface Water
 Sample Location Exceedences

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

0 30 60 120 Feet




| B12mw-012-GW | | | |
|--------------|-------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Manganese | 1100 | ug/l | |

| B12mw-010-GW | | | |
|--------------|------------|-------|-----------|
| Analyte | Result | Units | Qualifier |
| Arsenic | 2.2 | ug/l | |

Legend

- Vegetation
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Building
- Monitoring Well Locations
- Existing Monitoring Well Locations
- Steam Line Post

Notes:
 If Result = or > Background, then the value is presented with a shaded/highlighted style
 If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style.
 If Result = or > PRG, then the value is presented with a bold style.
 Result < PRG & Background, then the value is presented with a normal style.
 ug/l - micrograms per liter (parts per billion - ppb)

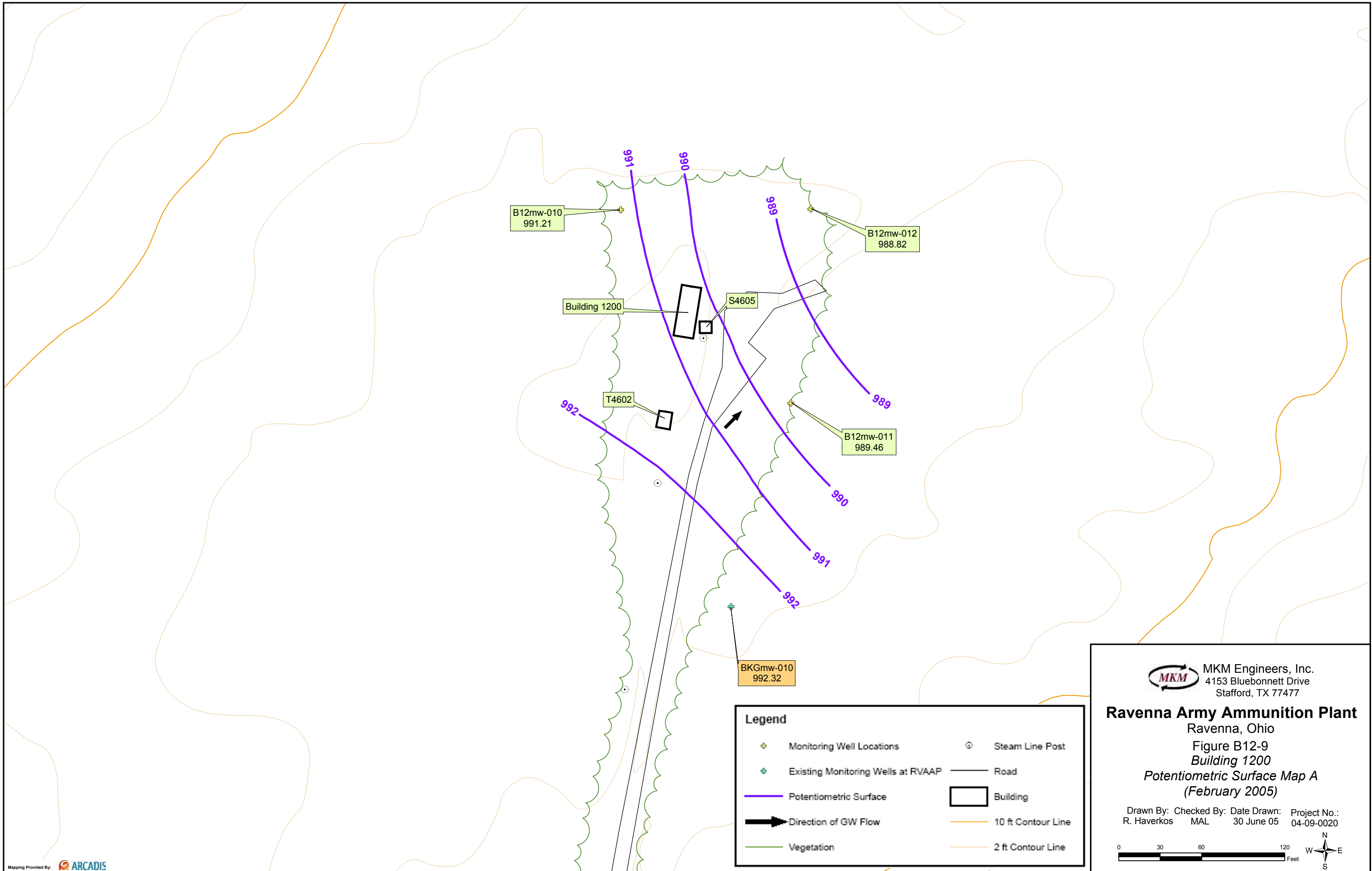


MKM Engineers, Inc.
 4153 Bluebonnett Drive
 Stafford, TX 77477

Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-8
Building 1200
Groundwater Sample Location Exceedences

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





Mapping Provided By: ARCADIS

Legend

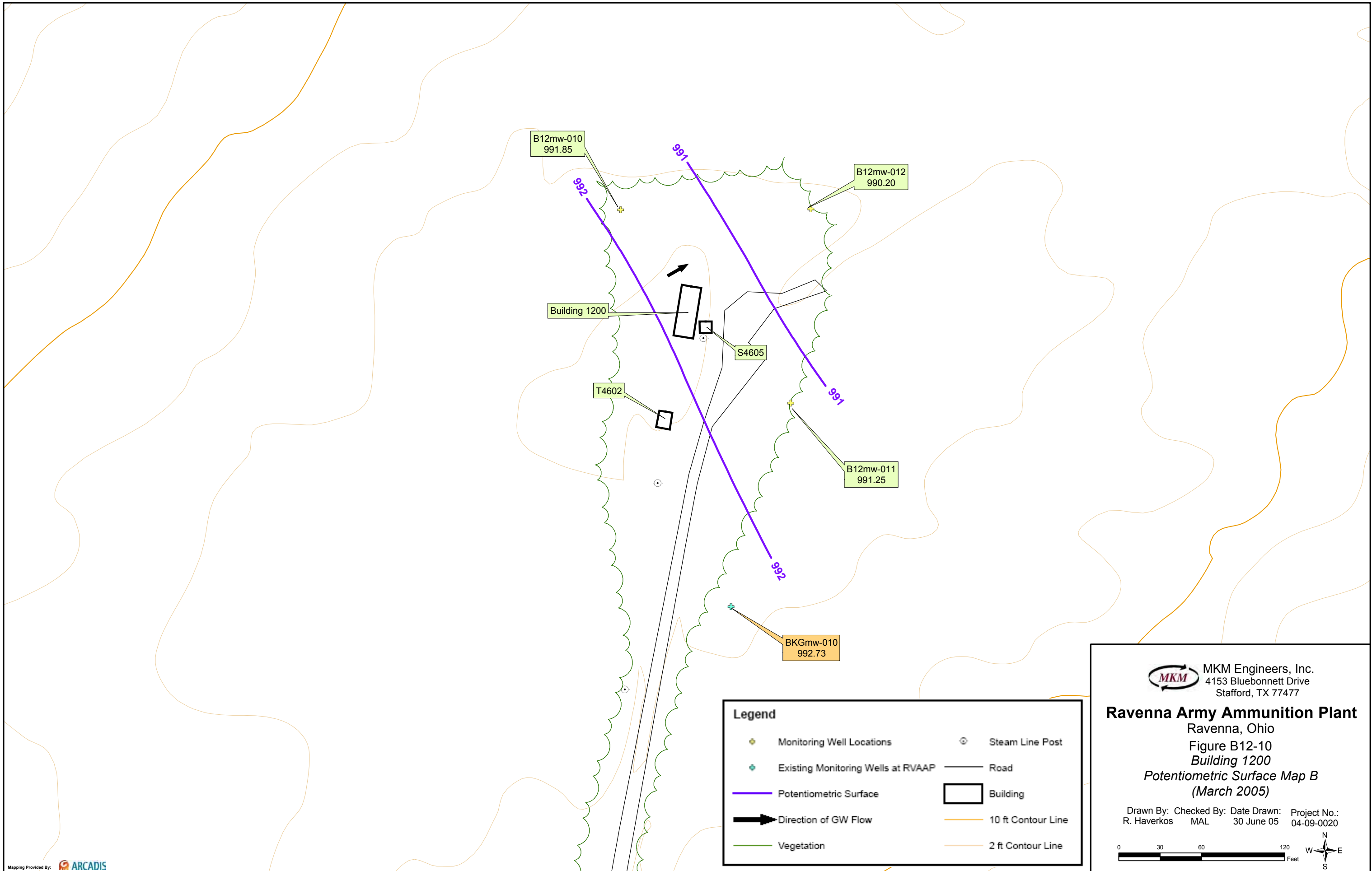
| | |
|------------------------------------|--------------------|
| Monitoring Well Locations | Steam Line Post |
| Existing Monitoring Wells at RVAAP | Road |
| Potentiometric Surface | Building |
| Direction of GW Flow | 10 ft Contour Line |
| Vegetation | 2 ft Contour Line |

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

Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-9
 Building 1200
 Potentiometric Surface Map A
 (February 2005)

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

0 30 60 120 Feet



Mapping Provided By: ARCADIS

Legend

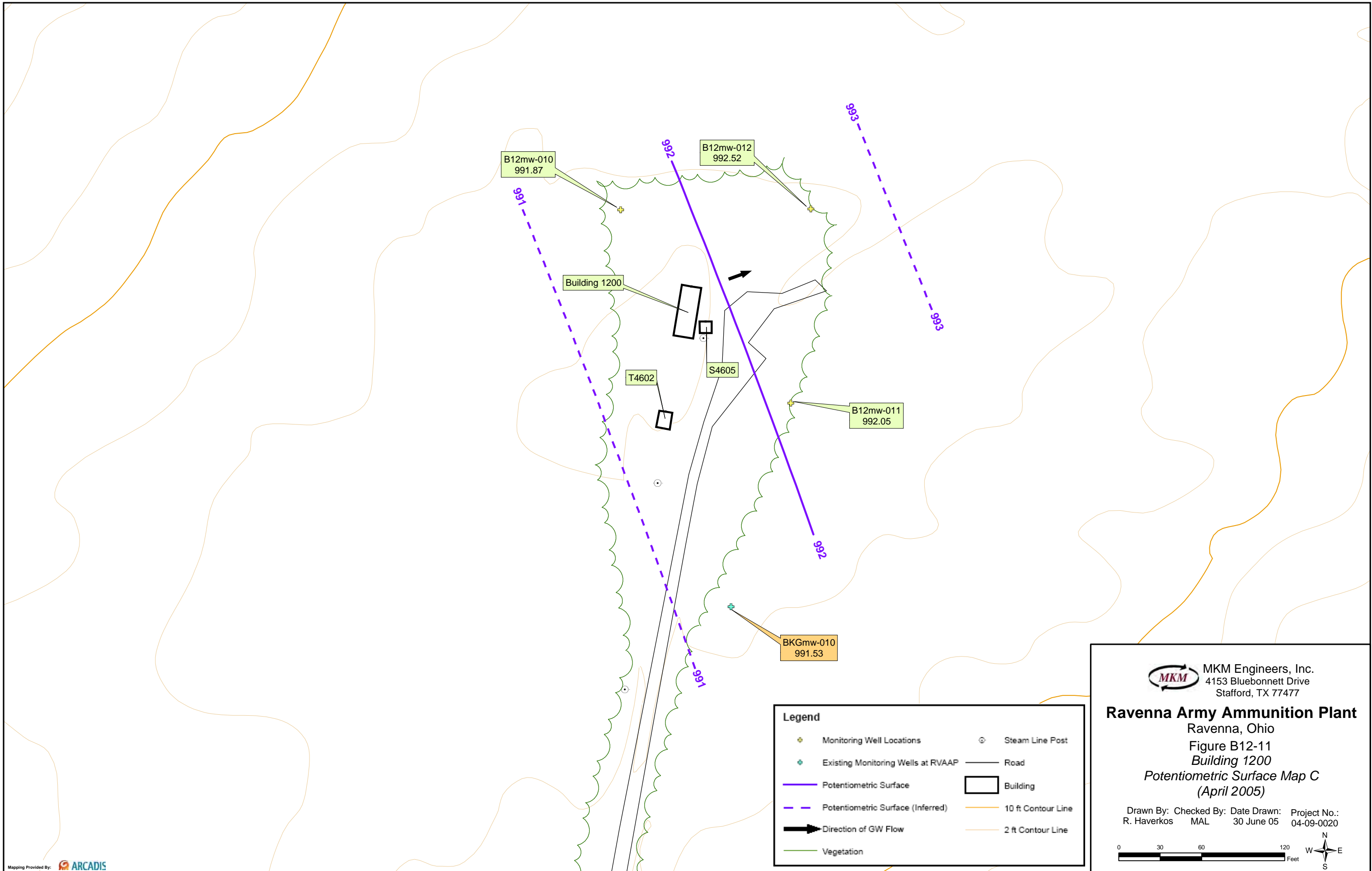
| | |
|------------------------------------|--------------------|
| Monitoring Well Locations | Steam Line Post |
| Existing Monitoring Wells at RVAAP | Road |
| Potentiometric Surface | Building |
| Direction of GW Flow | 10 ft Contour Line |
| Vegetation | 2 ft Contour Line |

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

Ravenna Army Ammunition Plant
 Ravenna, Ohio
 Figure B12-10
 Building 1200
 Potentiometric Surface Map B
 (March 2005)

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

0 30 60 120 Feet



Mapping Provided By: ARCADIS

Legend

| | |
|------------------------------------|--------------------|
| Monitoring Well Locations | Steam Line Post |
| Existing Monitoring Wells at RVAAP | Road |
| Potentiometric Surface | Building |
| Potentiometric Surface (Inferred) | 10 ft Contour Line |
| Direction of GW Flow | 2 ft Contour Line |
| Vegetation | |

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

Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure B12-11
Building 1200
Potentiometric Surface Map C
(April 2005)

