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1.0 INTRODUCTION

This report documents the results of the sampling completed at Load Line 5 (LL5) (AOC-39), one of the 14 RVAAP AOCs. Field activities were conducted from October 2004 to May 2005 to characterize 14 Ravenna Army Ammunition Plant (RVAAP) Areas of Concern (AOCs).

1.1 PURPOSE AND SCOPE

Characterization activities were conducted LL5 to collect sufficient data for all applicable media to allow efficient planning and execution of future environmental actions.

The characterization effort for the LL5 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 LL5 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, sediment, 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 LL5 and previous investigations performed at this AOC.

1.2.1 AOC Description and History

LL5 is located in an area known as Fuze and Booster Hill, which consists of Load Lines 5, 6, 7, 8, 9, 10 and 11 collectively. Fuze and Booster Hill is located in the south central part of the RVAAP facility. Load Line 5 is located south of Fuze and Booster Road, east of Load Line 6 and west of Load Line 10. Figure 1-2 shows the location of LL5 in relation to the RVAPP facility.

Load Line 5, also designated as Fuze Line # 1, was a finished product assembly line, which was operated from 1941 to 1945 to produce fuzes for artillery projectiles. LL5 is a 15.8 ha (39 acre) AOC that consists of 18 process buildings ranging in size between 120 sq ft and 32, 910 sq ft. Operations were discontinued at the end of WWII and the process equipment was removed in 1945. LL5 has been inactive for more than 50 years and is overgrown with vegetation consisting of young trees, bushes and weeds.

There is no historical evidence (process records, drawings, etc.) that bulk handling of primary explosives lead azide or lead styphnate took place within the boundaries of this load line as reported by USATHEMA (USATEHMA 1978). This also applies to the reported potential use of TNT, Composition B, propellants and explosives other than black powder, which was used in the delay component manufactured at this line and Load Line 6. With the exception of the mercury fulminate primer, which was loaded and assembled within the line, all other primary explosive products were delivered as sealed, finished sub-assemblies. There is no evidence that the booster component was included in the assembly processes conducted at this line.

A summary of building utilization is provided:

- Bldgs. 1F-1, 1F-3, 1F-4, 1F-9 and 1F-18 – primer manufacturing
- Bldgs. 1F-6, 1F-7, 1F-8, 1F-19 and 1F-20 – delay component manufacturing
- Bldg. 1F-10 – detonator service magazine

The detonator components were manufactured at Load Line 9 and were containerized when they arrived at LL5. The detonating components were stored in 1F-10 until utilization in the assembly process conducted in 1F-11. Unless spillage occurred at the storage magazine, there is no reason to expect wholesale primary explosive contamination.

- Bldgs. 1F-11and 1F-12 – assembly and testing

1.2.2 Previous Investigation

The following assessments and evaluations have been conducted at LL5:

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

This assessment identified the following conditions at RVAAP:

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

- The Ramsdell Quarry site landfill was identified as having a potential leaching problem.
- Trace quantities of 2,4,6-TNT was identified in the wells indicating that some leaching had occurred.

1.2.2.2 Preliminary Review and Visual Site Inspection conducted as a part of Resource Conservation and Recovery Act (RCRA) Facility Assessment conducted by the USEPA. (Jacobs Engineering Group, Inc. 1989)

- This document could not be located.

1.2.2.3 Preliminary Assessment Screening of the Boundary Load Line Areas (USAEHA 1994)

- This document could not be located.

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

LL5 was scored with a moderate (48.2) CHF for groundwater and a potential migration pathway factor and receptor pathway factor. The AOC also was scored with a moderate (17.7) CHF for surface soil with a potential migration pathway factor and receptor pathway factor. The final RRSE score for the AOC was medium.

- This evaluation identified groundwater and surface soil as a possible media of concern and identified a potential for contaminate migration. The evaluation also identifies the potential for exposure to receptors because the site has limited access. The final score for the RRSE at LL5 is "Medium."

1.2.3 Regulatory Authorities

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

1.2.4 Regulatory Status of Load Line 5

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

2.0 ENVIRONMENTAL SETTING AT LOAD LINE 5

This section describes the physical characteristics of LL5 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 LL5 is a combination of forested and open areas of former operations. An unnamed stream is located approximately 500 feet southeast of the AOC that flows to the West Branch of the Mahoning River. This AOC is approximately 1000 feet southwest of LL 10 and 750 feet northeast of the LL6 AOC. The AOC surface water flows to the southeast. Fuze and Booster Road is located approximately 750 to the northwest. The AOC has very little topographic relief.

2.1 SURFACE FEATURES

The topography at LL5 is characterized by gently undulating contours that shows a range of elevations between 1123 ft amsl to 1126 ft amsl from a topographic high in the north western portion of the load line to lows in south eastern portion of the load line (USGS Topographic Map, Windham Quadrangle 1994).

2.2 METEOROLOGY AND CLIMATE

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

2.3 SURFACE WATER HYDROLOGY

Surface water drainage generally follows the topography of the AOC toward the south and southeast. 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 six borings which are advanced during the characterization activities and completed as monitoring wells, were used to characterize the surface and subsurface geology at LL5. Fine grained Sandstone was encountered at the range of 21 to 28 ft. when installing the LL5 monitoring wells. The boring logs, which detail the vertical lithologic sequences, are found in Appendix H.

2.4.1 Glacial Deposits

Subsurface lithology at LL5 consists mostly of 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 11 to 24 ft bgs when the LL5 groundwater monitoring wells were drilled. Deposits with higher concentrations of sand and gravel generally control the elevation of the shallow water table zone, and bio-turbation has been observed to act as a conduit for the local shallow water table at various locations at LL5. Cross-sections of the subsurface at LL5 illustrate the lateral distribution and variation of these discontinuous glaciated sediments (Figures LL5-1 to LL5-4).

2.4.2 Sedimentary Rocks

Weathered grained sandstone was encountered at the range of 21 to 28 ft when installing the LL5 monitoring wells.

2.5 SOIL

Soils found at LL5 and adjacent areas are mostly the Mahoning Silt Loam (0 to 2 percent slopes). Gently sloped land with medium to rapid runoff, severe seasonal wetness and slow permeability characterize these soils.

2.6 HYDROGEOLOGY

This section describes the unconsolidated sediments and bedrock characteristics found at LL5.

2.6.1 Unconsolidated Sediments

Unconsolidated sediments at LL5 is consistent with the installation wide description located in Volume 1, Section 2.6.1.

2.6.2 Bedrock

Fine grained sandstone was encountered at the range of 21 to 28 ft when installing the LL5 monitoring wells. Bedrock slopes slightly in a west-southwest direction and ranges in elevation from approximately 1098 ft to approximately 1104 ft.

2.7 DEMOGRAPHY AND LAND USE

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

2.8 ECOLOGY

Ecological information is provided in Volume I, Section 2.8.

3.0 CHARACTERIZATION ACTIVITIES OF LOAD LINE 5

This section describes the field and analytical methods implemented during the RVAAP 14 AOC Characterization at LL5. The field and analytical programs were conducted in accordance with 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

AOC-specific field activities conducted from October 2004 thru May 2005 at LL5 included:

- Collecting multi-increment (MI) surface soil (0-1ft) samples (11-12-04 – 11-19-04);
- Collecting discrete surface soil (0-1ft) samples (11-15-04 – 11-19-04);
- Excavating of three test trenches (10-07-04);
- Installing six groundwater monitoring wells (12-08-04 – 12-10-04);
- Collecting geotechnical samples from the monitoring well borings (12-08-04 – 12-10-04);
- Conducting well slug tests (01-20-05);
- Collecting groundwater samples from monitoring wells (01-03-05 – 01-18-05);
- Collecting surface water samples (sewers/sumps/basements) (11-18-04 – 12-10-04);
- Collecting sediment samples (sewers/sumps) (11-18-04 – 12-10-04); and
- Conducting a sampling location and monitoring well survey (12-13-04 – 01-28-05).

Sampling was conducted at this AOC to assess the impact that LL5 operations may have had on soil, sediment, surface water and groundwater; and to evaluate where contaminants related to the former operations are found within the AOC. The following sections describe the rationales for the various types of samples that were collected and methods employed during the characterization. Information from previous assessments, evaluations and investigations, plus institutional knowledge of the historical operations that occurred at LL5, were used to determine the sampling locations, type of media collected, analysis performed and number of samples required to adequately characterize LL5. Table LL5-1 summarizes the type and number of samples collected and the analyses conducted. A photo log of investigation activities area provided in Appendix C. Figure LL5-5 shows the monitoring well locations, Figure LL5-6 show the sanitary sewer locations and Figure LL5-7 shows the sampling locations for all other media collected at this AOC.

3.1.1 Trenching Activities

Three test trenches were excavated in the LL5 AOC before the start of drilling operations. 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. Test trenches at LL5 did not exceed 12 ft bgs. Saturation was encountered in

LL5tr-001 at 11.3 ft bgs; LL5tr-002 at 9 ft bgs; and LL5tr-003 at 12 ft bgs. No suspect soil or MEC was encountered during the trenching operation. Trenching activities were conducted as described in Volume I, Section 3.1.5.

3.1.2 MI Surface Soil (0-1 ft) Sampling

Twenty-nine MI surface soil (0-1 ft) grids were sampled at this AOC to:

- Assess the potential impact of LL5 operations on the soils within the AOC;
- Evaluate soil surrounding the process buildings and dry drainage ditches within the AOC; and
- Determine the nature contamination found within LL5 decision units.

LL5 was divided into 29 MI grids located around process buildings and dry drainage ditch locations within the AOC. One MI surface soil (0-1 ft) sample was collected from each grid. Multi-increment samples were collected as described in Volume I, Section 3.1.10.1. Three split samples were collected and submitted for analysis to an independent, USACE-approved laboratory. Analysis for LL5 MI surface soil (0-1 ft) samples include the following parameters: TAL Metals, explosives, Nitrate, Volatile Organic compounds (VOC), Semi-Volatile Organic compounds (SVOCs), propellants, pesticides and polychlorinated biphenyls (PCBs).

Three discrete VOC samples were collected within surface soil (0-1 ft) MI grids to fulfill the 10 percent full suite requirement and the FWSAP approved VOC collection methods. describes the procedure used to collect discrete surface soil (0-1 ft) samples. Discrete VOC samples were not subjected to MI sample drying or processing. Field sampling forms documenting the surface soil (0-1 ft) sampling activities are presented in Appendix E.

3.1.3 Discrete Surface Soil (0-1 ft) Sampling (VOC)

One discrete VOC sample (LL5ss-030M) was collected, independent of any MI sampling grids, outside the building that was formerly used for solvent storage. The discrete surface soil (0-1ft) sample was collected as specified in Section 3.1.10.3 of Volume I. The discrete VOC sample was not subjected to MI sample drying or processing. One split sample associated with this location was collected and submitted for analysis to an independent, USACE-approved laboratory.

Samples were prepared, packaged and shipped per Volume I, Section 3.1.14. A field sampling form documenting this sampling activity is presented in Appendix E of this report.

3.1.4 Surface Water Sampling (Sewers/Sumps/Basements)

Surface water samples were collected at this AOC to:

- Evaluate the impact to sewer, basement, sump and/or basin water by runoff from LL5; and
- Identify the migration pathways for contaminated runoff from LL5.