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

0 30 60 120 Feet

Table B12-1
Building 1200 Summary of Sampling and Analysis
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| SAMPLE PREFIX | SAMPLE ID | VOC | SVOC | Explosives | Propellants | TAL Metals | Chrome +6 | Pesticides | PCB | Cyanides | Nitrate | TOC | Geo-Tech | Grain | FIELD QA/QC SAMPLES | | | | | |
|--|-----------|-------|-------|------------|-------------|------------|-----------|------------|-------|-------------|-----------|-----------|-----------|-----------|----------------------|------------------|-----------------|------------|--------|-------------|
| | | 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 |
| MULTI-INCREMENTAL SOILS | | | | | | | | | | | | | | | | | | | | |
| <i>Surface Soils</i> | SS-013M | | | 1 | | 1 | | | | | | | | | | | 1 | | 1 | 1 |
| | SS-014M | | | 1 | | 1 | | | | | | | | | | | | | | |
| | SS-015M | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | | | | | | | | | |
| | SS-016M | | | 1 | | 1 | | | | | | | | | | | | | | |
| | SS-017M | | | 1 | | 1 | | | | | | | | | | | | | | |
| | SS-018M | | | 1 | | 1 | | | | | | | | | | | | | | |
| <i>Dry-Ditch Soils</i> | SS-019M | | | 1 | | 1 | | | | | | | | | | | | | | |
| | SS-020M | | | 1 | | 1 | | | | | | | | | | | | | | |
| | SS-021M | | | 1 | | 1 | | | | | | | | | | | | | | |
| | SS-022M | | | 1 | | 1 | | | | | | | | | | | | | | |
| GROUNDWATER | | | | | | | | | | | | | | | | | | | | |
| | MW-010 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | MW-011 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | | 1 | 1 | | | 1 | | | 1 |
| | MW-012 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | | | | | | | | | |
| <i>Background Well</i> | BKGMW-010 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | | | | | | | | | |
| SURFACE WATER | | | | | | | | | | | | | | | | | | | | |
| | SW-025 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | | | | | | 1 | 0 | 0 | 0 |
| <i>Pond/Wet Ditch/Spring</i> | SW-026 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | | | | | | 1 | | | 1 |
| SEDIMENT | | | | | | | | | | | | | | | | | | | | |
| | SD-023M | | | 1 | | 1 | | | | | | 1 | | 1 | | | 1 | | | 1 |
| <i>Pond/Wet Ditch/Spring</i> | SD-024M | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | |
| 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 B12-2
Building 1200 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO |
|-------------|----------------|-----------------------------|------------------------------------|--|-------|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | | | | Sample Date: 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/4/2004 | 11/4/2004 | 11/4/2004 | 11/5/2004 | 11/5/2004 | 12/1/2004 | 12/1/2004 | 11/10/2004 | 11/10/2004 |
| | | | | | | Sample Depth: 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-0.5 ft | 0-1 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-1 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | | | | | | | | | | | | |
| Metals | 6010B | Aluminum | 7614 nc | 17700 | mg/kg | 12000 | 12000 | 12000 | | 12000 | 30000 | 17000 | 14000 | 16000 | 14000 | 13000 | 15000 |
| | 6010B | Arsenic | 0.39 ca | 15.4 | mg/kg | 11 | 11 | 12 | | 10 | 2.7 | 6.8 | 12 | 11 | 11 | 9.5 | 14 |
| | 6010B | Barium | 538 nc | 88.4 | mg/kg | 90 | 86 | 74 | | 79 | 320 | 200 | 96 | 120 | 97 | 110 | 100 |
| | 6010B | Beryllium | 15 nc | 0.88 | mg/kg | 0.8 | 0.75 | 0.78 | | 0.69 | 5.9 | 2.9 | 1.2 | 1.2 | 0.87 | 1.2 | 0.93 |
| | 6010B | Cadmium | 3.7 nc | 0.00 | mg/kg | | | 0.1 | | | 0.46 | 3.3 | 0.52 | | | 0.24 | |
| | 6010B | Calcium | --[n] | 15800 | mg/kg | 4800 | 4700 | 3400 | | 1700 | 190000 | 79000 | 16000 | 17000 | 4500 | 15000 | 1400 |
| | 6010B | Chromium | 30 ca | 17.4 | mg/kg | 19 | 18 | 20 | | 18 | 20 | 33 | 22 | 24 | 22 | 24 | 23 |
| | 6010B | Cobalt | 30 ca | 10.4 | mg/kg | 11 | 8.7 | 9.3 | | 13 | 1.3 | 4.5 | 9.3 | 6.8 | 8 | 8.2 | 15 |
| | 6010B | Copper | 313 nc | 17.7 | mg/kg | 15 | 15 | 17 | | 12 | 7.6 | 71 | 25 | 19 | 16 | 13 | 13 |
| | 6010B | Iron | 2346 nc | 23100 | mg/kg | 22000 | 21000 | 23000 | | 21000 | 9900 | 21000 | 24000 | 24000 | 23000 | 18000 | 28000 |
| | 6010B | Lead | 400 pbk | 26.1 | mg/kg | 34 | 36 J | 24 | | 18 | 19 | 86 | 69 | 15 | 19 | 32 | 21 |
| | 6010B | Magnesium | --[n] | 3030 | mg/kg | 2400 | 2300 J | 2700 | | 1700 | 21000 | 11000 | 4400 | 4600 | 2500 J | 3200 | 2500 |
| | 6010B | Manganese | 176 nc | 1450 | mg/kg | 710 | 530 | 480 | | 670 | 4100 | 2700 | 770 | 530 | 390 | 910 | 1800 |
| | 6010B | Nickel | 156 nc | 21.1 | mg/kg | 16 | 15 | 20 | | 16 | 6.6 | 15 | 21 | 20 | 18 | 17 | 21 |
| | 6010B | Potassium | --[n] | 927 | mg/kg | 1000 | 970 J | 1200 | | 720 | 2300 | 1600 | 1500 | 1800 | 1300 J | 980 | 1200 |
| | 6010B | Selenium | 39 nc | 1.4 | mg/kg | 0.57 | | | | | 1.6 | 0.98 | 0.57 | 1.3 | 0.94 | 1 | 1.4 |
| | 6010B | Sodium | --[n] | 123 | mg/kg | 330 | 300 | 320 | | 260 | 1200 | 860 | 380 | 460 | 380 | 390 | 340 |
| | 6010B | Vanadium | 7.8 nc | 31.1 | mg/kg | 23 | 21 | 22 | | 24 | 7.4 | 11 | 21 | 23 | 25 | 22 | 29 |
| | 6010B | Zinc | 2346 nc | 61.8 | mg/kg | 73 | 70 | 72 | | 56 | 66 | 180 | 170 | 130 | 88 | 110 | 67 |
| | 7471A | Mercury | 2.3 nc | 0.04 | mg/kg | 0.047 | 0.04 | 0.059 | | | 0.05 | 0.034 | 0.031 | 0.083 | | | 0.097 |
| SVOCs | 8270C | Benzo(a)anthracene | 0.62 ca | -- | mg/kg | | | | | 0.018 J | | | | | | | |
| | 8270C | Benzo(a)pyrene | 0.062 ca | -- | mg/kg | | | | | 0.011 J | | | | | | | |
| | 8270C | Benzo(b)fluoranthene | 0.62 ca | -- | mg/kg | | | | | 0.03 J | | | | | | | |
| | 8270C | Benzo(g,h,i)perylene | -- | -- | mg/kg | | | | | 0.021 J | | | | | | | |
| | 8270C | Benzo(k)fluoranthene | 6.2 ca | -- | mg/kg | | | | | 0.013 J | | | | | | | |
| | 8270C | Bis(2-ethylhexyl) phthalate | 35 ca | -- | mg/kg | | | | | 0.052 J | | | | | | | |
| | 8270C | Chrysene | 62 ca | -- | mg/kg | | | | | 0.02 J | | | | | | | |
| | 8270C | Fluoranthene | 229 nc | -- | mg/kg | | | | | 0.023 J | | | | | | | |
| | 8270C | Pyrene | 232 nc | -- | mg/kg | | | | | 0.026 J | | | | | | | |
| Explosives | 8330 | 2,4,6-TNT | 16 ca | -- | mg/kg | | 0.072 J | | | | 0.28 | | | | | | |
| | 8330 | HMX | 306 nc | -- | mg/kg | | | | | | 6.3 | | 11 | | | | |
| | 8330 | RDX | 4.4 ca | -- | mg/kg | | | | | | 0.13 J | | 13 | | | | |
| Propellants | 353.2 Modified | Nitrocellulose | -- | -- | mg/kg | | | | 0.87 | | | | | | | | |

Table B12-2
Building 1200 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO | |
|-------|--------|-----------|------------------------------------|--|-------|-------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|-----------------------|-----------------------|------------------------|----------------------|
| | | | | | | Sample Date: Sample Depth: | 11/5/2004 0-1 ft | 11/5/2004 0-1 ft | 11/5/2004 0-1 ft | 11/4/2004 0-1 ft | 11/4/2004 0-1 ft | 11/4/2004 0-1 ft | 11/5/2004 0-0.5 ft | 11/5/2004 0-1 ft | 12/1/2004 0-0.5 ft | 12/1/2004 0-0.5 ft | 11/10/2004 0-0.5 ft | 11/10/2004 0-1 ft |
| | | | | | | | | | | | | | | | | | | |

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 (The screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
 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 B12-3
Building 1200 Summary of Sediment Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Sediment Background Criteria | Units | B12sd-023M-DUP | B12sd-023M-SD | B12sd-024D-SD | B12sd-024M-SD |
|-------------|----------------|----------------------|------------------------------------|------------------------------------|-------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | | | | | Sample Date: Sample Depth: | Sample Date: Sample Depth: | Sample Date: Sample Depth: | Sample Date: Sample Depth: |
| | | | | | | 11/5/2004 0-0.5 ft | 11/5/2004 0-0.5 ft | 11/5/2004 0-0.5 ft | 11/5/2004 0-0.5 ft |
| Metals | 6010B | Aluminum | 7614 nc | 13900 | mg/kg | 11000 | 10000 | | 15000 |
| | 6010B | Arsenic | 0.39 ca | 19.5 | mg/kg | 11 | 9.6 | | 8 |
| | 6010B | Barium | 538 nc | 123 | mg/kg | 70 | 71 | | 120 |
| | 6010B | Beryllium | 15 nc | 0.38 | mg/kg | 0.8 | 0.76 | | 0.86 |
| | 6010B | Cadmium | 3.7 nc | 0.00 | mg/kg | | | | 0.19 |
| | 6010B | Calcium | --[n] | 5510 | mg/kg | 570 | 770 | | 2700 |
| | 6010B | Chromium | 30 ca | 18.1 | mg/kg | 17 | 15 | | 18 |
| | 6010B | Cobalt | 30 ca | 9.1 | mg/kg | 11 | 9 | | 8.5 |
| | 6010B | Copper | 313 nc | 27.6 | mg/kg | 20 | 20 | | 18 |
| | 6010B | Iron | 2346 nc | 28200 | mg/kg | 21000 | 19000 | | 23000 |
| | 6010B | Lead | 400 pbk | 27.4 | mg/kg | 18 | 19 | | 22 |
| | 6010B | Magnesium | --[n] | 2760 | mg/kg | 2900 | 2500 | | 2200 |
| | 6010B | Manganese | 176 nc | 1950 | mg/kg | 210 | 210 | | 390 |
| | 6010B | Nickel | 156 nc | 17.7 | mg/kg | 24 | 22 | | 22 |
| | 6010B | Potassium | --[n] | 1950 | mg/kg | 1800 | 1200 | | 1200 |
| | 6010B | Selenium | 39 nc | 1.7 | mg/kg | | | | 0.98 |
| | 6010B | Sodium | --[n] | 112 | mg/kg | 370 | 290 | | 290 |
| | 6010B | Vanadium | 7.8 nc | 26.1 | mg/kg | 19 | 19 | | 26 |
| | 6010B | Zinc | 2346 nc | 532 | mg/kg | 59 | 58 | | 110 |
| | 7471A | Mercury | 2.3 nc | 0.06 | mg/kg | 0.085 | 0.035 | | 0.2 |
| Pesticides | 8081A | gamma-BHC | 0.44 ca | -- | mg/kg | | | | 0.013 |
| VOCs | 8260B | 2-Butanone | 2231 nc | -- | mg/kg | | | 0.019 J | |
| | 8260B | Acetone | 1412 nc | -- | mg/kg | | | 0.084 | |
| SVOCs | 8270C | Benzo(b)fluoranthene | 0.62 ca | -- | mg/kg | | | | 0.14 J |
| | 8270C | Benzo(g,h,i)perylene | -- | -- | mg/kg | | | | 0.16 J |
| Propellants | 353.2 Modified | Nitrocellulose | -- | -- | mg/kg | | | | 1.7 |

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 (The screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
- 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 B12-4
Building 1200 Summary of Surface Water Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sw-025-DUP | B12sw-025-SW | B12sw-026-SW | |
|-------------|----------|-----------------------------|--------------------------|------|-----------------------------------|---------------|--------------|--------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | surface | surface | surface |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | | Surface Water Background Criteria | Units | | | |
| Metals | 6010B | Aluminum | 36499 | nc | 3370 | ug/l | 1600 | 440 | 670 |
| | 6010B | Barium | 2555 | nc | 47.5 | ug/l | 91 | 86 | 34 |
| | 6010B | Calcium | --[n] | | 41400 | ug/l | 49000 | 48000 | 26000 |
| | 6010B | Chromium | 109 | nc | 0.00 | ug/l | 2.8 | 1.8 | 1.7 |
| | 6010B | Iron | 10950 | nc | 2560 | ug/l | 3900 | 3100 | 1200 |
| | 6010B | Magnesium | --[n] | | 10800 | ug/l | 5900 | 5700 | 3800 |
| | 6010B | Manganese | 876 | nc | 391 | ug/l | 4500 | 4500 | 480 |
| | 6010B | Nickel | 730 | nc | 0.00 | ug/l | 2.9 | 2.4 | 2 |
| | 6010B | Potassium | --[n] | | 3170 | ug/l | 6700 | 6500 | 4600 |
| | 6010B | Sodium | --[n] | | 21300 | ug/l | 1200 | 1000 | 940 |
| | 6010B | Vanadium | 36 | nc | 0.00 | ug/l | 2.8 | | |
| | 6010B | Zinc | 10950 | nc | 42 | ug/l | 12 | | |
| | 7060A | Arsenic | 0.045 | ca | 3.2 | ug/l | 3 | 1.7 | |
| | 7421 | Lead | 15 | mcl | 0.00 | ug/l | 1.2 | | |
| | 7470A | Mercury | 11 | nc | 0.00 | ug/l | | | 0.051 |
| 7841 | Thallium | 2.4 | nc | 0.00 | ug/l | 1.5 | | | |
| VOCs | 8260B | Acetone | 5475 | nc | -- | ug/l | 6.6 J | 7.2 J | 5.5 J |
| | 8260B | Toluene | 723 | nc | -- | ug/l | 1.3 | 1 | |
| SVOCs | 8270C | 2-Methylphenol | 1825 | nc | -- | ug/l | 2.2 | 1.8 J | |
| | 8270C | 4-Methylphenol | 182 | nc | -- | ug/l | 11 | 6.5 | |
| | 8270C | Benzoic acid | 145979 | nc | -- | ug/l | 93 | 79 J | |
| | 8270C | Benzyl alcohol | 10950 | nc | -- | ug/l | 7.8 J | 8.5 J | |
| | 8270C | Bis(2-ethylhexyl) phthalate | 4.8 | ca | -- | ug/l | | | 4.5 J |
| | 8270C | Phenol | 10950 | nc | -- | ug/l | 10 | 7.7 | |
| Explosives | 8330 | 3-Nitrotoluene | 122 | nc | -- | ug/l | 0.34 J | 0.49 J | |
| | 8330 | HMX | 1825 | nc | -- | ug/l | 24 | 29 | 3.7 |
| | 8330 | RDX | 0.61 | ca | -- | ug/l | 35 | 42 | 2.8 |
| Propellants | 8332 | Nitroglycerine | 4.8 | ca | -- | ug/l | 5.4 | 5.9 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 (The screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
- 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.

Table B12-5
Building 1200 Summary of Groundwater Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | | B12mw-010-GW | B12mw-011-DUP | B12mw-011-GW | B12mw-012-GW | BK Gmw-010 | |
|--------|--------|-----------|--------------------------|--|--|-------|---------------|---------------|--------------|--------------|------------|------------|
| | | | | | | | Sample Date: | 1/14/2005 | 12/9/2004 | 12/9/2004 | 1/19/2005 | 1/21/2005 |
| | | | | | | | Sample Depth: | 19 ft | 23 ft | 23 ft | 23 ft | 17 ft |
| | | | | | | | Description: | C/Filtered | C/Filtered | C/Filtered | C/Filtered | C/Filtered |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | Unconsolidated Filtered Groundwater Background | Consolidated Filtered Groundwater Background | Units | | | | | | |
| Metals | 6010B | Aluminum | 36499 nc | -- | -- | ug/l | 2600 J | | | | 140 | |
| | 6010B | Barium | 2555 nc | 82.1 | 256 | ug/l | 24 | 2.1 | 2.1 | 35 | 19 | |
| | 6010B | Cadmium | 18 nc | 0.00 | 0.00 | ug/l | | | | 0.25 | | |
| | 6010B | Calcium | --[n] | 115000 | 53100 | ug/l | 4100 | 12000 | 12000 | 56000 | 11000 | |
| | 6010B | Chromium | 109 nc | 7.3 | 0.00 | ug/l | 4.8 | | | | | |
| | 6010B | Cobalt | 730 nc | 0.00 | 0.00 | ug/l | 1.4 | | | 9.4 | | |
| | 6010B | Copper | 1460 nc | 0.00 | 0.00 | ug/l | 2.7 | | | | | |
| | 6010B | Iron | 10950 nc | 279 | 1430 | ug/l | 4400 | | | | | |
| | 6010B | Magnesium | --[n] | 43300 | 15000 | ug/l | 4800 | 8800 | 8800 | 37000 | 14000 | |
| | 6010B | Manganese | 876 nc | 1020 | 1340 | ug/l | 230 | 46 | 46 | 1100 | 760 | |
| | 6010B | Nickel | 730 nc | 0.00 | 83.4 | ug/l | 26 | | | 51 | 74 | |
| | 6010B | Potassium | --[n] | 2890 | 5770 | ug/l | 1300 | 1600 | 1600 | 4000 | 750 | |
| | 6010B | Selenium | 182 nc | 0.00 | 0.00 | ug/l | | | 3.7 | | | |
| | 6010B | Sodium | --[n] | 45700 | 51400 | ug/l | 6300 | 5600 | 5500 | 14000 | 3900 | |
| | 6010B | Vanadium | 36 nc | 0.00 | 0.00 | ug/l | 3.7 | | | | | |
| | 6010B | Zinc | 10950 nc | 60.9 | 52.3 | ug/l | 110 | | | 4.9 | 30 | |
| | 7060A | Arsenic | 0.045 ca | 11.7 | 0.00 | ug/l | 2.2 | | | | | |
| 7421 | Lead | 15 mcl | 0.00 | 0.00 | ug/l | 2.7 | | | | | | |

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 (The screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
- 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 B12-6
Building 1200 Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO |
|--------|------------|--------------------|------------------------------------|--|-------|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | | | | Sample Date: 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/4/2004 | 11/4/2004 | 11/4/2004 | 11/5/2004 | 11/5/2004 | 12/1/2004 | 12/1/2004 | 11/10/2004 | 11/10/2004 |
| | | | | | | Sample Depth: 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-0.5 ft | 0-1 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-1 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | | | | | | | | | | | | |
| Metals | 6010B | Aluminum | 7614 nc | 17700 | mg/kg | 12000 | 12000 | 12000 | | 12000 | 30000 | 17000 | 14000 | 16000 | 14000 | 13000 | 15000 |
| | 6010B | Arsenic | 0.39 ca | 15.4 | mg/kg | 11 | 11 | 12 | | 10 | 2.7 | 6.8 | 12 | 11 | 11 | 9.5 | 14 |
| | 6010B | Barium | 538 nc | 88.4 | mg/kg | 90 | 86 | 74 | | 79 | 320 | 200 | 96 | 120 | 97 | 110 | 100 |
| | 6010B | Beryllium | 15 nc | 0.88 | mg/kg | 0.8 | 0.75 | 0.78 | | 0.69 | 5.9 | 2.9 | 1.2 | 1.2 | 0.87 | 1.2 | 0.93 |
| | 6010B | Cadmium | 3.7 nc | 0.00 | mg/kg | 0.125 U | 0.12 U | 0.1 | | 0.135 U | 0.46 | 3.3 | 0.52 | 0.125 U | 0.12 U | 0.24 | 0.14 U |
| | 6010B | Calcium | --[n] | 15800 | mg/kg | 4800 | 4700 | 3400 | | 1700 | 19000 | 79000 | 16000 | 17000 | 4500 | 15000 | 1400 |
| | 6010B | Chromium | 30 ca | 17.4 | mg/kg | 19 | 18 | 20 | | 18 | 20 | 33 | 22 | 24 | 22 | 24 | 23 |
| | 6010B | Cobalt | 30 ca | 10.4 | mg/kg | 11 | 8.7 | 9.3 | | 13 | 1.3 | 4.5 | 9.3 | 6.8 | 8 | 8.2 | 15 |
| | 6010B | Copper | 313 nc | 17.7 | mg/kg | 15 | 15 | 17 | | 12 | 7.6 | 71 | 25 | 19 | 16 | 13 | 13 |
| | 6010B | Iron | 2346 nc | 23100 | mg/kg | 22000 | 21000 | 23000 | | 21000 | 9900 | 21000 | 24000 | 24000 | 23000 | 18000 | 28000 |
| | 6010B | Lead | 400 pbk | 26.1 | mg/kg | 34 | 36 J | 24 | | 18 | 19 | 86 | 69 | 15 | 19 | 32 | 21 |
| | 6010B | Magnesium | --[n] | 3030 | mg/kg | 2400 | 2300 J | 2700 | | 1700 | 21000 | 11000 | 4400 | 4600 | 2500 J | 3200 | 2500 |
| | 6010B | Manganese | 176 nc | 1450 | mg/kg | 710 | 530 | 480 | | 670 | 4100 | 2700 | 770 | 530 | 390 | 910 | 1800 |
| | 6010B | Nickel | 156 nc | 21.1 | mg/kg | 16 | 15 | 20 | | 16 | 6.6 | 15 | 21 | 20 | 18 | 17 | 21 |
| | 6010B | Potassium | --[n] | 927 | mg/kg | 1000 | 970 J | 1200 | | 720 | 2300 | 1600 | 1500 | 1800 | 1300 J | 980 | 1200 |
| | 6010B | Selenium | 39 nc | 1.4 | mg/kg | 0.57 | 0.7 U | 0.7 U | | 0.8 U | 1.6 | 0.98 | 0.57 | 1.3 | 0.94 | 1 | 1.4 |
| | 6010B | Silver | 39 nc | 0.00 | mg/kg | 0.495 U | 0.475 U | 0.48 U | | 0.55 U | 0.55 U | 0.465 U | 0.475 U | 0.495 U | 0.49 U | 0.55 U | 0.55 U |
| | 6010B | Sodium | --[n] | 123 | mg/kg | 330 | 300 | 320 | | 260 | 1200 | 860 | 380 | 460 | 380 | 390 | 340 |
| | 6010B | Vanadium | 7.8 nc | 31.1 | mg/kg | 23 | 21 | 22 | | 24 | 7.4 | 11 | 21 | 23 | 25 | 22 | 29 |
| | 6010B | Zinc | 2346 nc | 61.8 | mg/kg | 73 | 70 | 72 | | 56 | 66 | 180 | 170 | 130 | 88 | 110 | 67 |
| | 7041 | Antimony | 3.1 nc | 0.96 | mg/kg | 0.6 U | - R | 0.65 U | | 0.75 U | 0.7 U | 0.6 U | 0.6 U | 0.7 U | 0.7 U | 0.75 U | 0.75 U |
| | 7471A | Mercury | 2.3 nc | 0.04 | mg/kg | 0.047 | 0.04 | 0.059 | | 0.05 | 0.034 | 0.031 | 0.083 | 0.02 U | 0.0195 U | 0.0095 U | 0.097 |
| | 7841 | Thallium | 0.52 nc | 0.00 | mg/kg | 0.265 U | 0.27 U | 0.27 U | | 0.31 U | 0.295 U | 0.255 U | 0.265 U | 0.295 U | 0.31 U | 0.325 U | 0.325 U |
| | Pesticides | 8081A | 4,4'-DDD | 2.4 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | |
| 8081A | | 4,4'-DDE | 1.7 ca | -- | mg/kg | | | | | 0.0011 U | | | | | | | |
| 8081A | | 4,4'-DDT | 1.7 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Aldrin | 0.029 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | alpha-BHC | 0.09 sat | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | alpha-Chlordane | 1.6 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | beta-BHC | 0.32 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | delta-BHC | -- | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Dieldrin | 0.030 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Endosulfan I | 37 nc | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Endosulfan II | 37 nc | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Endosulfan sulfate | 37 nc | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Endrin | 1.8 nc | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Endrin aldehyde | -- | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Endrin ketone | -- | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | gamma-BHC | 0.44 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | gamma-Chlordane | 1.6 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Heptachlor | 0.11 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Heptachlor epoxide | 0.053 ca | -- | mg/kg | | | | | 0.00095 U | | | | | | | |
| 8081A | | Methoxychlor | 31 nc | -- | mg/kg | | | | | 0.00455 U | | | | | | | |

Table B12-6
Building 1200 Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO |
|---------------|---------------|----------------------------|------------------------------------|--|-------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Sample Date: | | | | | | 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/4/2004 | 11/4/2004 | 11/4/2004 | 11/5/2004 | 11/5/2004 | 12/1/2004 | 12/1/2004 | 11/10/2004 | 11/10/2004 |
| Sample Depth: | | | | | | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-0.5 ft | 0-1 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-1 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | | | | | | | | | | | | |
| PCBs | 8081A | Toxaphene | 0.44 | ca | -- | mg/kg | | | | 0.009 | U | | | | | | |
| | 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 | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,1,2,2-Tetrachloroethane | 0.41 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,1,2-Trichloroethane | 0.73 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,1-Dichloroethane | 51 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,1-Dichloroethene | 12 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,2-Dibromoethane | 0.032 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,2-Dichloroethane | 0.28 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 1,2-Dichloroethene (total) | 6.9 | nc | -- | mg/kg | | | 0.0065 | U | | | | | | | |
| | 8260B | 1,2-Dichloropropane | 0.34 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | 2-Butanone | 2231 | nc | -- | mg/kg | | | 0.01 | U | | | | | | | |
| | 8260B | 2-Hexanone | 530 | nc | -- | mg/kg | | | 0.0065 | U | | | | | | | |
| | 8260B | 4-Methyl-2-pentanone | 528 | nc | -- | mg/kg | | | 0.0065 | U | | | | | | | |
| | 8260B | Acetone | 1412 | nc | -- | mg/kg | | | 0.01 | U | | | | | | | |
| | 8260B | Benzene | 0.64 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Bromochloromethane | -- | -- | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Bromodichloromethane | 0.82 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Bromoform | 62 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Bromomethane | 0.39 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Carbon disulfide | 36 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Carbon tetrachloride | 0.25 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Chlorobenzene | 15 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Chloroethane | 3.0 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Chloroform | 0.22 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Chloromethane | 4.7 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | cis-1,2-Dichloroethene | 4.3 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | cis-1,3-Dichloropropene | 0.78 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Dibromochloromethane | 1.1 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Ethylbenzene | 395 | sat | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | m&p-Xylenes | 27 | nc | -- | mg/kg | | | 0.0065 | U | | | | | | | |
| | 8260B | Methylene chloride | 9.1 | ca | -- | mg/kg | | | 0.0065 | U | | | | | | | |
| | 8260B | o-Xylene | 27 | nc | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Styrene | 1700 | sat | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Tetrachloroethene | 0.48 | ca | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| | 8260B | Toluene | 520 | sat | -- | mg/kg | | | 0.0033 | U | | | | | | | |
| 8260B | Total Xylenes | 27 | nc | -- | mg/kg | | | 0.0065 | U | | | | | | | | |

Table B12-6
Building 1200 Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO | |
|-------|--------|------------------------------|---------------------------------|----------------------------------|-------|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|
| | | | | | | Sample Date: 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/4/2004 | 11/4/2004 | 11/4/2004 | 11/5/2004 | 11/5/2004 | 12/1/2004 | 12/1/2004 | 11/10/2004 | 11/10/2004 | |
| | | | | | | Sample Depth: 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-0.5 ft | 0-1 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-1 ft | |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | | | | | | | | | | | | | |
| | 8260B | trans-1,2-Dichloroethene | 6.9 nc | -- | mg/kg | | | | 0.0033 U | | | | | | | | | |
| | 8260B | trans-1,3-Dichloropropene | 0.78 ca | -- | mg/kg | | | | 0.0033 U | | | | | | | | | |
| | 8260B | Trichloroethene | 0.053 ca | -- | mg/kg | | | | 0.0033 U | | | | | | | | | |
| | 8260B | Vinyl chloride | 0.079 ca | -- | mg/kg | | | | 0.0033 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 | | | | | 0.036 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 | | | | | 0.36 U | | | | | | | | |
| | 8270C | 4,6-Dinitro-2-methylphenol | 0.61 nc | -- | mg/kg | | | | | 0.36 U | | | | | | | | |
| | 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 | | | | | 0.36 U | | | | | | | | |
| | 8270C | 4-Chlorophenyl phenyl ether | -- | -- | mg/kg | | | | | 0.09 U | | | | | | | | |
| | 8270C | 4-Methylphenol | 31 nc | -- | mg/kg | | | | | 0.036 U | | | | | | | | |
| | 8270C | 4-Nitroaniline | 23 ca | -- | mg/kg | | | | | 0.36 U | | | | | | | | |
| | 8270C | 4-Nitrophenol | -- | -- | mg/kg | | | | | 0.36 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 | | | | | 0.018 J | | | | | | | | |
| | 8270C | Benzo(a)pyrene | 0.062 ca | -- | mg/kg | | | | | 0.011 J | | | | | | | | |
| | 8270C | Benzo(b)fluoranthene | 0.62 ca | -- | mg/kg | | | | | 0.03 J | | | | | | | | |
| | 8270C | Benzo(g,h,i)perylene | -- | -- | mg/kg | | | | | 0.021 J | | | | | | | | |
| | 8270C | Benzo(k)fluoranthene | 6.2 ca | -- | mg/kg | | | | | 0.013 J | | | | | | | | |
| | 8270C | Benzoic acid | 100000 max | -- | mg/kg | | | | | - R | | | | | | | | |
| | 8270C | Benzyl alcohol | 1833 nc | -- | mg/kg | | | | | 0.36 U | | | | | | | | |
| | 8270C | Bis(2-chloroethoxy)methane | -- | -- | mg/kg | | | | | 0.036 U | | | | | | | | |
| | 8270C | Bis(2-chloroethyl) ether | 0.22 ca | -- | mg/kg | | | | | 0.036 U | | | | | | | | |

Table B12-6
Building 1200 Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO |
|-------------|-----------------|-----------------------------|------------------------------------|--|-------|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | | | | Sample Date: 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/4/2004 | 11/4/2004 | 11/4/2004 | 11/5/2004 | 11/5/2004 | 12/1/2004 | 12/1/2004 | 11/10/2004 | 11/10/2004 |
| | | | | | | Sample Depth: 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-1 ft | 0-0.5 ft | 0-1 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-1 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | | | | | | | | | | | | |
| | 8270C | Bis(2-ethylhexyl) phthalate | 35 ca | -- | mg/kg | | | | | 0.052 J | | | | | | | |
| | 8270C | Butylbenzyl phthalate | 1222 nc | -- | mg/kg | | | | | 0.036 U | | | | | | | |
| | 8270C | Carbazole | 24 ca | -- | mg/kg | | | | | 0.09 U | | | | | | | |
| | 8270C | Chrysene | 62 ca | -- | mg/kg | | | | | 0.02 J | | | | | | | |
| | 8270C | Dibenzo(a,h)anthracene | 0.062 ca | -- | mg/kg | | | | | 0.018 U | | | | | | | |
| | 8270C | Dibenzofuran | 15 nc | -- | mg/kg | | | | | 0.036 U | | | | | | | |
| | 8270C | Diethyl phthalate | 4888 nc | -- | mg/kg | | | | | 0.036 U | | | | | | | |
| | 8270C | Dimethyl phthalate | 100000 max | -- | mg/kg | | | | | 0.036 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 | | | | | 0.023 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 | | | | | 0.036 U | | | | | | | |
| | 8270C | n-Nitrosodiphenylamine | 99 ca | -- | mg/kg | | | | | 0.018 U | | | | | | | |
| | 8270C | Pentachlorophenol | 3.0 ca | -- | mg/kg | | | | | 0.18 U | | | | | | | |
| | 8270C | Phenanthrene | -- | -- | mg/kg | | | | | 0.027 U | | | | | | | |
| | 8270C | Phenol | 1833 nc | -- | mg/kg | | | | | 0.09 U | | | | | | | |
| | 8270C | Pyrene | 232 nc | -- | mg/kg | | | | | 0.026 J | | | | | | | |
| Explosives | 8330 | 1,3,5-Trinitrobenzene | 183 nc | -- | mg/kg | 0.049 U | 0.05 U | 0.049 U | | 0.05 U | 0.0495 U | 0.049 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 | 0.049 U | 0.05 U | 0.049 U | | 0.05 U | 0.0495 U | 0.049 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 | 0.049 U | 0.072 J | 0.049 U | | 0.05 U | 0.0495 U | 0.28 | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.0495 U |
| | 8330 | 2,4-Dinitrotoluene | 12 nc | -- | mg/kg | 0.049 U | 0.05 U | 0.049 U | | 0.05 U | 0.0495 U | 0.049 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 | 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 | 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 | 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 | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| | 8330 | 4-Amino-2,6-Dinitrotoluene | -- | -- | mg/kg | 0.145 U | 0.15 U | 0.145 U | | 0.15 U | 0.15 U | 0.145 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U |
| | 8330 | 4-Nitrotoluene | 12 ca | -- | mg/kg | 0.1 U | 0.1 U | 0.1 U | | 0.1 U | 0.1 U | 0.1 U | 0.1 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 | 6.3 | 0.1 U | 11 | 0.1 U | 0.1 U | 0.1 U |
| | 8330 | Nitrobenzene | 2 nc | -- | mg/kg | 0.049 U | 0.05 U | 0.049 U | | 0.05 U | 0.0495 U | 0.049 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 | 0.13 J | 0.1 U | 13 | 0.1 U | 0.1 U | 0.1 U |
| | 8330 | Tetryl | 61 nc | -- | mg/kg | 0.195 U | 0.2 U | 0.195 U | | 0.2 U | 0.2 U | 0.195 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.195 U |
| Propellants | 353.2 Modified | Nitrocellulose | -- | -- | mg/kg | | | | | 0.87 | | | | | | | |
| | 8332 | Nitroglycerine | 35 ca | -- | mg/kg | | | | | 0.25 U | | | | | | | |
| | SW8330 Modified | Nitroguanidine | 611 nc | -- | mg/kg | | | | | 0.125 U | | | | | | | |