Four of the ten sewers contained enough water for a viable sample. There was limited access to the four sewer locations at LL5. Therefore, the alternative sampling method described in Volume 1, Section

3.1.10.6 (peristaltic pump and tubing) was employed. No water was present in the remaining six sewer locations; therefore, no surface water samples were collected from these locations.

Surface water samples were collected from each of the two basement locations. No water was present at the sump location; therefore, no sample was collected. Water quality measurements (pH, conductivity, dissolved oxygen content, and temperature) were recorded just prior to sample collection. Surface water samples were collected as described in Volume I, Section 3.1.10.6. Analysis for LL5 surface water samples included the following: TAL Metals, Explosives, Nitrate, VOCs, and SVOCs, propellants, pesticides and PCBs.

Two split samples were collected for analysis by an independent, USACE-approved laboratory. Samples were prepared, packaged and shipped per Volume I, Section 3.1.14. Field sampling forms for the surface water are presented in Appendix O.

3.1.5 Sediment (Sewers/Sumps) Sampling

Sediment samples (sewer/sump) were collected at this AOC to:

- Evaluate impact to sewer/sump sediments by LL5 surface water runoff; and
- Evaluate the potential migration of contaminants in sewer/sump sediments beyond the AOC boundaries.

Sewer/sump sediment samples were co-located with the sewer/sump water samples. Two of the 11 sewers/sumps contained enough recoverable sediment to constitute a viable sample. All sewer/sump/basin sediment samples were collected using a long handled scoop or telescopic pole with Teflon swivel cup as specified in Volume I, Section 3.1.10.7. Analysis for LL5 sewer/sump sediment samples included the following parameters: TAL Metals, Explosives and Nitrate.

Split samples were not collected for sewer sediments due to the lack of sufficient quantity of sample media. Samples were prepared, packaged and shipped per Volume I, Section 3.1.14. Field sampling forms are presented in Appendix Q.

3.1.6 Groundwater Investigation Activities

The groundwater activities were conducted at this AOC to:

- Determine the impact of LL5 operations on groundwater quality at the AOC; and
- Collect data pertaining to groundwater flow at LL5.

Six boreholes were advanced and converted to monitoring wells at LL5. The depth of the monitoring wells ranged from 21 to 27.8 ft bgs. The monitoring wells were located in the following locations to maximize the information obtained about the groundwater beneath LL5.

- LL5mw-001: Center of the explosives handling area.
- LL5mw-002: Within the explosives handling area.
- LL5mw-003: Upgradient of the northeast boundary of the explosives handling area.
- LL5mw-004: Downgradient of the explosives handling area.

- LL5mw-005: Downgradient of the explosives handling area.
- LL5mw-006: Downgradient of the AOC.

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

3.1.6.1 Monitoring Well Installation and Development

An 8.25 in. OD, hollow-stem auger was used to advance the borehole through unconsolidated material and weathered bedrock. The average borehole depth was 7.19 m (23.6 ft) bgs. Weathered bedrock was encountered at four of the six boring locations at depths of 24.6 ft bgs; (LL5mw-002), 21.8 ft bgs; (LL5mw-004), 26.0 ft bgs; (LL5mw-005) and 22.0 ft. bgs (LL5mw-006).

Monitoring well installation and development at LL5 followed the procedures reported in Volume I, Section 3.1.6. Well construction diagrams and well development records are provided in Appendix H.

3.1.6.2 Geotechnical Sample Collection (Shelby Tubes)

Three Shelby tubes were collected at monitoring well locations LL5mw-001 (6 to 8 ft), LL5mw-003 (8 to 10 ft) and LL5mw-006 (10 to 12 ft), and sent to the laboratory for analysis. Geotechnical sample collection was conducted IAW Section 4.4.2.4.1 of the FWSAP and included the following analysis: moisture content, Alterberg limits, specific gravity, grain size, pH and total organic content. Geotechnical analytical data can be found in Appendix J.

3.1.6.3 Groundwater Sampling

Six ground water samples were collected for analysis at LL5. Samples were prepared, packaged and shipped per Volume I, Section 3.1.14. One split sample was collected and submitted for analysis to an independent, USACE-approved laboratory. Analysis for LL5 ground water samples included the following parameters: TAL Metals, Explosives, Nitrate, VOCs, SVOCs, propellants, pesticides and PCBs. Well purging and sampling records are provided at Appendix H. No detections were observed in the PID readings for the wells at LL5. 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. 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.

3.1.6.4 In-Situ Permeability Testing

A slug test was performed at each of the six monitoring wells at LL5 to evaluate the hydraulic conductivity of the media surrounding each well screen. Slug tests were performed at the LL5 monitoring wells as discussed in Volume I, Section 3.1.10.12. Slug test data records are provided at Appendix K. The testing results are presented in Section 4.6.

3.1.6.5 Water Level Measurements

Static water level and total depth measurements were recorded for each monitoring well on three separate occasions to provide data on the groundwater flow regime underlying the LL5. These water level readings were collected during February 2005, March 2005, and May 2005. Water level measurements

were performed as discussed in Volume I, Section 3.1.10.13. Groundwater elevation data is included in Appendix M.

3.1.7 Sampling Location and Monitoring Well Survey

The sampling location and monitoring well survey at LL5 was conducted per the specifications in Section 3.1.11, in Volume I of this characterization report. The monitoring well survey report can be found in Appendix N and the sample location survey data in Appendix S.

3.2 DEVIATIONS FROM THE WORK PLAN

Every effort was made to complete the field activities as required by the FWSAP and the approved RVAAP 14 AOC FWSAP Addendum. However, in some instances, circumstances or field conditions necessitated a modification. Modifications to the FWSAP during the LL5 characterization activities are noted below.

- Construction of monitoring wells 003 and 004 deviated from the approved plans. LL5mw-004 was constructed with 4.5 ft of sand above the screen rather than the FWSAP approved construction requirement of 3 ft; and 2.5 ft of bentonite rather than 3 ft. LL5mw-003 and LL5mw-004 were both constructed with 7 ft casing lengths rather than 8 ft of casing.
- The approved plan specified that wells be developed no earlier than 24 hours, and no later than seven days, after the grout was set. However, unanticipated logistical challenges delayed the development of the six LL5 wells until eight or nine days after the grout was set.
- Because of an extremely low recharge rate, at least two days were required to replace each borehole volume of groundwater at Monitoring Well LL5mw-003. After three weeks, although only three volumes of water had been removed, the groundwater samples were collected.
- Six of the ten scoped sewer locations and the scoped sump location contained no water for sample collection.
- Nine of the ten scoped sewer sediment locations did not contain enough recoverable sediment to constitute a viable sample.
- Due to insufficient quantities of sediment, split samples were not collected for sewer sediments at this AOC.

Although deviations were made to the FWSAP, the objectives of the LL5 characterization were achieved.

4.0 NATURE OF CONTAMINATION AT LOAD LINE 5

This section summarizes the analytical results from surface soil (0-1 ft), groundwater, surface water and sediment environmental sampling conducted at the LL5. The results are organized by media: surface soil (0-1 ft), surface water, sediment, and groundwater. 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 summary of the results and initial screening of the analytical data for samples collected during the AOC characterization.

4.1 MI SURFACE SOIL (0-1 FT)

During the characterization at LL5, 35 MI surface soil (0-1 ft) samples (30 regular and five QC) were collected from various locations. Three discrete surface soil (0-1 ft) samples were collected for VOC analysis. All positive detections were compared to RVAAP background and residential PRG values as previously discussed.

Surface soil (0-1 ft) results at or above detection limits are presented in Table LL5-2. A summary of all surface soil (0-1 ft) analytical results is presented in Table LL5-6. Locations of surface soil (0-1 ft) analytes detected at or above background levels and residential PRG exceedances are shown in Figures LL5-8 and LL5-9. Laboratory analytical reports are provided in Appendix F.

The surface soil (0-1 ft) analytical results that exceeded background or Region 9 residential PRGs are summarized as follows:

- **Aluminum** exceeded the Region 9 residential PRG in 33 samples and exceeded background and the Region 9 PRG in one sample with a **maximum concentration of 18000 mg/kg.**
- **Arsenic** exceeded the Region 9 residential PRG in 35 samples with a **maximum concentration of 14 mg/kg.**
- **Barium** exceeded background in seven samples with a **maximum concentration of 220 mg/kg.**
- **Beryllium** exceeded background in six samples with a **maximum concentration of 4.2 mg/kg.**
- **Cadmium** exceeded background in 31 samples with a **maximum concentration of 3.0 mg/kg.**
- **Calcium** exceeded background in seven samples with a **maximum concentration of 140000 mg/kg.**
- **Chromium** exceeded background in 29 samples and exceeded background and the Region 9 residential PRG in two samples with a **maximum concentration of 34 mg/kg.**
- **Cobalt** exceeded background in seven samples with a **maximum concentration of 13 mg/kg.**
- **Copper** exceeded background in 21 samples with a **maximum concentration of 49 mg/kg.**
- **Iron** exceeded the Region 9 residential PRG in 24 samples, and exceeded background and the Region 9 residential PRG in 11 samples with a **maximum concentration of 26000 mg/kg.**

- **Lead** exceeded background in 20 samples with a **maximum concentration of 170 mg/kg.**
- **Magnesium** exceeded background in 16 samples with a **maximum concentration of 16000 mg/kg.**
- **Manganese** exceeded the Region 9 residential PRG in 34 samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 3100 mg/kg.**
- **Nickel** exceeded background in 12 samples with a **maximum concentration of 30 mg/kg.**
- **Potassium** exceeded background in 26 samples with a **maximum concentration of 2100 mg/kg.**
- **Selenium** exceeded background in one sample with a **maximum concentration of 1.8 mg/kg.**
- **Sodium** exceeded background in 35 samples with a **maximum concentration of 970 mg/kg.**
- **Vanadium** exceeded the Region 9 residential PRG in 35 samples with a **maximum concentration of 25 mg/kg.**
- **Zinc** exceeded background in 35 samples with a **maximum concentration of 140 mg/kg.**
- **Mercury** exceeded background in 14 samples, and exceeded background and the Region 9 PRG in one sample with a **maximum concentration of 3.0 mg/kg.**
- **Thallium** exceeded background in five samples with a **maximum concentration of 0.28 mg/kg.**
- **2-Methylnaphthalene** exceeded laboratory detection limits in two samples with a **maximum concentration of 0.11 mg/kg.**
- **Acenaphthylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.016 J mg/kg.** J value indicates an estimated result.
- **Benzo(a)pyrene** exceeded the Region 9 residential PRG in two samples with a **maximum concentration of 0.15 mg/kg.**
- **Benzo(g,h,i)perylene** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 0.097 mg/kg.**
- **Phenanthrene** exceeded the laboratory detection limit in three samples with a **maximum concentration of 0.2 mg/kg.**
- **VOCs, pesticides, PCBs, explosives and propellants** 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 characterization effort at LL5. Results from the sediment samples were compared to facility-wide background concentrations for sediments and Region 9 residential PRGs for residential soil.

Sediment analytical results at or above detection limits are presented in Table LL5-3. All sediment analytical results are presented in Table LL5-7. Sample locations where concentrations of sediment analytes detected at or above background levels and Region 9 residential PRGs are shown in Figure LL5-10. Laboratory analytical reports are provided in Appendix R.

The sediment analytical results that exceeded background or Region 9 residential PRGs are summarized as follows:

- **Aluminum** exceeded the Region 9 residential PRG in two samples with a **maximum concentration of 9900 J mg/kg.** J value indicates an estimated result.