Table B12-6
Building 1200 Summary of All Surface Soil (0-1 ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Surface Soil Background Criteria | Units | B12ss-013M-DUP | B12ss-013M-SO | B12ss-014M-SO | B12ss-015D-SO | B12ss-015M-SO | B12ss-016M-SO | B12ss-017M-SO | B12ss-018M-SO | B12ss-019M-SO | B12ss-020M-SO | B12ss-021M-SO | B12ss-022M-SO | |
|-------|--------|-----------|------------------------------------|--|-------|-------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|-----------------------|-----------------------|------------------------|----------------------|
| | | | | | | Sample Date: Sample Depth: | 11/5/2004 0-1 ft | 11/5/2004 0-1 ft | 11/5/2004 0-1 ft | 11/4/2004 0-1 ft | 11/4/2004 0-1 ft | 11/4/2004 0-1 ft | 11/5/2004 0-0.5 ft | 11/5/2004 0-1 ft | 12/1/2004 0-0.5 ft | 12/1/2004 0-0.5 ft | 11/10/2004 0-0.5 ft | 11/10/2004 0-1 ft |
| | | | | | | | | | | | | | | | | | | |

Notes:
 -- no background/PRG value is available for this analyte
 blank cell indicates that the analysis was not performed
 mg/kg - means milligrams per Kilogram (parts per million - ppm)
 PRG - preliminary remediation goals (The screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
 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 B12-7
Building 1200 Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sd-023M-DUP | B12sd-023M-SD | B12sd-024D-SD | B12sd-024M-SD | |
|------------|--------|--------------------|------------------------------------|------------------------------------|-------|----------------|---------------|---------------|---------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Sediment Background Criteria | Units | | | | | |
| Metals | 6010B | Aluminum | 7614 nc | 13900 | mg/kg | 11000 | 10000 | | 15000 | |
| | 6010B | Arsenic | 0.39 ca | 19.5 | mg/kg | 11 | 9.6 | | 8 | |
| | 6010B | Barium | 538 nc | 123 | mg/kg | 70 | 71 | | 120 | |
| | 6010B | Beryllium | 15 nc | 0.38 | mg/kg | 0.8 | 0.76 | | 0.86 | |
| | 6010B | Cadmium | 3.7 nc | 0.00 | mg/kg | 0.225 U | 0.235 U | | 0.19 | |
| | 6010B | Calcium | --[n] | 5510 | mg/kg | 570 | 770 | | 2700 | |
| | 6010B | Chromium | 30 ca | 18.1 | mg/kg | 17 | 15 | | 18 | |
| | 6010B | Cobalt | 30 ca | 9.1 | mg/kg | 11 | 9 | | 8.5 | |
| | 6010B | Copper | 313 nc | 27.6 | mg/kg | 20 | 20 | | 18 | |
| | 6010B | Iron | 2346 nc | 28200 | mg/kg | 21000 | 19000 | | 23000 | |
| | 6010B | Lead | 400 pbk | 27.4 | mg/kg | 18 | 19 | | 22 | |
| | 6010B | Magnesium | --[n] | 2760 | mg/kg | 2900 | 2500 | | 2200 | |
| | 6010B | Manganese | 176 nc | 1950 | mg/kg | 210 | 210 | | 390 | |
| | 6010B | Nickel | 156 nc | 17.7 | mg/kg | 24 | 22 | | 22 | |
| | 6010B | Potassium | --[n] | 1950 | mg/kg | 1800 | 1200 | | 1200 | |
| | 6010B | Selenium | 39 nc | 1.7 | mg/kg | 1.35 U | 1.4 U | | 0.98 | |
| | 6010B | Silver | 39 nc | 0.00 | mg/kg | 0.9 U | 0.95 U | | 1.15 U | |
| | 6010B | Sodium | --[n] | 112 | mg/kg | 370 | 290 | | 290 | |
| | 6010B | Vanadium | 7.8 nc | 26.1 | mg/kg | 19 | 19 | | 26 | |
| | 6010B | Zinc | 2346 nc | 532 | mg/kg | 59 | 58 | | 110 | |
| | 7041 | Antimony | 3.1 nc | 0.00 | mg/kg | 1.25 U | 1.15 U | | 1.85 U | |
| | 7471A | Mercury | 2.3 nc | 0.06 | mg/kg | 0.085 | 0.035 | | 0.2 | |
| | 7841 | Thallium | 0.52 nc | 0.89 | mg/kg | 0.55 U | 0.6 U | | 0.8 U | |
| Pesticides | 8081A | 4,4'-DDD | 2.4 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | 4,4'-DDE | 1.7 ca | -- | mg/kg | | | | 0.00335 U | |
| | 8081A | 4,4'-DDT | 1.7 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Aldrin | 0.029 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | alpha-BHC | 0.09 sat | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | alpha-Chlordane | 1.6 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | beta-BHC | 0.32 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | delta-BHC | -- | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Dieldrin | 0.030 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Endosulfan I | 37 nc | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Endosulfan II | 37 nc | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Endosulfan sulfate | 37 nc | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Endrin | 1.8 nc | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Endrin aldehyde | -- | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Endrin ketone | -- | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | gamma-BHC | 0.44 ca | -- | mg/kg | | | | 0.013 | |
| | 8081A | gamma-Chlordane | 1.6 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Heptachlor | 0.11 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Heptachlor epoxide | 0.053 ca | -- | mg/kg | | | | 0.00285 U | |
| | 8081A | Methoxychlor | 31 nc | -- | mg/kg | | | | 0.014 U | |

Table B12-7
Building 1200 Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sd-023M-DUP | B12sd-023M-SD | B12sd-024D-SD | B12sd-024M-SD |
|-------|-------------------|----------------------------|------------------------------------|------------------------------------|-------|------------------------|---------------|---------------|---------------|
| | | | | | | Sample Date: 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Sediment Background Criteria | Units | | | | |
| | 8081A | Toxaphene | 0.44 ca | -- | mg/kg | | | | 0.028 U |
| PCBs | 8082 | Aroclor 1016 | 0.39 nc | -- | mg/kg | | | | 0.055 U |
| | 8082 | Aroclor 1221 | 0.22 ca | -- | mg/kg | | | | 0.055 U |
| | 8082 | Aroclor 1232 | 0.22 ca | -- | mg/kg | | | | 0.028 U |
| | 8082 | Aroclor 1242 | 0.22 ca | -- | mg/kg | | | | 0.055 U |
| | 8082 | Aroclor 1248 | 0.22 ca | -- | mg/kg | | | | 0.028 U |
| | 8082 | Aroclor 1254 | 0.22 ca | -- | mg/kg | | | | 0.055 U |
| | 8082 | Aroclor 1260 | 0.22 ca | -- | mg/kg | | | | 0.055 U |
| VOCs | 8260B | 1,1,1-Trichloroethane | 1200 sat | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,1,2,2-Tetrachloroethane | 0.41 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,1,2-Trichloroethane | 0.73 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,1-Dichloroethane | 51 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,1-Dichloroethene | 12 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,2-Dibromoethane | 0.032 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,2-Dichloroethane | 0.28 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | 1,2-Dichloroethene (total) | 6.9 nc | -- | mg/kg | | | 0.014 U | |
| | 8260B | 1,2-Dichloropropane | 0.34 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | 2-Butanone | 2231 nc | -- | mg/kg | | | 0.019 J | |
| | 8260B | 2-Hexanone | 530 nc | -- | mg/kg | | | 0.014 U | |
| | 8260B | 4-Methyl-2-pentanone | 528 nc | -- | mg/kg | | | 0.014 U | |
| | 8260B | Acetone | 1412 nc | -- | mg/kg | | | 0.084 | |
| | 8260B | Benzene | 0.64 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Bromochloromethane | -- | -- | mg/kg | | | 0.007 U | |
| | 8260B | Bromodichloromethane | 0.82 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Bromoform | 62 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Bromomethane | 0.39 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | Carbon disulfide | 36 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | Carbon tetrachloride | 0.25 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Chlorobenzene | 15 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | Chloroethane | 3.0 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Chloroform | 0.22 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Chloromethane | 4.7 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | cis-1,2-Dichloroethene | 4.3 nc | -- | mg/kg | | | 0.007 U | |
| | 8260B | cis-1,3-Dichloropropene | 0.78 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Dibromochloromethane | 1.1 ca | -- | mg/kg | | | 0.007 U | |
| | 8260B | Ethylbenzene | 395 sat | -- | mg/kg | | | 0.007 U | |
| | 8260B | m&p-Xylenes | 27 nc | -- | mg/kg | | | 0.014 U | |
| | 8260B | Methylene chloride | 9.1 ca | -- | mg/kg | | | 0.014 U | |
| 8260B | o-Xylene | 27 nc | -- | mg/kg | | | 0.007 U | | |
| 8260B | Styrene | 1700 sat | -- | mg/kg | | | 0.007 U | | |
| 8260B | Tetrachloroethene | 0.48 ca | -- | mg/kg | | | 0.007 U | | |
| 8260B | Toluene | 520 sat | -- | mg/kg | | | 0.007 U | | |
| 8260B | Total Xylenes | 27 nc | -- | mg/kg | | | 0.014 U | | |

Table B12-7
Building 1200 Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sd-023M-DUP | B12sd-023M-SD | B12sd-024D-SD | B12sd-024M-SD | |
|-------|--------|------------------------------|------------------------------------|------------------------------------|-------|----------------|---------------|---------------|---------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Sediment Background Criteria | Units | | | | | |
| | 8260B | trans-1,2-Dichloroethene | 6.9 nc | -- | mg/kg | | | 0.007 U | | |
| | 8260B | trans-1,3-Dichloropropene | 0.78 ca | -- | mg/kg | | | 0.007 U | | |
| | 8260B | Trichloroethene | 0.053 ca | -- | mg/kg | | | 0.007 U | | |
| | 8260B | Vinyl chloride | 0.079 ca | -- | mg/kg | | | 0.007 U | | |
| SVOCs | 8270C | 1,2,4-Trichlorobenzene | 6.2 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 1,2-Dichlorobenzene | 600 sat | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 1,3-Dichlorobenzene | 53 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 1,4-Dichlorobenzene | 3.4 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 2,2-oxybis (1-chloropropane) | 2.9 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 2,4,5-Trichlorophenol | 611 nc | -- | mg/kg | | | | 2.2 U | |
| | 8270C | 2,4,6-Trichlorophenol | 0.61 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 2,4-Dichlorophenol | 18 nc | -- | mg/kg | | | | 2.2 U | |
| | 8270C | 2,4-Dimethylphenol | 122 nc | -- | mg/kg | | | | 2.2 U | |
| | 8270C | 2,4-Dinitrophenol | 12 nc | -- | mg/kg | | | | - R | |
| | 8270C | 2,4-Dinitrotoluene | 12 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | 2,6-Dinitrotoluene | 6.1 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | 2-Chloronaphthalene | 494 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 2-Chlorophenol | 6.3 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 2-Methylnaphthalene | -- | -- | mg/kg | | | | 0.22 U | |
| | 8270C | 2-Methylphenol | 306 nc | -- | mg/kg | | | | 0.445 U | |
| | 8270C | 2-Nitroaniline | 18.3 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 2-Nitrophenol | -- | -- | mg/kg | | | | 2.2 U | |
| | 8270C | 3,3'-Dichlorobenzidine | 1.1 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 3-Nitroaniline | 1.8 nc | -- | mg/kg | | | | 4.45 U | |
| | 8270C | 4,6-Dinitro-2-methylphenol | 0.61 nc | -- | mg/kg | | | | 4.45 U | |
| | 8270C | 4-Bromophenyl phenyl ether | -- | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 4-Chloro-3-methylphenol | -- | -- | mg/kg | | | | 2.2 U | |
| | 8270C | 4-Chloroaniline | 24 nc | -- | mg/kg | | | | 4.45 U | |
| | 8270C | 4-Chlorophenyl phenyl ether | -- | -- | mg/kg | | | | 1.1 U | |
| | 8270C | 4-Methylphenol | 31 nc | -- | mg/kg | | | | 0.445 U | |
| | 8270C | 4-Nitroaniline | 23 ca | -- | mg/kg | | | | 4.45 U | |
| | 8270C | 4-Nitrophenol | -- | -- | mg/kg | | | | 4.45 U | |
| | 8270C | Acenaphthene | 368 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Acenaphthylene | -- | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Anthracene | 2189 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Benzo(a)anthracene | 0.62 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Benzo(a)pyrene | 0.062 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Benzo(b)fluoranthene | 0.62 ca | -- | mg/kg | | | | 0.14 J | |
| | 8270C | Benzo(g,h,i)perylene | -- | -- | mg/kg | | | | 0.16 J | |
| | 8270C | Benzo(k)fluoranthene | 6.2 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Benzoic acid | 100000 max | -- | mg/kg | | | | - R | |
| | 8270C | Benzyl alcohol | 1833 nc | -- | mg/kg | | | | 4.45 U | |
| | 8270C | Bis(2-chloroethoxy)methane | -- | -- | mg/kg | | | | 0.445 U | |
| | 8270C | Bis(2-chloroethyl) ether | 0.22 ca | -- | mg/kg | | | | 0.445 U | |

Table B12-7
Building 1200 Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sd-023M-DUP | B12sd-023M-SD | B12sd-024D-SD | B12sd-024M-SD | |
|-------------|-----------------|-----------------------------|------------------------------------|------------------------------------|-------|----------------|---------------|---------------|---------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Sediment Background Criteria | Units | | | | | |
| | 8270C | Bis(2-ethylhexyl) phthalate | 35 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Butylbenzyl phthalate | 1222 nc | -- | mg/kg | | | | 0.445 U | |
| | 8270C | Carbazole | 24 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Chrysene | 62 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Dibenzo(a,h)anthracene | 0.062 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Dibenzofuran | 15 nc | -- | mg/kg | | | | 0.445 U | |
| | 8270C | Diethyl phthalate | 4888 nc | -- | mg/kg | | | | 0.445 U | |
| | 8270C | Dimethyl phthalate | 100000 max | -- | mg/kg | | | | 0.445 U | |
| | 8270C | Di-n-butyl phthalate | 611 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Di-n-octyl phthalate | 244 nc | -- | mg/kg | | | | 2.2 U | |
| | 8270C | Fluoranthene | 229 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Fluorene | 275 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Hexachlorobenzene | 0.30 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Hexachlorobutadiene | 6.2 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Hexachlorocyclopentadiene | 37 nc | -- | mg/kg | | | | 6.5 U | |
| | 8270C | Hexachloroethane | 35 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Indeno(1,2,3-cd)pyrene | 0.62 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Isophorone | 512 ca | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Naphthalene | 5.6 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Nitrobenzene | 2 nc | -- | mg/kg | | | | 0.22 U | |
| | 8270C | n-Nitroso-di-n-propylamine | 0.069 ca | -- | mg/kg | | | | 0.445 U | |
| | 8270C | n-Nitrosodiphenylamine | 99 ca | -- | mg/kg | | | | 0.22 U | |
| | 8270C | Pentachlorophenol | 3.0 ca | -- | mg/kg | | | | 2.2 U | |
| | 8270C | Phenanthrene | -- | -- | mg/kg | | | | 0.335 U | |
| | 8270C | Phenol | 1833 nc | -- | mg/kg | | | | 1.1 U | |
| | 8270C | Pyrene | 232 nc | -- | mg/kg | | | | 0.335 U | |
| Explosives | 8330 | 1,3,5-Trinitrobenzene | 183 nc | -- | mg/kg | 0.05 U | 0.05 U | | 0.25 U | |
| | 8330 | 1,3-Dinitrobenzene | 0.61 nc | -- | mg/kg | 0.05 U | 0.05 U | | 0.25 U | |
| | 8330 | 2,4,6-TNT | 16 ca | -- | mg/kg | 0.05 U | 0.05 U | | 0.25 U | |
| | 8330 | 2,4-Dinitrotoluene | 12 nc | -- | mg/kg | 0.05 U | 0.05 U | | 0.25 U | |
| | 8330 | 2,6-Dinitrotoluene | 6.1 nc | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | 2-Amino-4,6-Dinitrotoluene | -- | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | 2-Nitrotoluene | 0.88 ca | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | 3-Nitrotoluene | 73 nc | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | 4-Amino-2,6-Dinitrotoluene | -- | -- | mg/kg | 0.15 U | 0.15 U | | 0.75 U | |
| | 8330 | 4-Nitrotoluene | 12 ca | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | HMX | 306 nc | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | Nitrobenzene | 2 nc | -- | mg/kg | 0.05 U | 0.05 U | | 0.25 U | |
| | 8330 | RDX | 4.4 ca | -- | mg/kg | 0.1 U | 0.1 U | | 0.5 U | |
| | 8330 | Tetryl | 61 nc | -- | mg/kg | 0.2 U | 0.2 U | | 1 U | |
| Propellants | 353.2 Modified | Nitrocellulose | -- | -- | mg/kg | | | | 1.7 | |
| | 8332 | Nitroglycerine | 35 ca | -- | mg/kg | | | | 0.25 U | |
| | SW8330 Modified | Nitroguanidine | 611 nc | -- | mg/kg | | | | 0.125 U | |