- **Arsenic** 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 180 mg/kg.**
- **Barium** exceeded background in one sample with a **maximum concentration of 220 mg/kg.**
- **Beryllium** exceeded background in three samples with a **maximum concentration of 0.68 mg/kg.**
- **Cadmium** exceeded background in two samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 6.4 mg/kg.**
- **Calcium** exceeded background in one sample with a **maximum concentration of 140000 mg/kg.**
- **Chromium** exceeded background in two samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 130 mg/kg.**
- **Cobalt** exceeded background in one sample with a **maximum concentration of 9.4 mg/kg.**
- **Copper** exceeded background in two samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 340 mg/kg.**
- **Iron** exceeded background and the Region 9 PRG in three samples with a **maximum concentration of 100000 mg/kg.**
- **Lead** exceeded background in two samples, and exceeded background and the Region 9 residential PRG in one sample with a **maximum concentration of 1500 mg/kg.**
- **Magnesium** exceeded background in one sample with a **maximum concentration of 3200 J mg/kg.** J value indicates an estimated result.
- **Manganese** exceeded the Region 9 residential PRG in three samples with a **maximum concentration of 100 mg/kg.**
- **Nickel** exceeded background in three samples with a **maximum concentration of 33 mg/kg.**
- **Selenium** exceeded background in one sample with a **maximum concentration of 2.5 mg/kg.**
- **Sodium** exceeded background in three samples with a **maximum concentration of 730 mg/kg.**
- **Vanadium** exceeded the Region 9 residential PRG in one sample, and exceeded background and the Region 9 residential PRG in two samples with a **maximum concentration of 32 mg/kg.**
- **Zinc** exceeded background in one sample with a **maximum concentration of 1700 mg/kg.**
- **Antimony** exceeded background in one sample with a **maximum concentration of 3.1 mg/kg.**

4.3 SURFACE WATER

Eight surface water samples (six regular and two QC) were collected during the characterization effort at LL5. Results from the laboratory analysis were compared to RVAAP surface water background concentrations and/or USEPA Region 9 tap water PRGs.

Surface water analytical results at or above detection limits are presented in Table LL5-4. All surface water analytical results are presented in Table LL5-8. The sample locations where surface water analytes detected at or above background levels and Region 9 tap water PRGs are shown in Figure LL5-10. Laboratory analytical reports are provided in Appendix P.

The surface water analytical results that exceeded background or Region 9 tap water PRGs are summarized as follows:

- **Cadmium** exceeded background in three samples with a **maximum concentration of 0.33 µg/L.**
- **Calcium** exceeded background in one sample with a **maximum concentration of 42000 µg/L.**
- **Chromium** exceeded background in four samples with a **maximum concentration of 2.9 µg/L.**
- **Iron** exceeded background in one sample with a **maximum concentration of 2700 µg/L.**
- **Nickel** exceeded background in one sample with a **maximum concentration of 1.6 µg/L.**
- **Potassium** exceeded background in three samples with a **maximum concentration of 28000 µg/L.**
- **Selenium** exceeded background in one sample with a **maximum concentration of 3.6 µg/L.**
- **Vanadium** exceeded background in five samples with a **maximum concentration of 3.0 µg/L.**
- **Zinc** exceeded background in two samples with a **maximum concentration of 81 µg/L.**
- **Arsenic** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 1.2 µg/L.**
- **Lead** exceeded background in two samples with a **maximum concentration of 0.98 µg/L.**
- **Mercury** exceeded background in one sample with a **maximum concentration of 0.064 µg/L.**
- **Benzo(a)anthracene** exceeded the Region 9 tap water PRG in two samples with a **maximum concentration of 0.17 J µg/L.** J value indicates an estimated result.
- **Benzo(a)pyrene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.25 J µg/L.** J value indicates an estimated result.
- **Benzo(b)fluoranthene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.18 J µg/L.** J value indicates an estimated result.
- **Benzo(g,h,i)perylene** exceeded the laboratory detection limit in one sample with a **maximum concentration of 0.32 J µg/L.** J value indicates an estimated result.
- **Bis(2-ethylhexyl)phthalate** exceeded the Region 9 tap water PRG in three samples with a **maximum concentration of 0.17 J µg/L.** J value indicates an estimated result.
- **Dibenzo(a,h)anthracene** exceeded the Region 9 tap water PRG in one sample with a **maximum concentration of 0.31 J µg/L.** J value indicates an estimated result.
- **Indeno(1,2,3-cd)pyrene** exceeded the Region 9 tap water PRG in two samples with a **maximum concentration of 0.29 J µg/L.** J value indicates an estimated result.
- **VOCs, pesticides, PCBs and propellants** were below Region 9 tap water PRGs and/or laboratory detection limits.

4.4 GROUNDWATER

Seven groundwater samples (six regular and one QC) were collected from monitoring wells LL5mw-001 through LL5mw-006 during the LL5 characterization. Groundwater samples were collected in order to identify any subsurface contamination of the shallow water table. The groundwater analytical results were compared to RVAAP groundwater background values and USEPA Region 9 tap water PRGs.

Groundwater results at or above detection limits are presented in Table LL5-5. All groundwater analytical results are presented in Table LL5-9. Groundwater analytes detected at or above background levels and tap water PRGs are shown on figure LL5-11. Laboratory analytical reports are provided in Appendix L.

The groundwater analytical results that exceeded RVAPP background or Region 9 tap water PRGs are summarized as follows:

- **Calcium** exceeded background in five samples with a **maximum concentration of 71000 µg/L.**
- **Cobalt** exceeded background in two samples with a **maximum concentration of 4.2 µg/L.**
- **Copper** exceeded background in two samples with a **maximum concentration of 2.8 µg/L.**
- **Magnesium** exceeded background in five samples with a **maximum concentration of 31000 µg/L.**
- **Manganese** exceeded background and the Region 9 tap water PRG in one sample with a **maximum concentration of 2000 µg/L.**
- **Nickel** exceeded background in one sample with a **maximum concentration of 2.2 µg/L.**
- **Potassium** exceeded background in one sample with a **maximum concentration of 3800 µg/L.**
- **Selenium** exceeded background in one sample with a **maximum concentration of 3.3 µg/L.**
- **Vanadium** exceeded background in one sample with a **maximum concentration of 1.0 µg/L.**
- **Antimony** exceeded background in three samples with a **maximum concentration of 4.1 µg/L.**
- **Arsenic** exceeded background and the Region 9 tap water PRG in one sample with a **maximum concentration of 2.3 µg/L.**
- **Lead** exceeded background in one sample with a **maximum concentration of 1.2 µg/L.**

4.5 GEOTECHNICAL

Geotechnical analysis was conducted during groundwater monitoring well installation. Three Shelby tubes were collected at monitoring well locations LL5mw-001 (10-12 ft), LL5mw-004 (8-10 ft) and LL5mw-005 (4-6 ft). The results of the geotechnical analysis are summarized in the following table.

Sample Number	Depth Feet	Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index	Agg. %	C Sand %	M Sand %	F Sand %	Silt & Clay %	Soil Description	Class Sym.	pH	Specific Gravity
LL5mw-001 (6-8 ft)	7.6	20.6	39	25	14	1.1	0.5	1.9	8.4	88.1	Brown lean clay, little sand, trace gravel	CL	8.5	2.782
LL5mw-004 (8-10 ft)	9.6	22.0	NP	NP	NP	0.0	0.0	0.0	2.5	97.5	Brown silt, trace sand	ML	8.4	2.732
LL5mw-005 (4-6 ft)	11.6	17.9	29	21	8	0.7	2.6	2.0	8.1	86.5	Brown lean clay, little sand, trace gravel	CL	8.8	2.788

4.6 IN SITU PERMEABILITY TESTING RESULTS

Following installation of the monitoring wells, slug tests were completed to determine the in-situ permeability of the aquifer underlying the LL5. The following table shows the results of the slug tests performed in January and February 2005.

Hydraulic Conductivities in Load Line 5 Monitoring Wells

Monitoring Well ID	Screened Interval Depth (ft)	Total Borehole Depth (ft)	Geologic Material Adjacent to Screen	Hydraulic conductivity (cm/s)
MW-001	14-24	24	Sandy silt, silty sand, sandstone	1.91 E-4
MW-002	15-25	25	Sandy silt, silty sand	2.52 E-4
MW-003	11-21	21	Sandy silt, silty sand	1.76 E-4
MW-004	12-22	22.4	Sandy silt, silty sand	1.36 E-4
MW-005	17-27	27.8	Sandy silt, silty sand	5.52 E-4
MW-006	14-24	24.5	Sandy silt, silty sand	1.31 E-4

Based on the results of the slug tests, hydraulic conductivities arithmetic average 2.40 x 10^{-4} cm/s in the soil underlying LL5. 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 x 10^{-2} cm/s to 4.46 x 10^{-6} cm/s (USACE, 1999).

Data from the three rounds of well gauging were used to produce potentiometric surface maps for LL5 (Figures LL5-12 through LL5-14). The water level data suggest that groundwater flows to the east/southeast at a gradient of approximately 0.004 ft/ft.

5.0 HUMAN HEALTH AND ECOLOGICAL RISK SCREENING FOR LOAD LINE 5

This section details both the human health and ecological risk screening performed at LL5.

5.1 HUMAN HEALTH RISK SCREENING

Total chromium analytical results were conservatively screened against 1/10th of the PRG value; therefore, a screening value of 21 mg/kg was used rather than 210 mg/kg.

5.1.1 Surface Soil (0-1 ft)

Table LL5-10 presents the human health screening table for surface soil (0-1 ft) at LL5. A total of 46 constituents were detected including metals and SVOCs.

- Nineteen constituents had detections greater than background concentrations: aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, zinc, mercury, and thallium.
- Seven constituents had detections above the adjusted Region 9 residential PRGs: aluminum, arsenic, chromium, iron, manganese, vanadium, and benzo(a)pyrene.
- Five constituents had detected concentrations above both RVAAP background and the adjusted Region 9 residential PRG: aluminum, chromium, iron, manganese, and mercury.
- Four constituents have no established background value or Region 9 residential PRG: 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, and phenanthrene.

Based on these comparisons, ten constituents were identified as chemicals of potential concern (COPC) in surface soil (0-1ft) at LL5: aluminum, chromium, iron, manganese, mercury, 2-methylnaphthalene, acenaphthylene, benzo(a)pyrene, benzo(g,h,i)perylene, and phenanthrene. Of these COPC, 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, and phenanthrene were identified due to the lack of screening criteria.

5.1.2 Sediment

Table LL5-11 presents the human health screening table for sediment at LL5. Twenty-three constituents were detected in sediment. These constituents included metals and one nutrient.

- Eighteen constituents had detected concentrations greater than background values: arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, selenium, sodium, vanadium, zinc, antimony, and mercury.
- Nine constituents had detections above the adjusted Region 9 residential PRGs: arsenic, aluminum, cadmium, chromium, copper, iron, lead, manganese, and vanadium.
- Seven constituents also had detected concentrations above both RVAAP background and the adjusted Region 9 residential PRGs: arsenic, cadmium, chromium, copper, iron, lead, and vanadium.

Based on these comparisons, arsenic, cadmium, chromium, copper, iron, lead, and vanadium were identified as COPCs.

5.1.3 Surface Water

Table LL5-12 presents the human health screening table for surface water at LL5. Eight surface water samples were collected resulting in a total of 31 detected constituents.