Table B12-7
Building 1200 Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sd-023M-DUP | B12sd-023M-SD | B12sd-024D-SD | B12sd-024M-SD | |
|-------|--------|-----------|------------------------------------|------------------------------------|-------|----------------|---------------|---------------|---------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft | 0-0.5 ft |
| Group | Method | Parameter | Region 9 PRG (Residential Soil) | Sediment Background Criteria | Units | | | | | |
| | | | | | | | | | | |

Notes:

- no background/PRG value is available for this analyte
- blank cell indicates that the analysis was not performed
- mg/kg - means milligrams per Kilogram (parts per million - ppm)
- PRG - preliminary remediation goals (The screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
- 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 B12-8
Building 1200 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sw-025-DUP | B12sw-025-SW | B12sw-026-SW |
|------------|-----------|--------------------|--------------------------|-----------------------------------|---------|------------------------|--------------|--------------|
| | | | | | | Sample Date: 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: surface | surface | surface |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | Surface Water Background Criteria | Units | | | |
| Metals | 6010B | Aluminum | 36499 nc | 3370 | ug/l | 1600 | 440 | 670 |
| | 6010B | Barium | 2555 nc | 47.5 | ug/l | 91 | 86 | 34 |
| | 6010B | Beryllium | 73 nc | 0.00 | ug/l | 1 U | 1 U | 1 U |
| | 6010B | Cadmium | 18 nc | 0.00 | ug/l | 1 U | 1 U | 1 U |
| | 6010B | Calcium | --[n] | 41400 | ug/l | 49000 | 48000 | 26000 |
| | 6010B | Chromium | 109 nc | 0.00 | ug/l | 2.8 | 1.8 | 1.7 |
| | 6010B | Cobalt | 730 nc | 0.00 | ug/l | 2.5 U | 2.5 U | 2.5 U |
| | 6010B | Copper | 1460 nc | 7.9 | ug/l | 5 U | 5 U | 5 U |
| | 6010B | Iron | 10950 nc | 2560 | ug/l | 3900 | 3100 | 1200 |
| | 6010B | Magnesium | --[n] | 10800 | ug/l | 5900 | 5700 | 3800 |
| | 6010B | Manganese | 876 nc | 391 | ug/l | 4500 | 4500 | 480 |
| | 6010B | Nickel | 730 nc | 0.00 | ug/l | 2.9 | 2.4 | 2 |
| | 6010B | Potassium | --[n] | 3170 | ug/l | 6700 | 6500 | 4600 |
| | 6010B | Selenium | 182 nc | 0.00 | ug/l | 7.5 U | 7.5 U | 7.5 U |
| | 6010B | Silver | 182 nc | 0.00 | ug/l | 5 U | 5 U | 5 U |
| | 6010B | Sodium | --[n] | 21300 | ug/l | 1200 | 1000 | 940 |
| | 6010B | Vanadium | 36 nc | 0.00 | ug/l | 2.8 | 5 U | 5 U |
| | 6010B | Zinc | 10950 nc | 42 | ug/l | 12 | 15 U | 15 U |
| | 7041 | Antimony | 15 nc | 0.00 | ug/l | 3.75 U | 3.75 U | 3.75 U |
| | 7060A | Arsenic | 0.045 ca | 3.2 | ug/l | 3 | 1.7 | 1 U |
| 7421 | Lead | 15 mcl | 0.00 | ug/l | 1.2 | 1.5 U | 1.5 U | |
| 7470A | Mercury | 11 nc | 0.00 | ug/l | 0.1 U | 0.1 UJ | 0.051 | |
| 7841 | Thallium | 2.4 nc | 0.00 | ug/l | 1.5 | 2 U | 2 U | |
| Pesticides | 8081A | 4,4'-DDD | 0.28 ca | -- | ug/l | 0.055 U | 0.055 U | 0.055 U |
| | 8081A | 4,4'-DDE | 0.20 ca | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | 4,4'-DDT | 0.20 ca | -- | ug/l | 0.075 U | 0.075 U | 0.075 U |
| | 8081A | Aldrin | 0.0040 ca | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | alpha-BHC | 0.011 nc | -- | ug/l | 0.075 U | 0.075 U | 0.075 U |
| | 8081A | alpha-Chlordane | 0.19 ca | -- | ug/l | 0.0245 U | 0.025 U | 0.0245 U |
| | 8081A | beta-BHC | 0.037 ca | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | delta-BHC | -- | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | Dieldrin | 0.0042 ca | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | Endosulfan I | 220 nc | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | Endosulfan II | 220 nc | -- | ug/l | 0.075 U | 0.075 U | 0.075 U |
| | 8081A | Endosulfan sulfate | 220 nc | -- | ug/l | 0.075 U | 0.075 U | 0.075 U |
| | 8081A | Endrin | 11 nc | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | Endrin aldehyde | -- | -- | ug/l | 0.075 U | 0.075 UJ | 0.075 U |
| | 8081A | Endrin ketone | -- | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | gamma-BHC | 0.052 ca | -- | ug/l | 0.075 U | 0.075 UJ | 0.075 U |
| | 8081A | gamma-Chlordane | 0.19 ca | -- | ug/l | 0.049 U | 0.0495 U | 0.0485 U |
| | 8081A | Heptachlor | 0.015 ca | -- | ug/l | 0.075 U | 0.075 U | 0.075 U |
| | 8081A | Heptachlor epoxide | 0.0074 ca | -- | ug/l | 0.075 U | 0.075 U | 0.075 U |
| | 8081A | Methoxychlor | 182 nc | -- | ug/l | 0.295 U | 0.295 U | 0.29 U |
| 8081A | Toxaphene | 0.061 ca | -- | ug/l | 0.245 U | 0.25 U | 0.245 U | |
| PCBs | 8082 | Aroclor 1016 | 0.96 ca | -- | ug/l | 0.295 U | 0.295 U | 0.29 U |
| | 8082 | Aroclor 1221 | 0.034 ca | -- | ug/l | 0.65 U | 0.65 U | 0.65 U |
| | 8082 | Aroclor 1232 | 0.034 ca | -- | ug/l | 0.65 U | 0.65 U | 0.65 U |
| | 8082 | Aroclor 1242 | 0.034 ca | -- | ug/l | 0.65 U | 0.65 U | 0.65 U |

Table B12-8
Building 1200 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sw-025-DUP | B12sw-025-SW | B12sw-026-SW |
|---------------|--------|------------------------------|-----------------------------|---|-------|---------------|--------------|--------------|
| Sample Date: | | | | | | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| Sample Depth: | | | | | | surface | surface | surface |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | Surface Water Background Criteria | Units | | | |
| | 8082 | Aroclor 1248 | 0.034 ca | -- | ug/l | 0.75 U | 0.75 U | 0.75 U |
| | 8082 | Aroclor 1254 | 0.034 ca | -- | ug/l | 0.65 U | 0.65 U | 0.65 U |
| | 8082 | Aroclor 1260 | 0.034 ca | -- | ug/l | 0.295 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 |
| | 8260B | 1,1,2,2-Tetrachloroethane | 0.055 ca | -- | ug/l | 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 |
| | 8260B | 1,1-Dichloroethane | 811 nc | -- | ug/l | 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 |
| | 8260B | 1,2-Dibromoethane | 0.0056 ca | -- | ug/l | 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 |
| | 8260B | 1,2-Dichloroethene (total) | 120 nc | -- | ug/l | 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 |
| | 8260B | 2-Butanone | 6968 nc | -- | ug/l | 5 U | 5 U | 5 U |
| | 8260B | 2-Hexanone | 2000 nc | -- | ug/l | 5 U | 5 U | 5 U |
| | 8260B | 4-Methyl-2-pentanone | 1993 nc | -- | ug/l | 5 U | 5 U | 5 U |
| | 8260B | Acetone | 5475 nc | -- | ug/l | 6.6 J | 7.2 J | 5.5 J |
| | 8260B | Benzene | 0.35 ca | -- | ug/l | 0.5 U | 0.5 U | 0.5 U |
| | 8260B | Bromochloromethane | -- | -- | ug/l | 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 |
| | 8260B | Bromoform | 8.5 ca | -- | ug/l | 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 |
| | 8260B | Carbon disulfide | 1043 nc | -- | ug/l | 2.5 U | 2.5 U | 2.5 U |
| | 8260B | Carbon tetrachloride | 0.17 ca | -- | ug/l | 0.5 U | 0.5 U | 0.5 U |
| | 8260B | Chlorobenzene | 106 nc | -- | ug/l | 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 |
| | 8260B | Chloroform | 0.17 ca | -- | ug/l | 0.5 U | 0.5 U | 0.5 U |
| | 8260B | Chloromethane | 158 nc | -- | ug/l | 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 |
| | 8260B | cis-1,3-Dichloropropene | 0.40 ca | -- | ug/l | 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 |
| | 8260B | Ethylbenzene | 1340 nc | -- | ug/l | 0.5 U | 0.5 U | 0.5 U |
| | 8260B | m&p-Xylenes | 206 nc | -- | ug/l | 1 U | 1 U | 1 U |
| | 8260B | Methylene chloride | 4.3 ca | -- | ug/l | 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 |
| | 8260B | Styrene | 1641 nc | -- | ug/l | 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 |
| | 8260B | Toluene | 723 nc | -- | ug/l | 1.3 | 1 | 0.5 U |
| | 8260B | Total Xylenes | 206 nc | -- | ug/l | 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 |
| | 8260B | trans-1,3-Dichloropropene | 0.40 ca | -- | ug/l | 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 |
| | 8260B | Vinyl chloride | 0.020 ca | -- | ug/l | 0.5 U | 0.5 U | 0.5 U |
| SVOCs | 8270C | 1,2,4-Trichlorobenzene | 7.2 nc | -- | ug/l | 1 U | 1 U | 1 U |
| | 8270C | 1,2-Dichlorobenzene | 370 nc | -- | ug/l | 1 U | 1 U | 1 U |
| | 8270C | 1,3-Dichlorobenzene | 182 nc | -- | ug/l | 1 U | 1 U | 1 U |
| | 8270C | 1,4-Dichlorobenzene | 0.50 ca | -- | ug/l | 1 U | 1 U | 1 U |
| | 8270C | 2,2-oxybis (1-chloropropane) | 0.27 ca | -- | ug/l | 1 UJ | 1 UJ | 1 UJ |
| | 8270C | 2,4,5-Trichlorophenol | 3650 nc | -- | ug/l | 4.95 U | 5 U | 4.9 U |

Table B12-8
Building 1200 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Tap Water) | Surface Water Background Criteria | Units | Sample Date: 11/5/2004 | | |
|-------|-----------------------------|-----------|-----------------------------|---|-------|--------------------------|--------------|--------------|
| | | | | | | B12sw-025-DUP | B12sw-025-SW | B12sw-026-SW |
| | | | | | | Sample Depth: surface | surface | surface |
| 8270C | 2,4,6-Trichlorophenol | 3.6 | nc | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | 2,4-Dichlorophenol | 109 | nc | -- | ug/l | 4.95 U | 5 U | 4.9 U |
| 8270C | 2,4-Dimethylphenol | 730 | nc | -- | ug/l | 4.95 U | 5 U | 4.9 U |
| 8270C | 2,4-Dinitrophenol | 73 | nc | -- | ug/l | 10 U | 10 U | 10 U |
| 8270C | 2,4-Dinitrotoluene | 73 | nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | 2,6-Dinitrotoluene | 36 | nc | -- | ug/l | 0.25 U | 0.25 U | 0.245 U |
| 8270C | 2-Chloronaphthalene | 487 | nc | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | 2-Chlorophenol | 30 | nc | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | 2-Methylnaphthalene | -- | -- | -- | ug/l | 0.25 U | 0.25 U | 0.245 U |
| 8270C | 2-Methylphenol | 1825 | nc | -- | ug/l | 2.2 | 1.8 J | 1 U |
| 8270C | 2-Nitroaniline | 109 | nc | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | 2-Nitrophenol | -- | -- | -- | ug/l | 4.95 U | 5 U | 4.9 U |
| 8270C | 3,3'-Dichlorobenzidine | 0.15 | ca | -- | ug/l | 2.5 U | 2.5 UJ | 2.45 U |
| 8270C | 3-Nitroaniline | 3.2 | ca | -- | ug/l | 4.95 U | 5 U | 4.9 U |
| 8270C | 4,6-Dinitro-2-methylphenol | 3.6 | nc | -- | ug/l | 10 U | 10 U | 10 U |
| 8270C | 4-Bromophenyl phenyl ether | -- | -- | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | 4-Chloro-3-methylphenol | -- | -- | -- | ug/l | 4.95 U | 5 U | 4.9 U |
| 8270C | 4-Chloroaniline | 146 | nc | -- | ug/l | 4.95 U | 5 U | 4.9 U |
| 8270C | 4-Chlorophenyl phenyl ether | -- | -- | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | 4-Methylphenol | 182 | nc | -- | ug/l | 11 | 6.5 | 1 U |
| 8270C | 4-Nitroaniline | 3.2 | ca | -- | ug/l | 4.95 U | 5 UJ | 4.9 U |
| 8270C | 4-Nitrophenol | -- | -- | -- | ug/l | 10 U | 10 U | 10 U |
| 8270C | Acenaphthene | 365 | nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | Acenaphthylene | -- | -- | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | Anthracene | 1825 | nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | Benzo(a)anthracene | 0.092 | ca | -- | ug/l | 0.1 U | 0.1 UJ | 0.1 U |
| 8270C | Benzo(a)pyrene | 0.0092 | ca | -- | ug/l | 0.2 U | 0.2 U | 0.195 U |
| 8270C | Benzo(b)fluoranthene | 0.092 | ca | -- | ug/l | 0.2 U | 0.2 U | 0.195 U |
| 8270C | Benzo(g,h,i)perylene | -- | -- | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | Benzo(k)fluoranthene | 0.92 | ca | -- | ug/l | 0.2 U | 0.2 U | 0.195 U |
| 8270C | Benzoic acid | 145979 | nc | -- | ug/l | 93 | 79 J | 10 U |
| 8270C | Benzyl alcohol | 10950 | nc | -- | ug/l | 7.8 J | 8.5 J | 10 U |
| 8270C | Bis(2-chloroethoxy)methane | -- | -- | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | Bis(2-chloroethyl) ether | 0.010 | ca | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | Bis(2-ethylhexyl) phthalate | 4.8 | ca | -- | ug/l | 7.5 U | 7.5 U | 4.5 J |
| 8270C | Butylbenzyl phthalate | 7300 | nc | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | Carbazole | 3.4 | ca | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | Chrysene | 9.2 | ca | -- | ug/l | 0.25 U | 0.25 U | 0.245 U |
| 8270C | Dibenzo(a,h)anthracene | 0.0092 | ca | -- | ug/l | 0.2 U | 0.2 U | 0.195 U |
| 8270C | Dibenzofuran | 12 | nc | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | Diethyl phthalate | 29199 | nc | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | Dimethyl phthalate | 364867 | nc | -- | ug/l | 1 U | 1 U | 1 U |
| 8270C | Di-n-butyl phthalate | 3650 | nc | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |
| 8270C | Di-n-octyl phthalate | 1460 | nc | -- | ug/l | 4.95 U | 5 UJ | 4.9 U |
| 8270C | Fluoranthene | 1460 | nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | Fluorene | 243 | nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U |
| 8270C | Hexachlorobenzene | 0.042 | ca | -- | ug/l | 0.25 U | 0.25 U | 0.245 U |
| 8270C | Hexachlorobutadiene | 0.86 | ca | -- | ug/l | 2.5 U | 2.5 U | 2.45 U |