- Eleven constituents had detections greater than background values: cadmium, calcium, chromium, iron, potassium, nickel, selenium, vanadium, zinc, lead, and mercury.
- An additional eight constituents had detections above the Region 9 tap water PRGs: arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and nitrate.
- No constituents were greater than both RVAAP background concentrations and Region 9 tap water PRGs.

Based on these comparisons, eight constituents were identified as COPC in surface water: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and nitrate.

5.1.4 Groundwater

Table LL5-13 presents the human health screening table for groundwater at LL5. A total of 18 constituents were detected including metals and one nutrient.

- Ten constituents had detections greater than background concentrations: calcium, cobalt, copper, magnesium, manganese, nickel, potassium, selenium, vanadium, antimony, arsenic, and lead.
- Two constituents, manganese and arsenic, were detected above both RVAAP background concentrations and Region 9 tap water PRGs.

Based on these comparisons, manganese and arsenic were identified as COPC in groundwater at LL5.

5.2 ECOLOGICAL RISK SCREENING

5.2.1 Surface Soil (0-1 ft)

Table LL5-14 presents the ecological screening table for surface soil (0-1 ft) at LL5. A total of 46 constituents were detected.

- Nineteen constituents had detections greater than background concentrations: aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, zinc, mercury, and thallium.
- Twelve constituents had detections above ecological screening values: aluminum, arsenic, chromium, iron, lead, manganese, nickel, selenium, vanadium, zinc, mercury, and Aroclor 1254.

- Four constituents (carbazole, dibenzofuran, 4-nitrotoluene, and nitrate) have no screening values.

Based on these comparisons, 14 constituents were identified as chemicals of potential ecological concern (COPECs) in surface soil (0-1 ft) at LL5: aluminum, chromium, iron, lead, manganese, nickel, selenium, zinc, mercury, aroclor 1254, carbazole, dibenzofuran, 4-nitrotoluene, and nitrate. Of these COPECs, carbazole, dibenzofuran, 4-nitrotoluene, and nitrate, were identified due to the lack of screening criteria.

5.2.2 Sediment

Table LL5-15 presents the ecological screening table for sediment at LL5. Twenty-two constituents were detected in sediment.

- Eighteen constituents had detected concentrations greater than background values: arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, selenium, sodium, vanadium, zinc, antimony, and mercury.
- Twelve constituents exceeded the Sediment Reference Value (SRV): arsenic, barium, cadmium, chromium, copper, iron, lead, nickel, selenium, zinc, antimony, and mercury.
- Eight constituents had detections above ecological screening values: arsenic, cadmium, chromium, copper, lead, nickel, zinc, and mercury.
- Nine constituents (aluminum, barium, beryllium, iron, manganese, selenium, vanadium, antimony, and nitrate) have no screening value. Of the ten, seven constituents (barium, beryllium, iron, selenium, vanadium and antimony) exceed the background value established for RVAAP and barium, iron, selenium and antimony exceed the SRV.

Based on these comparisons, 13 constituents were identified as COPECs: arsenic, barium, cadmium, chromium, copper, iron, lead, nickel, selenium, zinc, antimony, mercury, and nitrate. Of these COPECs, barium, iron, selenium, antimony, and nitrate were identified due to the lack of screening criteria.

5.2.3 Surface Water

Table LL-16 presents the ecological screening table for surface water at LL5. Thirty-one constituents were detected in surface water.

- Eleven constituents had detections greater than background values: cadmium, calcium, chromium, iron, nickel, potassium, selenium, vanadium, zinc, lead, and mercury.
- None of the constituents were detected above ecological screening values.
- Thirteen constituents (aluminum, iron, manganese, selenium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and nitrate) had no screening values. Of those eleven, two constituents (iron and selenium) also exceed the background values established for RVAAP.

Based on these comparisons, twelve constituents were identified as COPECs in surface water at LL5: iron, selenium, mercury, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene,

and nitrate. All 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 CONCLUSION FOR THE CHARACTERIZATION OF LOAD LINE 5

This section briefly summarizes the existing conditions that were found during the AOC characterization at LL5 and the risk screening tasks that were completed.

6.1 NATURE OF CONTAMINATION

The nature and extent of contamination is examined in all four media: soil, sediment, surface water and groundwater. Contaminants were detected above screening criteria in all environmental media sampled. Six constituents other than inorganics were detected above screening criteria in the samples collected from the various media. Beno(a)pyrene was detected above screening criteria in two out of three soil samples and SVOCs were detected in three of eight surface water samples at LL5.

- Contaminants detected in surface soil (0-1 ft) above background and/or Region 9 residential PRG screening values included 21 metals and one SVOC (Benzo(a)pyrene).
- In sediment, 20 metals were detected above background and/or Region 9 residential PRG screening values.
- In surface water, 12 metals, six SVOCs and nitrate were detected above background and/or Region 9 tap water PRG screening values
- In groundwater, 12 metals were detected above background and/or Region 9 tap water PRG screening values.

6.2 HUMAN HEALTH RISK SCREENING

A Human Health Risk Screening (HHRS) was conducted to compare the concentrations detected in LL5 samples to RVAAP-specific background values and U.S. EPA Region 9 residential PRGs. This preliminary screening was conducted to identify potential COPCs. The following table identifies the COPCs.

Table LL5-18			
Chemical of Potential Concern – All Media			
Soils	**Sediment**	**Surface Water**	**Groundwater**
Aluminum	Arsenic	Benzo(a)anthracene	Arsenic
Chromium	Cadmium	Benzo(a)pyrene	Manganese
Iron	Chromium	Benzo(b)fluoranthene	
Manganese	Copper	Benzo(g,h,i)perylene	
Mercury	Iron	Bis(2-ethylhexyl)phthalate	
2-Methylnapthalene	Lead	Dibenzo(a,h)anthracene	
Acenapthylene	Vanadium	Indeno(1,2,3-cd)pyrene	
Benzo(a)pyrene		Nitrate	
Benzo(g,h,i)perylene			
Phenanthrene			

6.3 ECOLOGICAL RISK SCREENING

An Ecological Risk Screening (ERS) was performed to compare contaminant concentrations detected at LL5 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 LL5. The following table summarizes those COPECs by media.

Table LL5-19			
Chemical of Potential Ecological Concern – All Media			
Soils	**Sediment**	**Surface Water**	**Groundwater**
Aluminum	Arsenic	Iron	Groundwater not
Chromium	Barium	Selenium	evaluated for ERS
Iron	Cadmium	Mercury	
Lead	Chromium	Benzo(a)anthracene	
Manganese	Copper	Benzo(a)pyrene	
Nickel	Iron	Benzo(b)fluoranthene	
Selenium	Lead	Benzo(g,h,i)perylene	
Zinc	Nickel	Benzo(k)fluoranthene	
Mercury	Selenium	Chrysene	
Aroclor 1254	Zinc	Dibenzo(a,h)anthracene	
Carbazole	Antimony	indeno(1,2,3-cd)pyrene	
Dibenzofuran	Mercury	Nitrate	
4-Nitrotoluene	Nitrate		
Nitrate			

6.4 CONCLUSION

Based on the COPCs presented in Section 6.2 and the COPECs presented in Section 6.3, a full risk evaluation should be carefully considered in the overall risk management decisions that are made for LL5.

LL5mw-002

B

A'

LL5mw-003

C'

LL5mw-001

LL5mw-004

LL5mw-005

A

B'

C

LL5mw-006

LL-6 MW002

Legend

- Monitoring Well Locations
- Existing Monitoring Wells at RVAAP
- Geologic Cross Section
- Vegetation
- Piping
- Steam Line Post
- Road
- Building
- Walkway
- Fence
- 10 ft Contour Line
- 2 ft Contour Line

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Stafford, TX 77477

Ravenna Army Ammunition Plant
Ravenna, Ohio

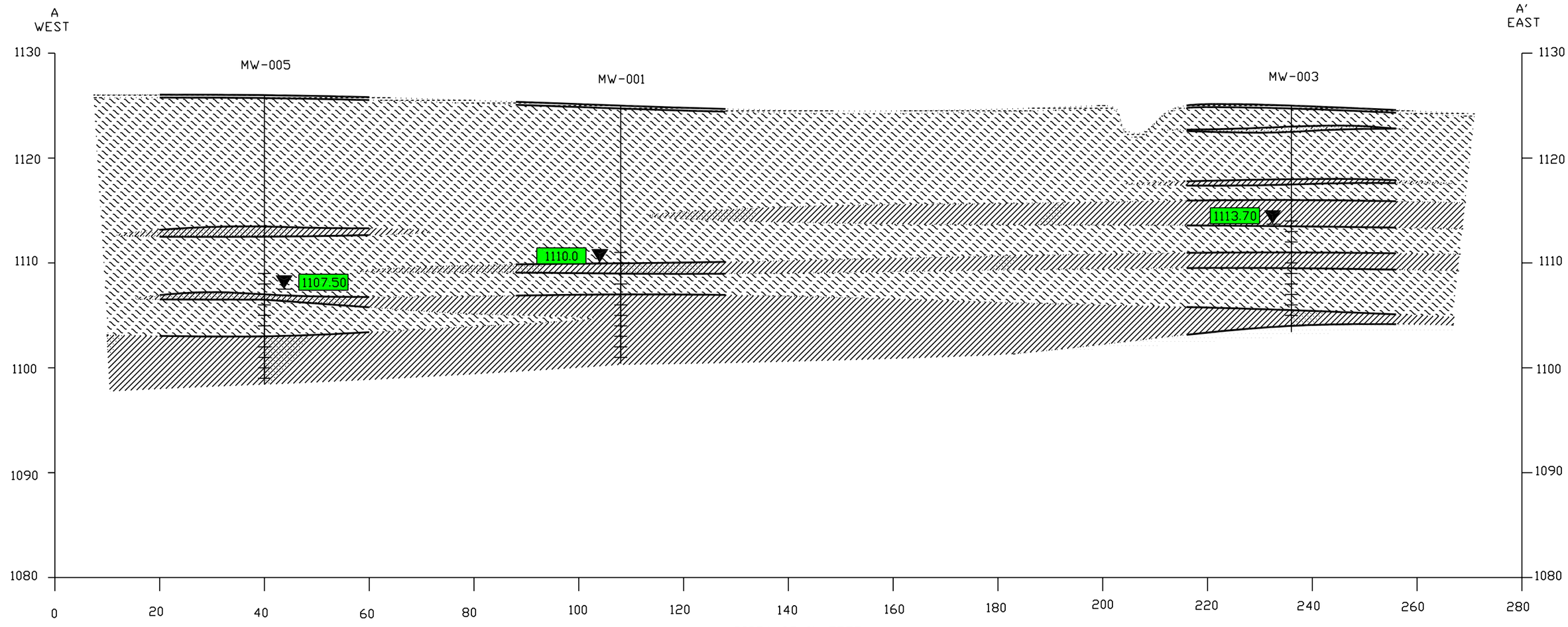
Figure LL5-1
Load Line 5
Geologic Cross Section

Characterization of 14 RVAAP AOCs

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

0 35 70 140 210 Feet

N W E S



CROSS SECTION A

HORIZONTAL 1"=20'
VERTICAL 1"=10'

VERTICAL EXAGGERATION = 10X

LEGEND

- TOP SOIL
- SAND STONE
- DEPTH GROUNDWATER ENCOUNTERED
- KNOWN SUBSURFACE SOIL CONDITIONS
- SILTY SAND
- CLAYEY SILT
- 1140.64 GROUNDWATER ELEVATION (ft)
- EXPECTED SUBSURFACE SOIL CONDITIONS
- SANDY SILT
- SCREEN INTERVAL