Table B12-8
Building 1200 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sw-025-DUP | B12sw-025-SW | B12sw-026-SW | |
|-------------|-----------------|----------------------------|-----------------------------|---|-------|---------------|--------------|--------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | surface | surface | surface |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | Surface Water Background Criteria | Units | | | | |
| | 8270C | Hexachlorocyclopentadiene | 219 nc | -- | ug/l | - R | - R | - R | |
| | 8270C | Hexachloroethane | 4.8 ca | -- | ug/l | 2.5 U | 2.5 U | 2.45 U | |
| | 8270C | Indeno(1,2,3-cd)pyrene | 0.092 ca | -- | ug/l | 0.2 U | 0.2 U | 0.195 U | |
| | 8270C | Isophorone | 71 ca | -- | ug/l | 1 U | 1 U | 1 U | |
| | 8270C | Naphthalene | 6.2 nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U | |
| | 8270C | Nitrobenzene | 3.4 nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U | |
| | 8270C | n-Nitroso-di-n-propylamine | 0.0096 ca | -- | ug/l | 0.25 U | 0.25 U | 0.245 U | |
| | 8270C | n-Nitrosodiphenylamine | 14 ca | -- | ug/l | 0.495 U | 0.5 U | 0.49 U | |
| | 8270C | Pentachlorophenol | 0.56 ca | -- | ug/l | 4.95 U | 5 UJ | 4.9 U | |
| | 8270C | Phenanthrene | -- | -- | ug/l | 0.495 U | 0.5 U | 0.49 U | |
| | 8270C | Phenol | 10950 nc | -- | ug/l | 10 | 7.7 | 2.45 U | |
| | 8270C | Pyrene | 182 nc | -- | ug/l | 0.495 U | 0.5 U | 0.49 U | |
| Explosives | 8330 | 1,3,5-Trinitrobenzene | 1095 nc | -- | ug/l | 0.16 U | 0.225 U | 0.11 U | |
| | 8330 | 1,3-Dinitrobenzene | 3.6 nc | -- | ug/l | 0.16 U | 0.225 U | 0.11 U | |
| | 8330 | 2,4,6-TNT | 2.2 ca | -- | ug/l | 0.2 U | 0.28 U | 0.135 U | |
| | 8330 | 2,4-Dinitrotoluene | 73 nc | -- | ug/l | 0.285 U | 0.405 U | 0.195 U | |
| | 8330 | 2,6-Dinitrotoluene | 36 nc | -- | ug/l | 0.34 U | 0.485 U | 0.235 U | |
| | 8330 | 2-Amino-4,6-Dinitrotoluene | -- | -- | ug/l | 0.285 U | 0.405 U | 0.195 U | |
| | 8330 | 2-Nitrotoluene | 0.049 ca | -- | ug/l | 0.245 U | 0.35 U | 0.17 U | |
| | 8330 | 3-Nitrotoluene | 122 nc | -- | ug/l | 0.34 J | 0.49 J | 0.17 U | |
| | 8330 | 4-Amino-2,6-Dinitrotoluene | -- | -- | ug/l | 0.26 U | 0.37 U | 0.18 U | |
| | 8330 | 4-Nitrotoluene | 0.66 ca | -- | ug/l | 0.245 U | 0.35 U | 0.17 U | |
| | 8330 | HMX | 1825 nc | -- | ug/l | 24 | 29 | 3.7 | |
| | 8330 | Nitrobenzene | 3.4 nc | -- | ug/l | 0.125 U | 0.18 U | 0.085 U | |
| | 8330 | RDX | 0.61 ca | -- | ug/l | 35 | 42 | 2.8 | |
| | 8330 | Tetryl | 365 nc | -- | ug/l | 0.6 U | 0.9 U | 0.425 U | |
| Propellants | 353.2 Modified | Nitrocellulose | -- | -- | ug/l | 250 U | 250 U | 250 U | |
| | 8332 | Nitroglycerine | 4.8 ca | -- | ug/l | 5.4 | 5.9 J | 0.55 U | |
| | SW8330 Modified | Nitroguanidine | 3650 nc | -- | ug/l | 10 U | 10 U | 10 U | |

Table B12-8
Building 1200 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | B12sw-025-DUP | B12sw-025-SW | B12sw-026-SW | |
|-------|--------|-----------|-----------------------------|---|-------|---------------|--------------|--------------|-----------|
| | | | | | | Sample Date: | 11/5/2004 | 11/5/2004 | 11/5/2004 |
| | | | | | | Sample Depth: | surface | surface | surface |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | Surface Water Background Criteria | Units | | | | |

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 screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
- 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 B12-9
Building 1200 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Tap Water) | Unconsolidated Filtered Groundwater Background | Consolidated Filtered Groundwater Background | Units | Sample Date: | | | | | |
|---------------|------------|--------------------|-----------------------------|---|---|-------|--------------|---------------|--------------|--------------|------------|----------|
| | | | | | | | B12mw-010-GW | B12mw-011-DUP | B12mw-011-GW | B12mw-012-GW | BKGMw-010 | |
| | | | | | | | 1/14/2005 | 12/9/2004 | 12/9/2004 | 1/19/2005 | 1/21/2005 | |
| Sample Depth: | | | | | | | Description | | | | | |
| | | | | | | | C/Filtered | C/Filtered | C/Filtered | C/Filtered | C/Filtered | |
| Metals | 6010B | Aluminum | 36499 nc | -- | -- | ug/l | 2600 J | 15.5 U | 19 U | 75 U | 140 | |
| | 6010B | Barium | 2555 nc | 82.1 | 256 | ug/l | 24 | 2.1 | 2.1 | 35 | 19 | |
| | 6010B | Beryllium | 73 nc | 0.00 | 0.00 | ug/l | 1 U | 1 U | 1 U | 1 U | 1 U | |
| | 6010B | Cadmium | 18 nc | 0.00 | 0.00 | ug/l | 1 U | 1 U | 1 U | 0.25 | 1 U | |
| | 6010B | Calcium | --[n] | 115000 | 53100 | ug/l | 4100 | 12000 | 12000 | 56000 | 11000 | |
| | 6010B | Chromium | 109 nc | 7.3 | 0.00 | ug/l | 4.8 | 5 U | 5 U | 5 U | 5 U | |
| | 6010B | Cobalt | 730 nc | 0.00 | 0.00 | ug/l | 1.4 | 2.5 U | 2.5 U | 9.4 | 2.5 U | |
| | 6010B | Copper | 1460 nc | 0.00 | 0.00 | ug/l | 2.7 | 5 U | 5 U | 5 U | 5 U | |
| | 6010B | Iron | 10950 nc | 279 | 1430 | ug/l | 4400 | 60 U | 60 U | 60 U | 60 U | |
| | 6010B | Magnesium | --[n] | 43300 | 15000 | ug/l | 4800 | 8800 | 8800 | 37000 | 14000 | |
| | 6010B | Manganese | 876 nc | 1020 | 1340 | ug/l | 230 | 46 | 46 | 1100 | 760 | |
| | 6010B | Nickel | 730 nc | 0.00 | 83.4 | ug/l | 26 | 5 U | 5 U | 51 | 74 | |
| | 6010B | Potassium | --[n] | 2890 | 5770 | ug/l | 1300 | 1600 | 1600 | 4000 | 750 | |
| | 6010B | Selenium | 182 nc | 0.00 | 0.00 | ug/l | 7.5 U | 7.5 U | 3.7 | 7.5 U | 7.5 U | |
| | 6010B | Silver | 182 nc | 0.00 | 0.00 | ug/l | 5 U | 0.385 U | 5 U | 5 U | 5 U | |
| | 6010B | Sodium | --[n] | 45700 | 51400 | ug/l | 6300 | 5600 | 5500 | 14000 | 3900 | |
| | 6010B | Vanadium | 36 nc | 0.00 | 0.00 | ug/l | 3.7 | 5 U | 5 U | 5 U | 5 U | |
| | 6010B | Zinc | 10950 nc | 60.9 | 52.3 | ug/l | 110 | 3.05 U | 2.55 U | 4.9 | 30 | |
| | 7041 | Antimony | 15 nc | 0.00 | 0.00 | ug/l | 3.75 U | 3.75 U | 3.75 U | 3.75 U | 3.75 U | |
| | 7060A | Arsenic | 0.045 ca | 11.7 | 0.00 | ug/l | 2.2 | 1 U | 1 U | 1 U | 1 U | |
| | 7421 | Lead | 15 mcl | 0.00 | 0.00 | ug/l | 2.7 | 1.5 U | 1.5 U | 1.5 U | 1.5 U | |
| | 7470A | Mercury | 11 nc | 0.00 | 0.00 | ug/l | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | |
| | 7841 | Thallium | 2.4 nc | 0.00 | 0.00 | ug/l | 2 U | 2 U | 2 U | 2 U | 2 U | |
| | Pesticides | 8081A | 4,4'-DDD | 0.28 ca | -- | -- | ug/l | 0.06 U | 0.05 U | 0.055 U | 0.05 U | 0.055 U |
| | | 8081A | 4,4'-DDE | 0.20 ca | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U |
| | | 8081A | 4,4'-DDT | 0.20 ca | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U |
| | | 8081A | Aldrin | 0.0040 ca | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U |
| 8081A | | alpha-BHC | 0.011 nc | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |
| 8081A | | alpha-Chlordane | 0.19 ca | -- | -- | ug/l | 0.027 U | 0.024 U | 0.025 U | 0.024 U | 0.0245 U | |
| 8081A | | beta-BHC | 0.037 ca | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | delta-BHC | -- | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | Dieldrin | 0.0042 ca | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | Endosulfan I | 220 nc | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | Endosulfan II | 220 nc | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |
| 8081A | | Endosulfan sulfate | 220 nc | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |
| 8081A | | Endrin | 11 nc | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | Endrin aldehyde | -- | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |
| 8081A | | Endrin ketone | -- | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | gamma-BHC | 0.052 ca | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |
| 8081A | | gamma-Chlordane | 0.19 ca | -- | -- | ug/l | 0.055 U | 0.0475 U | 0.0495 U | 0.0475 U | 0.0485 U | |
| 8081A | | Heptachlor | 0.015 ca | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |
| 8081A | | Heptachlor epoxide | 0.0074 ca | -- | -- | ug/l | 0.08 U | 0.07 U | 0.075 U | 0.07 U | 0.075 U | |

Table B12-9
Building 1200 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Tap Water) | Unconsolidated Filtered Groundwater Background | Consolidated Filtered Groundwater Background | Units | Sample Date: | | | | |
|---------------|----------|----------------------------|-----------------------------|---|---|-------|--------------|---------------|--------------|--------------|------------|
| | | | | | | | B12mw-010-CW | B12mw-011-DUP | B12mw-011-CW | B12mw-012-CW | BKGMw-010 |
| | | | | | | | 1/14/2005 | 12/9/2004 | 12/9/2004 | 1/19/2005 | 1/21/2005 |
| Sample Depth: | | | | | | | 19 ft | 23 ft | 23 ft | 23 ft | 17 ft |
| Description | | | | | | | C/Filtered | C/Filtered | C/Filtered | C/Filtered | C/Filtered |
| | 8081A | Methoxychlor | 182 nc | -- | -- | ug/l | 0.325 U | 0.285 U | 0.295 U | 0.285 U | 0.29 U |
| | 8081A | Toxaphene | 0.061 ca | -- | -- | ug/l | 0.27 U | 0.24 U | 0.25 U | 0.24 U | 0.245 U |
| PCBs | 8082 | Aroclor 1016 | 0.96 ca | -- | -- | ug/l | 0.325 U | 0.285 U | 0.295 U | 0.285 U | 0.29 U |
| | 8082 | Aroclor 1221 | 0.034 ca | -- | -- | ug/l | 0.7 U | 0.6 U | 0.65 U | 0.6 U | 0.65 U |
| | 8082 | Aroclor 1232 | 0.034 ca | -- | -- | ug/l | 0.7 U | 0.6 U | 0.65 U | 0.6 U | 0.65 U |
| | 8082 | Aroclor 1242 | 0.034 ca | -- | -- | ug/l | 0.7 U | 0.6 U | 0.65 U | 0.6 U | 0.65 U |
| | 8082 | Aroclor 1248 | 0.034 ca | -- | -- | ug/l | 0.8 U | 0.7 U | 0.75 U | 0.7 U | 0.75 U |
| | 8082 | Aroclor 1254 | 0.034 ca | -- | -- | ug/l | 0.7 U | 0.6 U | 0.65 U | 0.6 U | 0.65 U |
| | 8082 | Aroclor 1260 | 0.034 ca | -- | -- | ug/l | 0.325 U | 0.285 U | 0.295 U | 0.285 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 |
| | 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 |
| | 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 |
| | 8260B | 1,1-Dichloroethane | 811 nc | -- | -- | ug/l | 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 |
| | 8260B | 1,2-Dibromoethane | 0.0056 ca | -- | -- | ug/l | 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 |
| | 8260B | 1,2-Dichloroethene (total) | 120 nc | -- | -- | ug/l | 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 |
| | 8260B | 2-Butanone | 6968 nc | -- | -- | ug/l | 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 |
| | 8260B | 4-Methyl-2-pentanone | 1993 nc | -- | -- | ug/l | 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 |
| | 8260B | Benzene | 0.35 ca | -- | -- | ug/l | 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 |
| | 8260B | Bromodichloromethane | 0.18 ca | -- | -- | ug/l | 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 |
| | 8260B | Bromomethane | 8.7 nc | -- | -- | ug/l | 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 |
| | 8260B | Carbon tetrachloride | 0.17 ca | -- | -- | ug/l | 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 |
| | 8260B | Chloroethane | 4.6 ca | -- | -- | ug/l | 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 |
| | 8260B | Chloromethane | 158 nc | -- | -- | ug/l | 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 |
| | 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 |
| | 8260B | Dibromochloromethane | 0.13 ca | -- | -- | ug/l | 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 |
| | 8260B | m&p-Xylenes | 206 nc | -- | -- | ug/l | 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 |
| 8260B | o-Xylene | 206 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | |
| 8260B | Styrene | 1641 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | |

Table B12-9
Building 1200 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Tap Water) | Unconsolidated Filtered Groundwater Background | Consolidated Filtered Groundwater Background | Units | Sample Date: | | | | |
|---------------|--------|------------------------------|-----------------------------|---|---|-------|--------------|---------------|--------------|--------------|------------|
| | | | | | | | B12mw-010-GW | B12mw-011-DUP | B12mw-011-GW | B12mw-012-GW | BKGMw-010 |
| | | | | | | | 1/14/2005 | 12/9/2004 | 12/9/2004 | 1/19/2005 | 1/21/2005 |
| Sample Depth: | | | | | | | 19 ft | 23 ft | 23 ft | 23 ft | 17 ft |
| Description | | | | | | | C/Filtered | C/Filtered | C/Filtered | C/Filtered | C/Filtered |
| | 8260B | Tetrachloroethene | 0.10 ca | -- | -- | ug/l | 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 |
| | 8260B | Total Xylenes | 206 nc | -- | -- | ug/l | 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 |
| | 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 |
| | 8260B | Trichloroethene | 0.028 ca | -- | -- | ug/l | 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 |
| SVOCs | 8270C | 1,2,4-Trichlorobenzene | 7.2 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 1,2-Dichlorobenzene | 370 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 1,3-Dichlorobenzene | 182 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 1,4-Dichlorobenzene | 0.50 ca | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 2,2-oxybis (1-chloropropane) | 0.27 ca | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 2,4,5-Trichlorophenol | 3650 nc | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 2,4,6-Trichlorophenol | 3.6 nc | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | 2,4-Dichlorophenol | 109 nc | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 2,4-Dimethylphenol | 730 nc | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 2,4-Dinitrophenol | 73 nc | -- | -- | ug/l | 10 U | 10 U | 10 U | 9.5 U | 10 U |
| | 8270C | 2,4-Dinitrotoluene | 73 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | 2,6-Dinitrotoluene | 36 nc | -- | -- | ug/l | 0.25 U | 0.25 U | 0.25 U | 0.235 U | 0.245 U |
| | 8270C | 2-Chloronaphthalene | 487 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 2-Chlorophenol | 30 nc | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | 2-Methylnaphthalene | -- | -- | -- | ug/l | 0.25 U | 0.25 U | 0.25 U | 0.235 U | 0.245 U |
| | 8270C | 2-Methylphenol | 1825 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 2-Nitroaniline | 109 nc | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | 2-Nitrophenol | -- | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 3,3'-Dichlorobenzidine | 0.15 ca | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | 3-Nitroaniline | 3.2 ca | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 4,6-Dinitro-2-methylphenol | 3.6 nc | -- | -- | ug/l | 10 U | 10 U | 10 U | 9.5 U | 10 U |
| | 8270C | 4-Bromophenyl phenyl ether | -- | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | 4-Chloro-3-methylphenol | -- | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 4-Chloroaniline | 146 nc | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 4-Chlorophenyl phenyl ether | -- | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | 4-Methylphenol | 182 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | 4-Nitroaniline | 3.2 ca | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | 4-Nitrophenol | -- | -- | -- | ug/l | 10 U | 10 U | 10 U | 9.5 U | 10 U |
| | 8270C | Acenaphthene | 365 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Acenaphthylene | -- | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Anthracene | 1825 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Benzo(a)anthracene | 0.092 ca | -- | -- | ug/l | 0.1 U | 0.1 U | 0.1 U | 0.095 U | 0.1 U |
| | 8270C | Benzo(a)pyrene | 0.0092 ca | -- | -- | ug/l | 0.2 U | 0.2 U | 0.2 U | 0.185 U | 0.195 U |
| | 8270C | Benzo(b)fluoranthene | 0.092 ca | -- | -- | ug/l | 0.2 U | 0.2 U | 0.2 U | 0.185 U | 0.195 U |
| | 8270C | Benzo(g,h,i)perylene | -- | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |