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

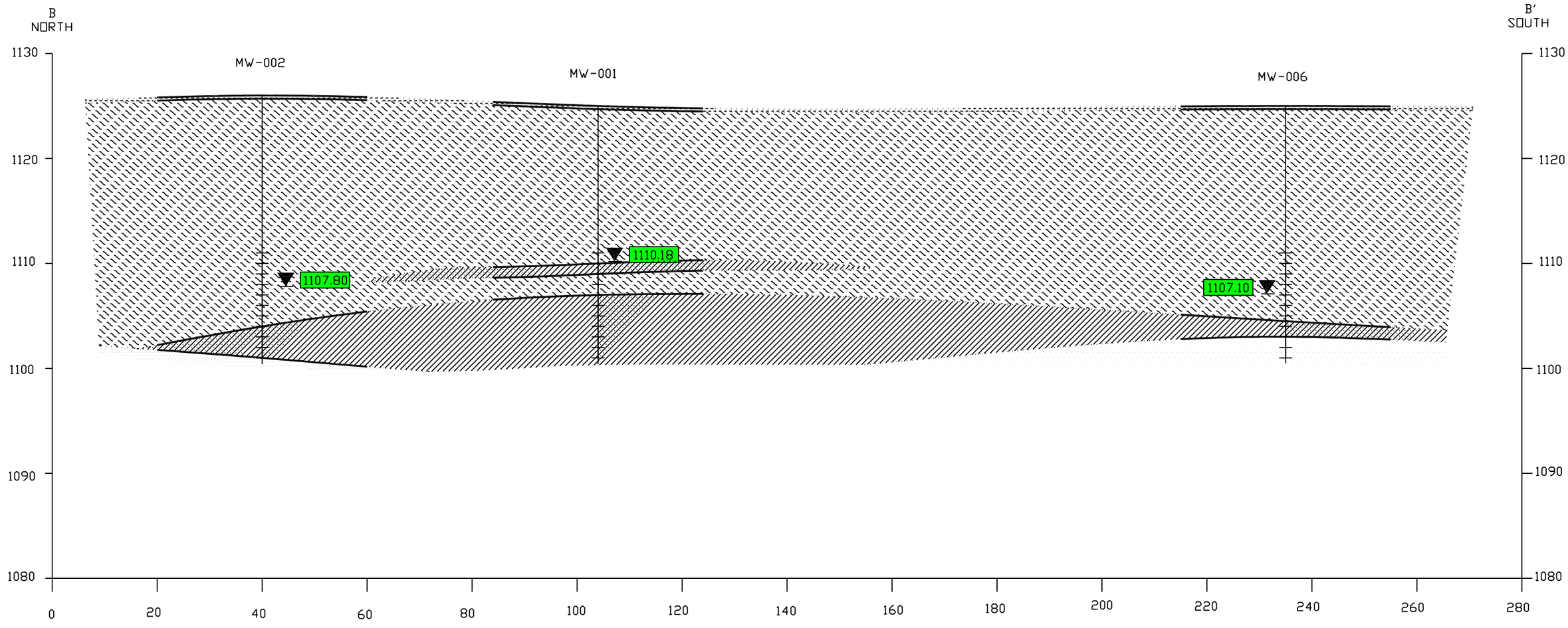
MKM ENGINEERS, INC.

DATE DRAWN 04/18/05

FIGURE LL5-2
LOAD LINE 5
GEOLOGIC CROSS SECTION A
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		LL5-2	

DRAWN BY	ST	APPR. BY	SRL



CROSS SECTION B

HORIZONTAL 1"=20'
VERTICAL 1"=10'

VERTICAL EXAGGERATION = 10X

LEGEND

- TOP SOIL
- SAND STONE
- SILTY SAND
- CLAYEY SILT
- SANDY SILT
- SCREEN INTERVAL
- DEPTH GROUNDWATER ENCOUNTERED
- 1140.64 GROUNDWATER ELEVATION (ft)
- KNOWN SUBSURFACE SOIL CONDITIONS
- EXPECTED SUBSURFACE SOIL CONDITIONS

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
			05/25/06	MS

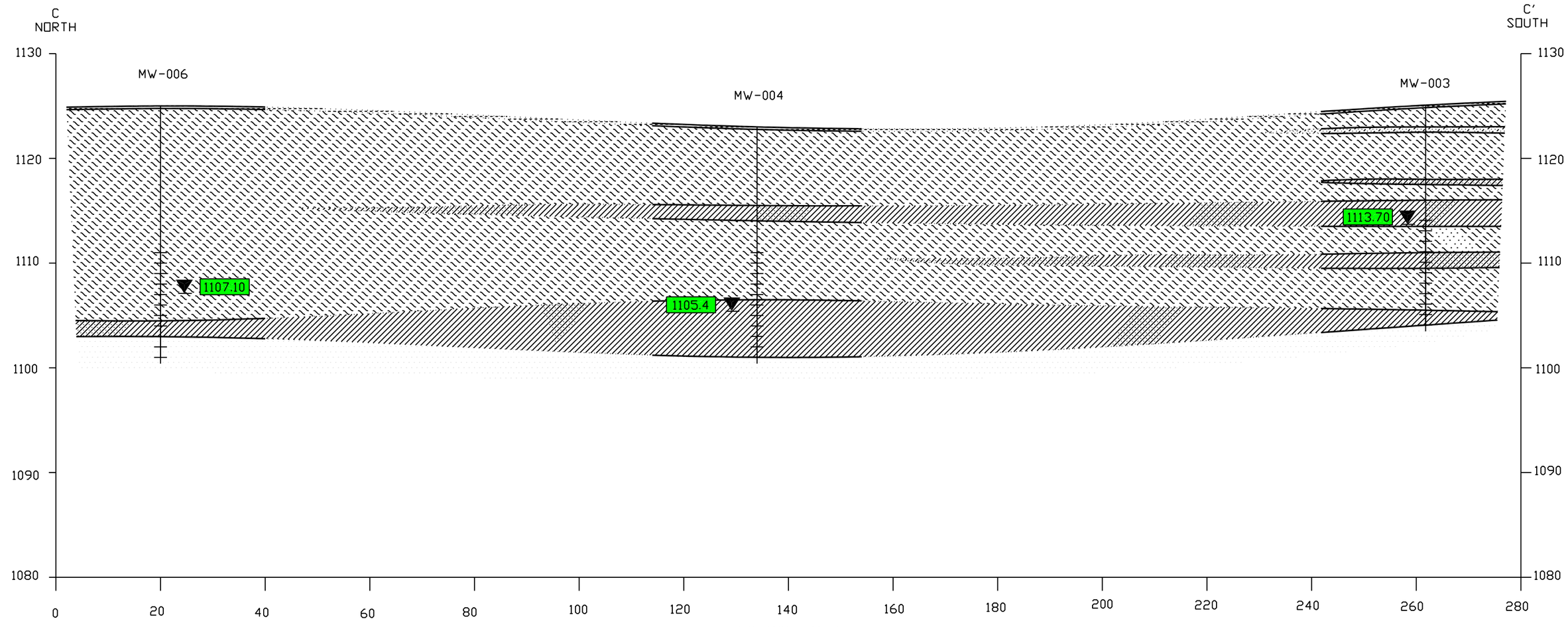
MKM ENGINEERS, INC.

DATE DRAWN 04/18/05

FIGURE LL5-3
LOAD LINE 5
GEOLOGIC CROSS SECTION B
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		LL5-3	

DRAWN BY	ST	APPR. BY	SRL



CROSS SECTION C

HORIZONTAL 1"=20'
VERTICAL 1"=10'

VERTICAL EXAGGERATION = 10X

LEGEND

- TOP SOIL
- SAND STONE
- DEPTH GROUNDWATER ENCOUNTERED
- KNOWN SUBSURFACE SOIL CONDITIONS
- SILTY SAND
- CLAYEY SILT
- 1140.64 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 LL5-4
LOAD LINE 5
GEOLOGIC CROSS SECTION C
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO

SIZE	PROJECT NO.	DWG NO.	REV
D		LL5-4	

DRAWN BY	ST	APPR. BY	SRL

LL5mw-002

LL5mw-003

LL5mw-001

LL5mw-004

LL5mw-005

LL5mw-006

LL-6 MW002

Legend

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

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Ravenna, Ohio

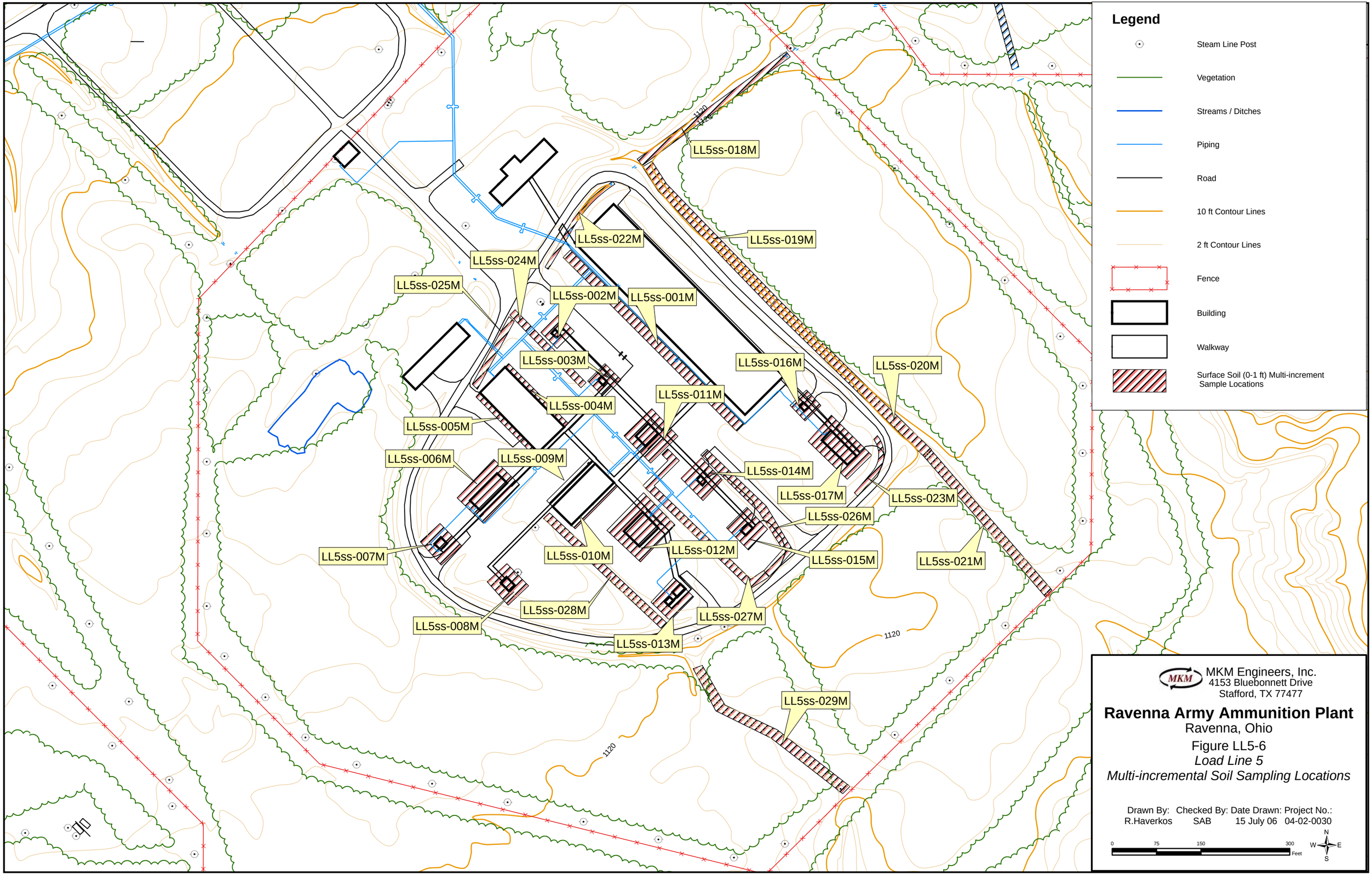
Figure LL5-5
Load Line 5
Monitoring Well Locations

Characterization of 14 RVAAP AOCs

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

0 35 70 140 210 Feet

N W E S


LL5ss-018M
LL5ss-022M
LL5ss-019M
LL5ss-024M
LL5ss-025M
LL5ss-002M
LL5ss-001M
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LL5ss-016M
LL5ss-020M
LL5ss-011M
LL5ss-004M
LL5ss-005M
LL5ss-006M
LL5ss-009M
LL5ss-014M
LL5ss-017M
LL5ss-023M
LL5ss-026M
LL5ss-007M
LL5ss-010M
LL5ss-012M
LL5ss-015M
LL5ss-021M
LL5ss-028M
LL5ss-008M
LL5ss-027M
LL5ss-013M
LL5ss-029M
1120
1120
1120
1120
Legend
Steam Line Post
Vegetation
Streams / Ditches
Piping
Road
10 ft Contour Lines
2 ft Contour Lines
Fence
Building
Walkway
Surface Soil (0-1 ft) Multi-increment Sample Locations
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Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure LL5-6
Load Line 5
Multi-incremental Soil Sampling Locations
Drawn By: R.Haverkos
Checked By: SAB
Date Drawn: 15 July 06
Project No.: 04-02-0030
0
75
150
300
Feet
N
W
E
S

LL5sw-012

LL5sd-002/
LL5sw-002

LL5sd-001/
LL5sw-001

LL5sd-004/
LL5sw-004

LL5ss-001

LL5sw-011

LL5sd-003/
LL5sw-003

LL5sd-006/
LL5sw-006

LL5sd-008/
LL5sw-008

LL5sd-005/
LL5sw-005

LL5sd-007/
LL5sw-007

LL5sd-013/
LL5sw-013

LL5sd-009/
LL5sw-009

LL5sd-010/
LL5sw-010

1120

1120

1120

Legend

- Vegetation
- Streams / Ditches
- Piping
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Walkway
- Steam Line Post
- Surface Water Sampling Location
- Surface Soil (0-1 ft) Discrete Sample Location
- Sediment/Surface Water Sewer Sample Locations
- Sediment/Surface Water Sump Sample Locations

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Ravenna, Ohio

Figure LL5-7

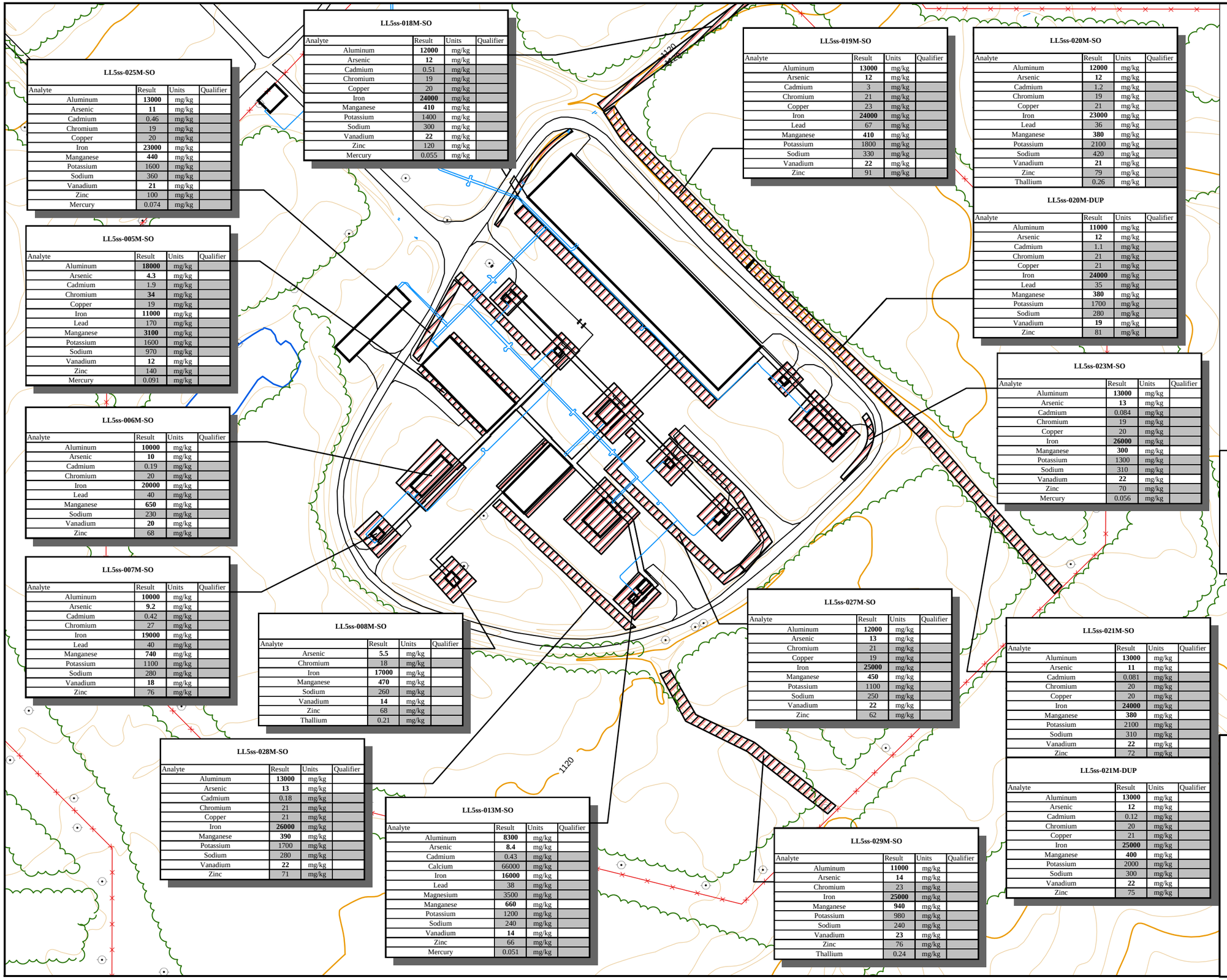
Load Line 5

Discrete Soil, Sediment, and Surface Water Sampling Locations

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

0 75 150 300 Feet

N W E S



LL5ss-025M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.46	mg/kg	
Chromium	19	mg/kg	
Copper	20	mg/kg	
Iron	**23000**	mg/kg	
Manganese	**440**	mg/kg	
Potassium	1600	mg/kg	
Sodium	360	mg/kg	
Vanadium	**21**	mg/kg	
Zinc	100	mg/kg	
Mercury	0.074	mg/kg	

LL5ss-018M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	0.51	mg/kg	
Chromium	19	mg/kg	
Copper	20	mg/kg	
Iron	**24000**	mg/kg	
Manganese	**410**	mg/kg	
Potassium	1400	mg/kg	
Sodium	300	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	120	mg/kg	
Mercury	0.055	mg/kg	

LL5ss-019M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	3	mg/kg	
Chromium	21	mg/kg	
Copper	23	mg/kg	
Iron	**24000**	mg/kg	
Lead	67	mg/kg	
Manganese	**410**	mg/kg	
Potassium	1800	mg/kg	
Sodium	330	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	91	mg/kg	

LL5ss-020M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	1.2	mg/kg	
Chromium	19	mg/kg	
Copper	21	mg/kg	
Iron	**23000**	mg/kg	
Lead	36	mg/kg	
Manganese	**380**	mg/kg	
Potassium	2100	mg/kg	
Sodium	420	mg/kg	
Vanadium	**21**	mg/kg	
Zinc	79	mg/kg	
Thallium	0.26	mg/kg	

LL5ss-020M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	1.1	mg/kg	
Chromium	21	mg/kg	
Copper	21	mg/kg	
Iron	**24000**	mg/kg	
Lead	35	mg/kg	
Manganese	**380**	mg/kg	
Potassium	1700	mg/kg	
Sodium	280	mg/kg	
Vanadium	**19**	mg/kg	
Zinc	81	mg/kg	

LL5ss-005M-SO

Analyte	Result	Units	Qualifier
Aluminum	**18000**	mg/kg	
Arsenic	**4.3**	mg/kg	
Cadmium	1.9	mg/kg	
Chromium	**34**	mg/kg	
Copper	19	mg/kg	
Iron	**11000**	mg/kg	
Lead	170	mg/kg	
Manganese	**3100**	mg/kg	
Potassium	1600	mg/kg	
Sodium	970	mg/kg	
Vanadium	**12**	mg/kg	
Zinc	140	mg/kg	
Mercury	0.091	mg/kg	

LL5ss-023M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**13**	mg/kg	
Cadmium	0.084	mg/kg	
Chromium	19	mg/kg	
Copper	20	mg/kg	
Iron	**26000**	mg/kg	
Manganese	**300**	mg/kg	
Potassium	1300	mg/kg	
Sodium	310	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	70	mg/kg	
Mercury	0.056	mg/kg	

LL5ss-006M-SO

Analyte	Result	Units	Qualifier
Aluminum	**10000**	mg/kg	
Arsenic	**10**	mg/kg	
Cadmium	0.19	mg/kg	
Chromium	20	mg/kg	
Iron	**20000**	mg/kg	
Lead	40	mg/kg	
Manganese	**650**	mg/kg	
Sodium	230	mg/kg	
Vanadium	**20**	mg/kg	
Zinc	68	mg/kg	

LL5ss-007M-SO

Analyte	Result	Units	Qualifier
Aluminum	**10000**	mg/kg	
Arsenic	**9.2**	mg/kg	
Cadmium	0.42	mg/kg	
Chromium	27	mg/kg	
Iron	**19000**	mg/kg	
Lead	40	mg/kg	
Manganese	**740**	mg/kg	
Potassium	1100	mg/kg	
Sodium	280	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	76	mg/kg	

LL5ss-008M-SO

Analyte	Result	Units	Qualifier
Arsenic	**5.5**	mg/kg	
Chromium	18	mg/kg	
Iron	**17000**	mg/kg	
Manganese	**470**	mg/kg	
Sodium	260	mg/kg	
Vanadium	**14**	mg/kg	
Zinc	68	mg/kg	
Thallium	0.21	mg/kg	

LL5ss-027M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**13**	mg/kg	
Chromium	21	mg/kg	
Copper	19	mg/kg	
Iron	**25000**	mg/kg	
Manganese	**450**	mg/kg	
Potassium	1100	mg/kg	
Sodium	250	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	62	mg/kg	