Table B12-9
Building 1200 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Group | Method | Parameter | Region 9 PRG (Tap Water) | Unconsolidated Filtered Groundwater Background | Consolidated Filtered Groundwater Background | Units | Sample Date: | | | | |
|------------|--------|-----------------------------|-----------------------------|---|---|-------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| | | | | | | | B12mw-010-GW | B12mw-011-DUP | B12mw-011-GW | B12mw-012-GW | BK Gmw-010 |
| | | | | | | | 1/14/2005 19 ft C/Filtered | 12/9/2004 23 ft C/Filtered | 12/9/2004 23 ft C/Filtered | 1/19/2005 23 ft C/Filtered | 1/21/2005 17 ft C/Filtered |
| | 8270C | Benzo(k)fluoranthene | 0.92 ca | -- | -- | ug/l | 0.2 U | 0.2 U | 0.2 U | 0.185 U | 0.195 U |
| | 8270C | Benzoic acid | 145979 nc | -- | -- | ug/l | 10 U | 10 U | 10 U | 9.5 U | 10 U |
| | 8270C | Benzyl alcohol | 10950 nc | -- | -- | ug/l | 10 U | 10 U | 10 U | 9.5 U | 10 U |
| | 8270C | Bis(2-chloroethoxy)methane | -- | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | Bis(2-chloroethyl) ether | 0.010 ca | -- | -- | ug/l | 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 U | 7.5 U |
| | 8270C | Butylbenzyl phthalate | 7300 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | Carbazole | 3.4 ca | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | Chrysene | 9.2 ca | -- | -- | ug/l | 0.25 U | 0.25 U | 0.25 U | 0.235 U | 0.245 U |
| | 8270C | Dibenzo(a,h)anthracene | 0.0092 ca | -- | -- | ug/l | 0.2 U | 0.2 U | 0.2 U | 0.185 U | 0.195 U |
| | 8270C | Dibenzofuran | 12 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | Diethyl phthalate | 29199 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | Dimethyl phthalate | 364867 nc | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | Di-n-butyl phthalate | 3650 nc | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | Di-n-octyl phthalate | 1460 nc | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | Fluoranthene | 1460 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Fluorene | 243 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Hexachlorobenzene | 0.042 ca | -- | -- | ug/l | 0.25 U | 0.25 U | 0.25 U | 0.235 U | 0.245 U |
| | 8270C | Hexachlorobutadiene | 0.86 ca | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | Hexachlorocyclopentadiene | 219 nc | -- | -- | ug/l | - R | - R | - R | 9.5 U | 10 U |
| | 8270C | Hexachloroethane | 4.8 ca | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | Indeno(1,2,3-cd)pyrene | 0.092 ca | -- | -- | ug/l | 0.2 U | 0.2 U | 0.2 U | 0.185 U | 0.195 U |
| | 8270C | Isophorone | 71 ca | -- | -- | ug/l | 1 U | 1 U | 1 U | 0.95 U | 1 U |
| | 8270C | Naphthalene | 6.2 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Nitrobenzene | 3.4 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | n-Nitroso-di-n-propylamine | 0.0096 ca | -- | -- | ug/l | 0.25 U | 0.25 U | 0.25 U | 0.235 U | 0.245 U |
| | 8270C | n-Nitrosodiphenylamine | 14 ca | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Pentachlorophenol | 0.56 ca | -- | -- | ug/l | 5 U | 5 U | 4.95 U | 4.65 U | 4.9 U |
| | 8270C | Phenanthrene | -- | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| | 8270C | Phenol | 10950 nc | -- | -- | ug/l | 2.5 U | 2.5 U | 2.5 U | 2.35 U | 2.45 U |
| | 8270C | Pyrene | 182 nc | -- | -- | ug/l | 0.5 U | 0.5 U | 0.495 U | 0.465 U | 0.49 U |
| Explosives | 8330 | 1,3,5-Trinitrobenzene | 1095 nc | -- | -- | ug/l | 0.105 U | 0.125 U | 0.125 U | 0.14 U | 0.1 U |
| | 8330 | 1,3-Dinitrobenzene | 3.6 nc | -- | -- | ug/l | 0.105 U | 0.125 U | 0.125 U | 0.14 U | 0.1 U |
| | 8330 | 2,4,6-TNT | 2.2 ca | -- | -- | ug/l | 0.13 U | 0.155 U | 0.155 U | 0.175 U | 0.125 U |
| | 8330 | 2,4-Dinitrotoluene | 73 nc | -- | -- | ug/l | 0.19 U | 0.22 U | 0.225 U | 0.25 U | 0.18 U |
| | 8330 | 2,6-Dinitrotoluene | 36 nc | -- | -- | ug/l | 0.225 U | 0.265 U | 0.27 U | 0.3 U | 0.215 U |
| | 8330 | 2-Amino-4,6-Dinitrotoluene | -- | -- | -- | ug/l | 0.19 U | 0.22 U | 0.225 U | 0.25 U | 0.18 U |
| | 8330 | 2-Nitrotoluene | 0.049 ca | -- | -- | ug/l | 0.165 U | 0.19 U | 0.195 U | 0.215 U | 0.155 U |
| | 8330 | 3-Nitrotoluene | 122 nc | -- | -- | ug/l | 0.165 U | 0.19 U | 0.195 U | 0.215 U | 0.155 U |
| | 8330 | 4-Amino-2,6-Dinitrotoluene | -- | -- | -- | ug/l | 0.175 U | 0.205 U | 0.205 U | 0.23 U | 0.165 U |
| | 8330 | 4-Nitrotoluene | 0.66 ca | -- | -- | ug/l | 0.165 U | 0.19 U | 0.195 U | 0.215 U | 0.155 U |
| | 8330 | HMX | 1825 nc | -- | -- | ug/l | 0.165 U | 0.19 U | 0.195 U | 0.215 U | 0.155 U |

Table B12-9
Building 1200 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| | | | | | | | B12mw-010-GW | B12mw-011-DUP | B12mw-011-GW | B12mw-012-GW | BKGMw-010 | |
|-------------|-----------------|----------------|-----------------------------|---|---|-------|---------------|---------------|--------------|--------------|------------|------------|
| | | | | | | | Sample Date: | 1/14/2005 | 12/9/2004 | 12/9/2004 | 1/19/2005 | 1/21/2005 |
| | | | | | | | Sample Depth: | 19 ft | 23 ft | 23 ft | 23 ft | 17 ft |
| | | | | | | | Description | C/Filtered | C/Filtered | C/Filtered | C/Filtered | C/Filtered |
| Group | Method | Parameter | Region 9 PRG (Tap Water) | Unconsolidated Filtered Groundwater Background | Consolidated Filtered Groundwater Background | Units | | | | | | |
| | 8330 | Nitrobenzene | 3.4 nc | -- | -- | ug/l | 0.085 U | 0.1 U | 0.1 U | 0.11 U | 0.08 U | |
| | 8330 | RDX | 0.61 ca | -- | -- | ug/l | 0.105 U | 0.125 U | 0.125 U | 0.14 U | 0.1 U | |
| | 8330 | Tetryl | 365 nc | -- | -- | ug/l | 0.41 U | 0.48 U | 0.49 U | 0.55 U | 0.39 U | |
| Propellants | 353.2 Modified | Nitrocellulose | -- | -- | -- | ug/l | 65 U | 250 U | 250 U | 65 U | 60 U | |
| | 8332 | Nitroglycerine | 4.8 ca | -- | -- | ug/l | 0.55 UJ | 0.6 U | 0.6 U | 0.7 U | 0.5 U | |
| | SW8330 Modified | Nitroguanidine | 3650 nc | -- | -- | ug/l | 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 screening value for lead is the Maximum Contaminant level (MCL) from the safe Drinking Water Act)
- 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
- 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 B12-13
Building 1200 Human Health Risk Screening Tables for Groundwater
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

| Parameter | Region 9 PRG (Tap Water) | | Consolidated Filtered Groundwater Background | Maximum Detected C/Filtered | Frequency of Detection | COPC |
|-----------|-----------------------------|-----|---|-----------------------------------|---------------------------|------------------|
| Aluminum | 36499 | nc | -- | 2600 | 2 / 5 | No |
| Barium | 2555 | nc | 256 | 35 | 5 / 5 | No |
| Cadmium | 18 | nc | 0.00 | 0.25 | 1 / 5 | No |
| Calcium | --[n] | | 53100 | 56000 | 5 / 5 | No |
| Chromium | 109 | nc | 0.00 | 4.8 | 1 / 5 | No |
| Cobalt | 730 | nc | 0.00 | 9.4 | 2 / 5 | No |
| Copper | 1460 | nc | 0.00 | 2.7 | 1 / 5 | No |
| Iron | 10950 | nc | 1430 | 4400 | 1 / 5 | No |
| Magnesium | --[n] | | 15000 | 37000 | 5 / 5 | No |
| Manganese | 876 | nc | 1340 | 1100 | 5 / 5 | No |
| Nickel | 730 | nc | 83.4 | 74 | 3 / 5 | No |
| Potassium | --[n] | | 5770 | 4000 | 5 / 5 | No |
| Selenium | 182 | nc | 0.00 | 3.7 | 1 / 5 | No |
| Sodium | --[n] | | 51400 | 14000 | 5 / 5 | No |
| Vanadium | 36 | nc | 0.00 | 3.7 | 1 / 5 | No |
| Zinc | 10950 | nc | 52.3 | 110 | 3 / 5 | No |
| Arsenic | 0.045 | ca | 0.00 | 2.2 | 1 / 5 | Yes, > BKG & PRG |
| Lead | 15 | mcl | 0.00 | 2.7 | 1 / 5 | No |

Notes:

-- - no value available

BKG - site specific background

PRG - USEPA Region 9 Preliminary Remediation Goals

NIX - 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

[n] - nutrient

*Concentration Units ug/L

Table B12-12
Building 1200 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 | 1600 | 3/3 | No |
| Barium | 2555 nc | 47.5 | 91 | 3/3 | No |
| Calcium | --[n] | 41400 | 49000 | 3/3 | No |
| Chromium | 109 nc | 0.00 | 2.8 | 3/3 | No |
| Iron | 10950 nc | 2560 | 3900 | 3/3 | No |
| Magnesium | --[n] | 10800 | 5900 | 3/3 | No |
| Manganese | 876 nc | 391 | 4500 | 3/3 | Yes, > BKG & PRG |
| Nickel | 730 nc | 0.00 | 2.9 | 3/3 | No |
| Potassium | --[n] | 3170 | 6700 | 3/3 | No |
| Sodium | --[n] | 21300 | 1200 | 3/3 | No |
| Vanadium | 36 nc | 0.00 | 2.8 | 1/3 | No |
| Zinc | 10950 nc | 42 | 12 | 1/3 | No |
| Arsenic | 0.045 ca | 3.2 | 3 | 2/3 | No |
| Lead | 15 mcl | 0.00 | 1.2 | 1/3 | No |
| Mercury | 11 nc | 0.00 | 0.051 | 1/3 | No |
| Thallium | 2.4 nc | 0.00 | 1.5 | 1/3 | No |
| Acetone | 5475 nc | -- | 7.2 | 3/3 | No |
| Toluene | 723 nc | -- | 1.3 | 2/3 | No |
| 2-Methylphenol | 1825 nc | -- | 2.2 | 2/3 | No |
| 4-Methylphenol | 182 nc | -- | 11 | 2/3 | No |
| Benzoic acid | 145979 nc | -- | 93 | 2/3 | No |
| Benzyl alcohol | 10950 nc | -- | 8.5 | 2/3 | No |
| Bis(2-ethylhexyl) phthalate | 4.8 ca | -- | 4.5 | 1/3 | No |
| Phenol | 10950 nc | -- | 10 | 2/3 | No |
| 3-Nitrotoluene | 122 nc | -- | 0.49 | 2/3 | No |
| HMX | 1825 nc | -- | 29 | 3/3 | No |
| RDX | 0.61 ca | -- | 42 | 3/3 | Yes, > PRG |
| Nitroglycerine | 4.8 ca | -- | 5.9 | 2/3 | Yes, > PRG |

Notes:

-- - no value available

BKG - site specific background

PRG - USEPA Region 9 Preliminary Remediation Goals

NIX - 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

[n] - nutrient

*Concentration Units ug/L

Table B12-11
Building 1200 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 | 15000 | 3 / 3 | Yes, > BKG & PRG |
| Arsenic | 0.39 ca | 19.5 | 11 | 3 / 3 | No |
| Barium | 538 nc | 123 | 120 | 3 / 3 | No |
| Beryllium | 15 nc | 0.38 | 0.86 | 3 / 3 | No |
| Cadmium | 3.7 nc | 0.00 | 0.19 | 1 / 3 | No |
| Calcium | --[n] | 5510 | 2700 | 3 / 3 | No |
| Chromium | 30 ca | 18.1 | 18 | 3 / 3 | No |
| Cobalt | 30 ca | 9.1 | 11 | 3 / 3 | No |
| Copper | 313 nc | 27.6 | 20 | 3 / 3 | No |
| Iron | 2346 nc | 28200 | 23000 | 3 / 3 | No |
| Lead | 400 pbk | 27.4 | 22 | 3 / 3 | No |
| Magnesium | --[n] | 2760 | 2900 | 3 / 3 | No |
| Manganese | 176 nc | 1950 | 390 | 3 / 3 | No |
| Nickel | 156 nc | 17.7 | 24 | 3 / 3 | No |
| Potassium | --[n] | 1950 | 1800 | 3 / 3 | No |
| Selenium | 39 nc | 1.7 | 0.98 | 1 / 3 | No |
| Sodium | --[n] | 112 | 370 | 3 / 3 | No |
| Vanadium | 7.8 nc | 26.1 | 26 | 3 / 3 | No |
| Zinc | 2346 nc | 532 | 110 | 3 / 3 | No |
| Mercury | 2.3 nc | 0.06 | 0.2 | 3 / 3 | No |
| gamma-BHC | 0.44 ca | -- | 0.013 | 1 / 1 | No |
| 2-Butanone | 2231 nc | -- | 0.019 | 1 / 1 | No |
| Acetone | 1412 nc | -- | 0.084 | 1 / 1 | No |
| Benzo(b)fluoranthene | 0.62 ca | -- | 0.14 | 1 / 1 | No |
| Benzo(g,h,i)perylene | -- | -- | 0.16 | 1 / 1 | Yes, NTX |
| Nitrocellulose | -- | -- | 1.7 | 1 / 1 | Yes, NTX |

Notes:

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

Table B12-10

**Building 1200 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 | 30000 | 11 / 11 | Yes, > BKG & PRG |
| Arsenic | 0.39 ca | | 15.4 | 14 | 11 / 11 | No |
| Barium | 538 nc | | 88.4 | 320 | 11 / 11 | No |
| Beryllium | 15 nc | | 0.88 | 5.9 | 11 / 11 | No |
| Cadmium | 3.7 nc | | 0.00 | 3.3 | 5 / 11 | No |
| Calcium | --[n] | | 15800 | 190000 | 11 / 11 | No |
| Chromium | 30 ca | | 17.4 | 33 | 11 / 11 | Yes, > BKG & PRG |
| Cobalt | 30 ca | | 10.4 | 15 | 11 / 11 | No |
| Copper | 313 nc | | 17.7 | 71 | 11 / 11 | No |
| Iron | 2346 nc | | 23100 | 28000 | 11 / 11 | Yes, > BKG & PRG |
| Lead | 400 pbk | | 26.1 | 86 | 11 / 11 | No |
| Magnesium | --[n] | | 3030 | 21000 | 11 / 11 | No |
| Manganese | 176 nc | | 1450 | 4100 | 11 / 11 | Yes, > BKG & PRG |
| Nickel | 156 nc | | 21.1 | 21 | 11 / 11 | No |
| Potassium | --[n] | | 927 | 2300 | 11 / 11 | No |
| Selenium | 39 nc | | 1.4 | 1.6 | 8 / 11 | No |
| Sodium | --[n] | | 123 | 1200 | 11 / 11 | No |
| Vanadium | 7.8 nc | | 31.1 | 29 | 11 / 11 | No |
| Zinc | 2346 nc | | 61.8 | 180 | 11 / 11 | No |
| Mercury | 2.3 nc | | 0.04 | 0.097 | 8 / 11 | No |
| Benzo(a)anthracene | 0.62 ca | | -- | 0.018 | 1 / 1 | No |
| Benzo(a)pyrene | 0.062 ca | | -- | 0.011 | 1 / 1 | No |
| Benzo(b)fluoranthene | 0.62 ca | | -- | 0.03 | 1 / 1 | No |
| Benzo(g,h,i)perylene | -- | | -- | 0.021 | 1 / 1 | Yes, NTX |
| Benzo(k)fluoranthene | 6.2 ca | | -- | 0.013 | 1 / 1 | No |
| Bis(2-ethylhexyl) phthalate | 35 ca | | -- | 0.052 | 1 / 1 | No |
| Chrysene | 62 ca | | -- | 0.02 | 1 / 1 | No |
| Fluoranthene | 229 nc | | -- | 0.023 | 1 / 1 | No |
| Pyrene | 232 nc | | -- | 0.026 | 1 / 1 | No |
| 2,4,6-TNT | 16 ca | | -- | 0.28 | 2 / 11 | No |
| HMX | 306 nc | | -- | 11 | 2 / 11 | No |
| RDX | 4.4 ca | | -- | 13 | 2 / 11 | Yes, > PRG |
| Nitrocellulose | -- | | -- | 0.87 | 1 / 1 | Yes, NTX |

Notes:

-- no value available

BKG - site specific background

PRG - USEPA Region 9 Preliminary Remediation Goals

NTX - no toxicity screening value available

nc - non-cancer basis, value is 1/10 the published PRG

ca - cancer basis

pbk - based on PBK modeling

mcl - based on CWA maximum contaminant level

max - ceiling limit

sat - soil saturation

[n] - nutrient

*Concentration Units mg/kg

Table B12-14

Building 1200 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 | 11 / 11 | 15182 | 30000 | mg/kg | 17700 | Yes | 600 ss2 | Yes | No | Yes | ASL |
| | Arsenic | 11 / 11 | 10 | 14 | mg/kg | 15.4 | No | 9.9 ss1 | Yes | No | No | BLBKG |
| | Barium | 11 / 11 | 125 | 320 | mg/kg | 88.4 | Yes | 283 ss1 | Yes | No | Yes | ASL |
| | Beryllium | 11 / 11 | 1.6 | 5.9 | mg/kg | 0.88 | Yes | 10 ss1 | No | No | No | BSL |
| | Cadmium | 5 / 11 | 0.49 | 3.3 | mg/kg | 0.00 | Yes | 4 ss1 | No | No | No | BSL |
| | Calcium | 11 / 11 | 30682 | 190000 | mg/kg | 15800 | Yes | NUT | No | No | No | BSL |
| | Chromium | 11 / 11 | 22 | 33 | mg/kg | 17.4 | Yes | 0.4 ss1 | Yes | No | Yes | ASL |
| | Cobalt | 11 / 11 | 8.6 | 15 | mg/kg | 10.4 | Yes | 20 ss1 | No | No | No | BSL |
| | Copper | 11 / 11 | 20 | 71 | mg/kg | 17.7 | Yes | 60 ss1 | Yes | No | Yes | ASL |
| | Iron | 11 / 11 | 21355 | 28000 | mg/kg | 23100 | Yes | 200 ss2 | Yes | No | Yes | ASL |
| | Lead | 11 / 11 | 34 | 86 | mg/kg | 26.1 | Yes | 40.5 ss1 | Yes | No | Yes | ASL |
| | Magnesium | 11 / 11 | 5300 | 21000 | mg/kg | 3030 | Yes | NUT | No | No | No | BSL |
| | Manganese | 11 / 11 | 1235 | 4100 | mg/kg | 1450 | Yes | 100 ss2 | Yes | No | Yes | ASL |
| | Nickel | 11 / 11 | 17 | 21 | mg/kg | 21.1 | No | 30 ss1 | No | No | No | BLBKG |
| | Potassium | 11 / 11 | 1325 | 2300 | mg/kg | 927 | Yes | NUT | No | No | No | BSL |
| | Selenium | 8 / 11 | 0.96 | 1.6 | mg/kg | 1.4 | Yes | 0.21 ss1 | Yes | No | Yes | ASL |
| | Sodium | 11 / 11 | 475 | 1200 | mg/kg | 123 | Yes | NUT | No | No | No | BSL |
| | Vanadium | 11 / 11 | 21 | 29 | mg/kg | 31.1 | No | 2 ss1 | Yes | No | No | BLBKG |
| | Zinc | 11 / 11 | 98 | 180 | mg/kg | 61.8 | Yes | 8.5 ss1 | Yes | No | Yes | ASL |
| | Mercury | 8 / 11 | 0.045 | 0.097 | mg/kg | 0.04 | Yes | 0.00051 ss1 | Yes | Yes | Yes | ASL |
| SVOCs | Benzo(a)anthracene | 1 / 1 | 0.018 | 0.018 | mg/kg | -- | NA | 5.21 ss4 | No | No | No | BSL |
| | Benzo(a)pyrene | 1 / 1 | 0.011 | 0.011 | mg/kg | -- | NA | 1.52 ss4 | No | No | No | BSL |
| | Benzo(b)fluoranthene | 1 / 1 | 0.030 | 0.03 | mg/kg | -- | NA | 59.8 ss4 | No | No | No | BSL |
| | Benzo(g,h,i)perylene | 1 / 1 | 0.021 | 0.021 | mg/kg | -- | NA | 119 ss4 | No | No | No | BSL |
| | Benzo(k)fluoranthene | 1 / 1 | 0.013 | 0.013 | mg/kg | -- | NA | 148 ss4 | No | No | No | BSL |
| | Bis(2-ethylhexyl) phthalate | 1 / 1 | 0.052 | 0.052 | mg/kg | -- | NA | 0.925 ss4 | No | No | No | BSL |
| | Chrysene | 1 / 1 | 0.020 | 0.02 | mg/kg | -- | NA | 4.73 ss4 | No | No | No | BSL |
| | Fluoranthene | 1 / 1 | 0.023 | 0.023 | mg/kg | -- | NA | 122 ss4 | No | No | No | BSL |
| | Pyrene | 1 / 1 | 0.026 | 0.026 | mg/kg | -- | NA | 78.5 ss4 | No | No | No | BSL |
| Explosives | 2,4,6-TNT | 2 / 11 | 0.073 | 0.28 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | HMX | 2 / 11 | 1.7 | 11 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| | RDX | 2 / 11 | 1.3 | 13 | mg/kg | -- | NA | -- | NSL | No | Yes | NSL |
| Propellants | Nitrocellulose | 1 / 1 | 0.87 | 0.87 | 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 (Efroymsen et al , 1997a)

ss2 - Toxicological Benchmarks for Soil and Litter Invertebrates (Efroymsen et al 1997b)

ss3 - Toxicological Benchmarks for Terrestrial Plants (Efroymsen 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 B12-15

Building 1200 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 | PBI | COPC | COPC Rationale |
|-------------|----------------------|------------------------|-----------------------|--------------------------------|-------|-----------------------------------|------------------------------------|-------|----------------------------|-----------------|---|-----|-------|----------------|
| Metals | Aluminum | 3 / 3 | 12000 | 15000 | mg/kg | 13900 | Yes | 29000 | No | -- | NSL | No | No | BLSRV |
| | Arsenic | 3 / 3 | 9.5 | 11 | mg/kg | 19.5 | No | 25 | No | 9.79 sd1 | Yes | No | No | BLBKG |
| | Barium | 3 / 3 | 87 | 120 | mg/kg | 123 | No | 190 | No | -- | NSL | No | No | BLBKG |
| | Beryllium | 3 / 3 | 0.81 | 0.86 | mg/kg | 0.38 | Yes | 0.8 | Yes | -- | NSL | No | Yes | NSL |
| | Cadmium | 1 / 3 | 0.22 | 0.19 | mg/kg | 0.00 | Yes | 0.79 | No | 0.99 sd1 | No | No | No | BLSRV |
| | Calcium | 3 / 3 | 1347 | 2700 | mg/kg | 5510 | No | 21000 | No | NUT | No | No | No | BLBKG |
| | Chromium | 3 / 3 | 17 | 18 | mg/kg | 18.1 | No | 29 | No | 43.4 sd1 | No | No | No | BLBKG |
| | Cobalt | 3 / 3 | 9.5 | 11 | mg/kg | 9.1 | Yes | 12 | No | 50 sd2 | No | No | No | BLSRV |
| | Copper | 3 / 3 | 19 | 20 | mg/kg | 27.6 | No | 32 | No | 31.6 sd1 | No | No | No | BLBKG |
| | Iron | 3 / 3 | 21000 | 23000 | mg/kg | 28200 | No | 41000 | No | -- | NSL | No | No | BLBKG |
| | Lead | 3 / 3 | 20 | 22 | mg/kg | 27.4 | No | 47 | No | 35.8 sd1 | No | No | No | BLBKG |
| | Magnesium | 3 / 3 | 2533 | 2900 | mg/kg | 2760 | Yes | 7100 | No | NUT | No | No | No | BLSRV |
| | Manganese | 3 / 3 | 270 | 390 | mg/kg | 1950 | No | 1500 | No | -- | NSL | No | No | BLBKG |
| | Nickel | 3 / 3 | 23 | 24 | mg/kg | 17.7 | Yes | 33 | No | 22.7 sd1 | Yes | No | No | BLSRV |
| | Potassium | 3 / 3 | 1400 | 1800 | mg/kg | 1950 | No | 6800 | No | NUT | No | No | No | BLBKG |
| | Selenium | 1 / 3 | 1.2 | 0.98 | mg/kg | 1.7 | No | 1.7 | No | -- | NSL | No | No | BLBKG |
| | Sodium | 3 / 3 | 317 | 370 | mg/kg | 112 | Yes | -- | NA | NUT | No | No | No | BSL |
| | Vanadium | 3 / 3 | 21 | 26 | mg/kg | 26.1 | No | 40 | No | -- | NSL | No | No | BLBKG |
| Zinc | 3 / 3 | 76 | 110 | mg/kg | 532 | No | 160 | No | 121 sd1 | No | No | No | BLBKG | |
| Mercury | 3 / 3 | 0.11 | 0.2 | mg/kg | 0.06 | Yes | 0.12 | Yes | 0.18 sd1 | Yes | Yes | Yes | ASL | |
| Pesticides | gamma-BHC | 1 / 1 | 0.013 | 0.013 | mg/kg | -- | NA | -- | NA | 0.00237 sd1 | Yes | Yes | Yes | ASL |
| VOCs | 2-Butanone | 1 / 1 | 0.019 | 0.019 | mg/kg | -- | NA | -- | NA | 0.0424 sd2 | No | No | No | BSL |
| | Acetone | 1 / 1 | 0.084 | 0.084 | mg/kg | -- | NA | -- | NA | 0.0099 sd2 | Yes | No | Yes | ASL |
| SVOCs | Benzo(b)fluoranthene | 1 / 1 | 0.14 | 0.14 | mg/kg | -- | NA | -- | NA | 10.4 sd2 | No | No | No | BSL |
| | Benzo(g,h,i)perylene | 1 / 1 | 0.16 | 0.16 | mg/kg | -- | NA | -- | NA | 0.17 sd2 | No | No | No | BSL |
| | Total PAHs (1) | 1 / 1 | 0.3 | 0.3 | mg/kg | -- | NA | -- | NA | 1.610 sd1 | No | No | No | BSL |
| Propellants | Nitrocellulose | 1 / 1 | 1.7 | 1.7 | mg/kg | -- | NA | -- | NA | -- | NSL | No | Yes | NSL |

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

PBI- persistent, bioaccumulative and toxic

NSL - no screening level

ASL- above screening level

BSL - below screening level

SRV-Sediment Reference Value (OEPA, 2003)

BLSRV-Below Sediment Reference Value

(1) - maximum detected concentration of total PAHs was calculated by summing positive detections

Table B12-16
Building 1200 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 | 3 / 3 | 903 | 1600 | ug/l | 3370 | No | -- | NSL | No | No | BLBKG |
| | Barium | 3 / 3 | 70 | 91 | ug/l | 47.5 | Yes | 2000 sw1 | No | No | No | BSL |
| | Calcium | 3 / 3 | 41000 | 49000 | ug/l | 41400 | Yes | NUT | No | No | No | BSL |
| | Chromium | 3 / 3 | 2.1 | 2.8 | ug/l | 0.00 | Yes | 2150 sw1[H] | No | No | No | BSL |
| | Iron | 3 / 3 | 2733 | 3900 | ug/l | 2560 | Yes | -- | NSL | No | Yes | NSL |
| | Magnesium | 3 / 3 | 5133 | 5900 | ug/l | 10800 | No | NUT | No | No | No | BLBKG |
| | Manganese | 3 / 3 | 3160 | 4500 | ug/l | 391 | Yes | -- | NSL | No | Yes | NSL |
| | Nickel | 3 / 3 | 2.4 | 2.9 | ug/l | 0.00 | Yes | 563 sw1[H] | No | No | No | BSL |
| | Potassium | 3 / 3 | 5933 | 6700 | ug/l | 3170 | Yes | NUT | No | No | No | BSL |
| | Sodium | 3 / 3 | 1047 | 1200 | ug/l | 21300 | No | NUT | No | No | No | BLBKG |
| | Vanadium | 1 / 3 | 4.3 | 2.8 | ug/l | 0.00 | Yes | 150 sw1 | No | No | No | BSL |
| | Zinc | 1 / 3 | 14 | 12 | ug/l | 42 | No | 144 sw1[H] | No | No | No | BLBKG |
| | Arsenic | 2 / 3 | 1.9 | 3 | ug/l | 3.2 | No | 340 sw1 | No | No | No | BLBKG |
| | Lead | 1 / 3 | 1.4 | 1.2 | ug/l | 0.00 | Yes | 161 sw1[H] | No | No | No | BSL |
| | Mercury | 1 / 3 | 0.084 | 0.051 | ug/l | 0.00 | Yes | 1.7 sw1 | No | Yes | Yes | PBT |
| Thallium | 1 / 3 | 1.8 | 1.5 | ug/l | 0.00 | Yes | 79 sw1 | No | No | No | BSL | |
| VOCs | Acetone | 3 / 3 | 6.4 | 7.2 | ug/l | -- | NA | -- | NSL | No | Yes | NSL |
| | Toluene | 2 / 3 | 0.93 | 1.3 | ug/l | -- | NA | 560 sw1 | No | No | No | BSL |
| SVOCs | 2-Methylphenol | 2 / 3 | 1.7 | 2.2 | ug/l | -- | NA | 600 sw1 | No | No | No | BSL |
| | 4-Methylphenol | 2 / 3 | 6.2 | 11 | ug/l | -- | NA | 480 sw1 | No | No | No | BSL |
| | Benzoic acid | 2 / 3 | 61 | 93 | ug/l | -- | NA | -- | NSL | No | Yes | NSL |
| | Benzyl alcohol | 2 / 3 | 8.8 | 8.5 | ug/l | -- | NA | -- | NSL | No | Yes | NSL |
| | Bis(2-ethylhexyl) phthalate | 1 / 3 | 6.5 | 4.5 | ug/l | -- | NA | 1100 sw1 | No | No | No | BSL |
| Explosives | Phenol | 2 / 3 | 6.7 | 10 | ug/l | -- | NA | 4700 sw1 | No | No | No | BSL |
| | 3-Nitrotoluene | 2 / 3 | 0.33 | 0.49 | ug/l | -- | NA | 380 sw1 | No | No | No | BSL |
| | HMX | 3 / 3 | 19 | 29 | ug/l | -- | NA | 1200 sw1 | No | No | No | BSL |
| Propellants | RDX | 3 / 3 | 27 | 42 | ug/l | -- | NA | 520 sw1 | No | No | No | BSL |
| | Nitroglycerine | 2 / 3 | 4.0 | 5.9 | ug/l | -- | NA | 160 sw1 | No | No | No | BSL |

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 B12-17
Building 1200 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 | Aluminum | X | | |
| | Beryllium | | | |
| | Chromium | X | | |
| | Copper | X | | |
| | Iron | X | | Q |
| | Lead | X | | |
| | Magnesium | | | |
| | Manganese | X | | Q |
| | Nickel | | | |
| | Selenium | X | | |
| | Zinc | X | | |
| | Lead | X | | |
| | Mercury | X | | X |
| Pesticides | gamma-BHC | | | |
| VOCs | Acetone | | | Q |
| SVOCs | Benzoic acid | | | Q |
| | Benzyl alcohol | | | Q |
| Explosives | 2,4,6-TNT | Q | | |
| | HMX | Q | | |
| | RDX | Q | | |
| Propellants | Nitrocellulose | 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 - qualitative COPEC