LL5ss-021M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.081	mg/kg	
Chromium	20	mg/kg	
Copper	20	mg/kg	
Iron	**24000**	mg/kg	
Manganese	**380**	mg/kg	
Potassium	2100	mg/kg	
Sodium	310	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	72	mg/kg	

LL5ss-021M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	0.12	mg/kg	
Chromium	20	mg/kg	
Copper	21	mg/kg	
Iron	**25000**	mg/kg	
Manganese	**400**	mg/kg	
Potassium	2000	mg/kg	
Sodium	300	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	75	mg/kg	

LL5ss-028M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**13**	mg/kg	
Cadmium	0.18	mg/kg	
Chromium	21	mg/kg	
Copper	21	mg/kg	
Iron	**26000**	mg/kg	
Manganese	**390**	mg/kg	
Potassium	1700	mg/kg	
Sodium	280	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	71	mg/kg	

LL5ss-013M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8300**	mg/kg	
Arsenic	**8.4**	mg/kg	
Cadmium	0.43	mg/kg	
Calcium	66000	mg/kg	
Iron	**16000**	mg/kg	
Lead	38	mg/kg	
Magnesium	3500	mg/kg	
Manganese	**660**	mg/kg	
Potassium	1200	mg/kg	
Sodium	240	mg/kg	
Vanadium	**14**	mg/kg	
Zinc	66	mg/kg	
Mercury	0.051	mg/kg	

LL5ss-029M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**14**	mg/kg	
Chromium	23	mg/kg	
Iron	**25000**	mg/kg	
Manganese	**940**	mg/kg	
Potassium	980	mg/kg	
Sodium	240	mg/kg	
Vanadium	**23**	mg/kg	
Zinc	76	mg/kg	
Thallium	0.24	mg/kg	

Legend

- Vegetation
- Streams / Ditches
- Piping
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Walkway
- Steam Line Post
- Surface Soil (0-1 ft) Multi-increment Sample Location
- Sediment Multi-increment Sample Location

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

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

Ravenna Army Ammunition Plant

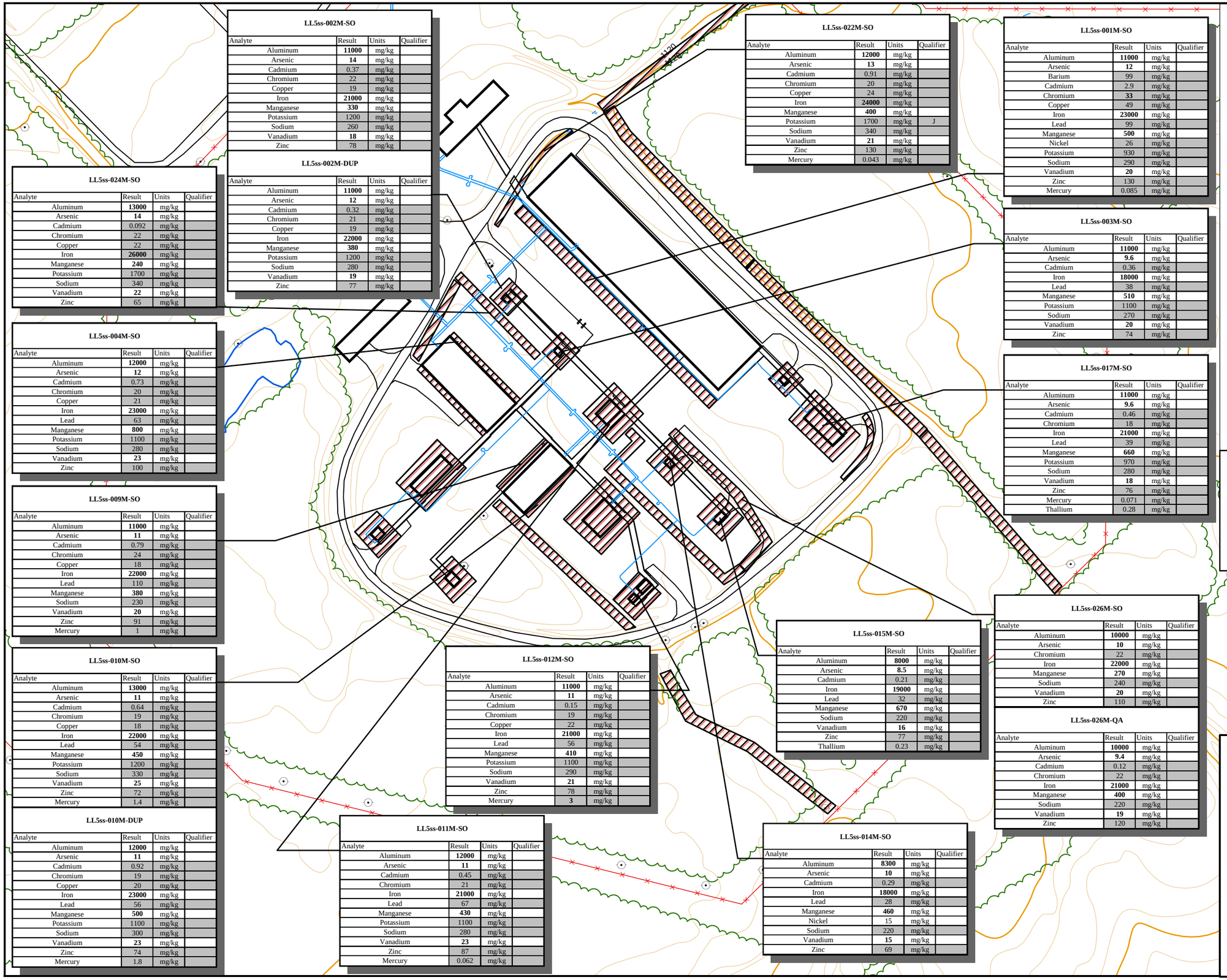
Ravenna, Ohio

Figure LL5-8A
Load Line 5
Soil and Sediment Sample Locations
Exceedences-Inorganics

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

0 70 140 280 Feet

N W E S



LL5ss-002M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**14**	mg/kg	
Cadmium	0.37	mg/kg	
Chromium	22	mg/kg	
Copper	19	mg/kg	
Iron	**21000**	mg/kg	
Manganese	**330**	mg/kg	
Potassium	1200	mg/kg	
Sodium	260	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	78	mg/kg	

LL5ss-002M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	0.32	mg/kg	
Chromium	21	mg/kg	
Copper	19	mg/kg	
Iron	**22000**	mg/kg	
Manganese	**380**	mg/kg	
Potassium	1200	mg/kg	
Sodium	280	mg/kg	
Vanadium	**19**	mg/kg	
Zinc	77	mg/kg	

LL5ss-022M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**13**	mg/kg	
Cadmium	0.91	mg/kg	
Chromium	20	mg/kg	
Copper	24	mg/kg	
Iron	**24000**	mg/kg	
Manganese	**400**	mg/kg	
Potassium	1700	mg/kg	J
Sodium	340	mg/kg	
Vanadium	**21**	mg/kg	
Zinc	130	mg/kg	
Mercury	0.043	mg/kg	

LL5ss-001M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**12**	mg/kg	
Barium	99	mg/kg	
Cadmium	2.9	mg/kg	
Chromium	**33**	mg/kg	
Copper	49	mg/kg	
Iron	**23000**	mg/kg	
Lead	99	mg/kg	
Manganese	**500**	mg/kg	
Nickel	26	mg/kg	
Potassium	930	mg/kg	
Sodium	290	mg/kg	
Vanadium	**20**	mg/kg	
Zinc	130	mg/kg	
Mercury	0.085	mg/kg	

LL5ss-024M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**14**	mg/kg	
Cadmium	0.092	mg/kg	
Chromium	22	mg/kg	
Copper	22	mg/kg	
Iron	**26000**	mg/kg	
Manganese	**240**	mg/kg	
Potassium	1700	mg/kg	
Sodium	340	mg/kg	
Vanadium	**22**	mg/kg	
Zinc	65	mg/kg	

LL5ss-003M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**9.6**	mg/kg	
Cadmium	0.36	mg/kg	
Iron	**18000**	mg/kg	
Lead	38	mg/kg	
Manganese	**510**	mg/kg	
Potassium	1100	mg/kg	
Sodium	270	mg/kg	
Vanadium	**20**	mg/kg	
Zinc	74	mg/kg	

LL5ss-004M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**12**	mg/kg	
Cadmium	0.73	mg/kg	
Chromium	20	mg/kg	
Copper	21	mg/kg	
Iron	**23000**	mg/kg	
Lead	63	mg/kg	
Manganese	**800**	mg/kg	
Potassium	1100	mg/kg	
Sodium	280	mg/kg	
Vanadium	**23**	mg/kg	
Zinc	100	mg/kg	

LL5ss-017M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**9.6**	mg/kg	
Cadmium	0.46	mg/kg	
Chromium	18	mg/kg	
Iron	**21000**	mg/kg	
Lead	39	mg/kg	
Manganese	**660**	mg/kg	
Potassium	970	mg/kg	
Sodium	280	mg/kg	
Vanadium	**18**	mg/kg	
Zinc	76	mg/kg	
Mercury	0.071	mg/kg	
Thallium	0.28	mg/kg	

LL5ss-009M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.79	mg/kg	
Chromium	24	mg/kg	
Copper	18	mg/kg	
Iron	**22000**	mg/kg	
Lead	110	mg/kg	
Manganese	**380**	mg/kg	
Sodium	230	mg/kg	
Vanadium	**20**	mg/kg	
Zinc	91	mg/kg	
Mercury	1	mg/kg	

LL5ss-012M-SO

Analyte	Result	Units	Qualifier
Aluminum	**11000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.15	mg/kg	
Chromium	19	mg/kg	
Copper	22	mg/kg	
Iron	**21000**	mg/kg	
Lead	56	mg/kg	
Manganese	**410**	mg/kg	
Potassium	1100	mg/kg	
Sodium	290	mg/kg	
Vanadium	**21**	mg/kg	
Zinc	78	mg/kg	
Mercury	**3**	mg/kg	

LL5ss-015M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8000**	mg/kg	
Arsenic	**8.5**	mg/kg	
Cadmium	0.21	mg/kg	
Iron	**19000**	mg/kg	
Lead	32	mg/kg	
Manganese	**670**	mg/kg	
Sodium	220	mg/kg	
Vanadium	**16**	mg/kg	
Zinc	77	mg/kg	
Thallium	0.23	mg/kg	

LL5ss-026M-SO

Analyte	Result	Units	Qualifier
Aluminum	**10000**	mg/kg	
Arsenic	**10**	mg/kg	
Chromium	22	mg/kg	
Iron	**22000**	mg/kg	
Manganese	**270**	mg/kg	
Sodium	240	mg/kg	
Vanadium	**20**	mg/kg	
Zinc	110	mg/kg	

LL5ss-026M-QA

Analyte	Result	Units	Qualifier
Aluminum	**10000**	mg/kg	
Arsenic	**9.4**	mg/kg	
Cadmium	0.12	mg/kg	
Chromium	22	mg/kg	
Iron	**21000**	mg/kg	
Manganese	**400**	mg/kg	
Sodium	220	mg/kg	
Vanadium	**19**	mg/kg	
Zinc	120	mg/kg	

LL5ss-010M-SO

Analyte	Result	Units	Qualifier
Aluminum	**13000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.64	mg/kg	
Chromium	19	mg/kg	
Copper	18	mg/kg	
Iron	**22000**	mg/kg	
Lead	54	mg/kg	
Manganese	**450**	mg/kg	
Potassium	1200	mg/kg	
Sodium	330	mg/kg	
Vanadium	**25**	mg/kg	
Zinc	72	mg/kg	
Mercury	1.4	mg/kg	

LL5ss-010M-DUP

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.92	mg/kg	
Chromium	19	mg/kg	
Copper	20	mg/kg	
Iron	**23000**	mg/kg	
Lead	56	mg/kg	
Manganese	**500**	mg/kg	
Potassium	1100	mg/kg	
Sodium	300	mg/kg	
Vanadium	**23**	mg/kg	
Zinc	74	mg/kg	
Mercury	1.8	mg/kg	

LL5ss-011M-SO

Analyte	Result	Units	Qualifier
Aluminum	**12000**	mg/kg	
Arsenic	**11**	mg/kg	
Cadmium	0.45	mg/kg	
Chromium	21	mg/kg	
Iron	**21000**	mg/kg	
Lead	67	mg/kg	
Manganese	**430**	mg/kg	
Potassium	1100	mg/kg	
Sodium	280	mg/kg	
Vanadium	**23**	mg/kg	
Zinc	87	mg/kg	
Mercury	0.062	mg/kg	

LL5ss-014M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8300**	mg/kg	
Arsenic	**10**	mg/kg	
Cadmium	0.29	mg/kg	
Iron	**18000**	mg/kg	
Lead	28	mg/kg	
Manganese	**460**	mg/kg	
Nickel	15	mg/kg	
Sodium	220	mg/kg	
Vanadium	**15**	mg/kg	
Zinc	69	mg/kg	

Legend

- Vegetation
- Streams / Ditches
- Piping
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Walkway
- Steam Line Post
- Surface Soil (0-1 ft) Multi-increment Sample Location
- Sediment Multi-increment Sample Location

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

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

Ravenna Army Ammunition Plant

Ravenna, Ohio

Figure LL5-8B

Load Line 5

Soil and Sediment Sample Locations

Exceedences-Inorganics

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

0 70 140 280 Feet

N W E S

LL5ss-014M-SO

Analyte	Result	Units	Qualifier
Aluminum	**8300**	mg/kg	
Arsenic	**10**	mg/kg	
Cadmium	0.29	mg/kg	
Iron	**18000**	mg/kg	
Lead	28	mg/kg	
Manganese	**460**	mg/kg	
Nickel	15	mg/kg	
Sodium	220	mg/kg	
Vanadium	**15**	mg/kg	
Zinc	69	mg/kg	

LL5ss-005M-SO

Analyte	Result	Units	Qualifier
Benzo(a)pyrene	**0.15**	mg/kg	

LL5ss-012M-SO

Analyte	Result	Units	Qualifier
Benzo(a)pyrene	**0.15**	mg/kg	

1120

1120

1120

Legend

- Vegetation
- Streams / Ditches
- Piping
- Road
- 10 ft Contours Lines
- 2 ft Contour Lines
- Fence
- Building
- Walkway
- Steam Line Post
- Surface Soil (0-1 ft) Multi-increment Sample Location
- Sediment Multi-increment Sample Location

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

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

Ravenna Army Ammunition Plant

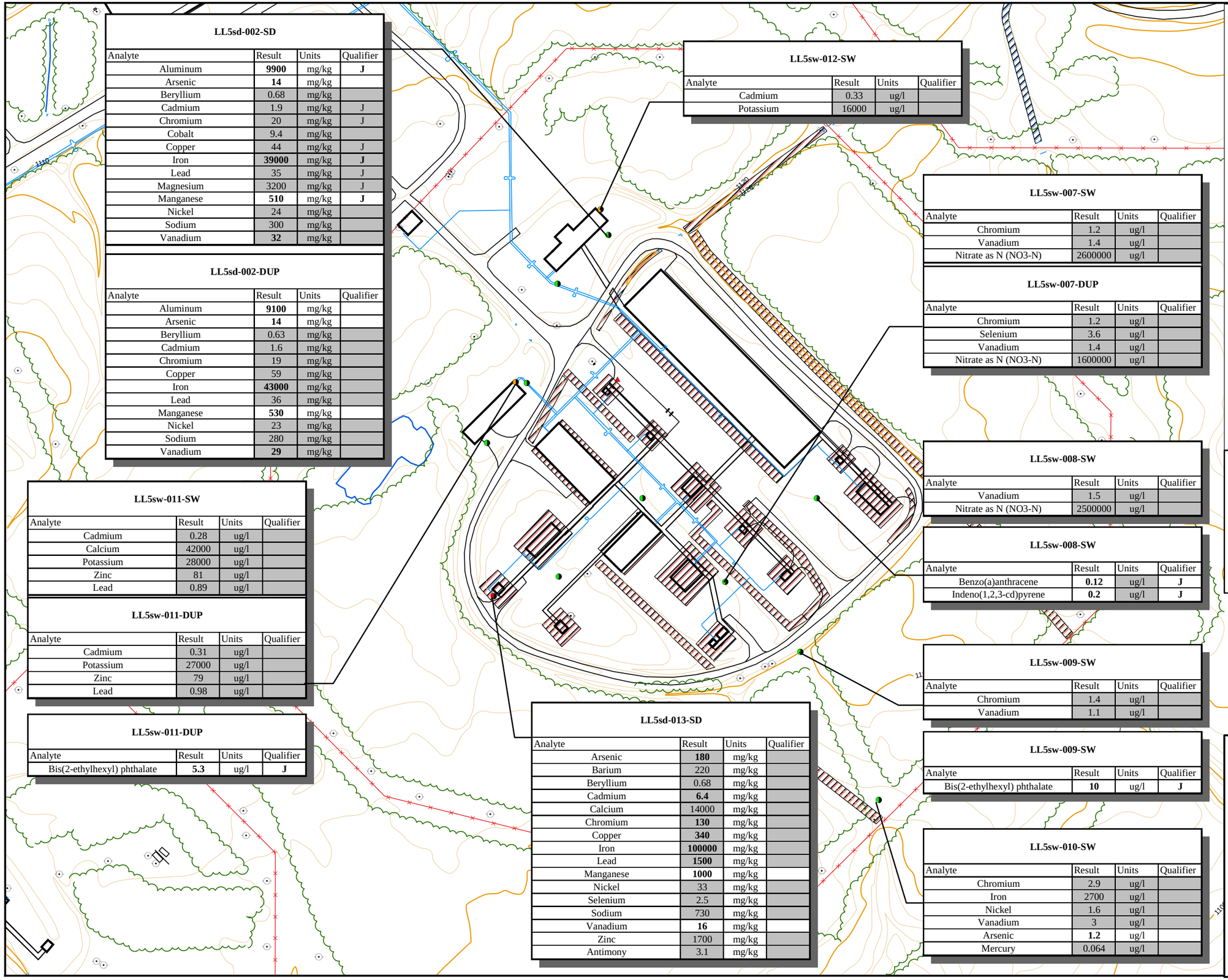
Ravenna, Ohio

Figure LL5-9
Load Line 5
Soil Sample Locations
Exceedences-Organics

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

0 75 150 300 Feet

N W E S



LL5sd-002-SD

Analyte	Result	Units	Qualifier
Aluminum	**9900**	mg/kg	**J**
Arsenic	**14**	mg/kg	
Beryllium	0.68	mg/kg	
Cadmium	1.9	mg/kg	J
Chromium	20	mg/kg	J
Cobalt	9.4	mg/kg	
Copper	44	mg/kg	J
Iron	**39000**	mg/kg	**J**
Lead	35	mg/kg	J
Magnesium	3200	mg/kg	J
Manganese	**510**	mg/kg	**J**
Nickel	24	mg/kg	
Sodium	300	mg/kg	
Vanadium	**32**	mg/kg	

LL5sd-002-DUP

Analyte	Result	Units	Qualifier
Aluminum	**9100**	mg/kg	
Arsenic	**14**	mg/kg	
Beryllium	0.63	mg/kg	
Cadmium	1.6	mg/kg	
Chromium	19	mg/kg	
Copper	59	mg/kg	
Iron	**43000**	mg/kg	
Lead	36	mg/kg	
Manganese	**530**	mg/kg	
Nickel	23	mg/kg	
Sodium	280	mg/kg	
Vanadium	**29**	mg/kg	

LL5sw-012-SW

Analyte	Result	Units	Qualifier
Cadmium	0.33	ug/l	
Potassium	16000	ug/l	

LL5sw-007-SW

Analyte	Result	Units	Qualifier
Chromium	1.2	ug/l	
Vanadium	1.4	ug/l	
Nitrate as N (NO3-N)	2600000	ug/l	

LL5sw-007-DUP

Analyte	Result	Units	Qualifier
Chromium	1.2	ug/l	
Selenium	3.6	ug/l	
Vanadium	1.4	ug/l	
Nitrate as N (NO3-N)	1600000	ug/l	

LL5sw-008-SW

Analyte	Result	Units	Qualifier
Vanadium	1.5	ug/l	
Nitrate as N (NO3-N)	2500000	ug/l	

LL5sw-008-SW

Analyte	Result	Units	Qualifier
Benzo(a)anthracene	**0.12**	ug/l	**J**
Indeno(1,2,3-cd)pyrene	**0.2**	ug/l	**J**

LL5sw-009-SW

Analyte	Result	Units	Qualifier
Chromium	1.4	ug/l	
Vanadium	1.1	ug/l	

LL5sw-009-SW

Analyte	Result	Units	Qualifier
Bis(2-ethylhexyl) phthalate	**10**	ug/l	**J**

LL5sw-010-SW

Analyte	Result	Units	Qualifier
Chromium	2.9	ug/l	
Iron	2700	ug/l	
Nickel	1.6	ug/l	
Vanadium	3	ug/l	
Arsenic	**1.2**	ug/l	
Mercury	0.064	ug/l	

LL5sw-011-SW

Analyte	Result	Units	Qualifier
Cadmium	0.28	ug/l	
Calcium	42000	ug/l	
Potassium	28000	ug/l	
Zinc	81	ug/l	
Lead	0.89	ug/l	

LL5sw-011-DUP

Analyte	Result	Units	Qualifier
Cadmium	0.31	ug/l	
Potassium	27000	ug/l	
Zinc	79	ug/l	
Lead	0.98	ug/l	

LL5sw-011-DUP

Analyte	Result	Units	Qualifier
Bis(2-ethylhexyl) phthalate	**5.3**	ug/l	**J**

LL5sd-013-SD

Analyte	Result	Units	Qualifier
Arsenic	**180**	mg/kg	
Barium	220	mg/kg	
Beryllium	0.68	mg/kg	
Cadmium	**6.4**	mg/kg	
Calcium	14000	mg/kg	
Chromium	**130**	mg/kg	
Copper	**340**	mg/kg	
Iron	**100000**	mg/kg	
Lead	**1500**	mg/kg	
Manganese	**1000**	mg/kg	
Nickel	33	mg/kg	
Selenium	2.5	mg/kg	
Sodium	730	mg/kg	
Vanadium	**16**	mg/kg	
Zinc	1700	mg/kg	
Antimony	3.1	mg/kg	

Legend

- Vegetation
- Streams / Ditches
- Piping
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Walkway
- Steam Line Post
- Surface Water Sampling Locations
- Shallow Soil Discrete Sample Locations
- Sediment/Surface Water Sewer Sample Locations
- Sediment/Surface Water Sump Sample Locations

Notes:
J - estimated value
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style.
If Result = or > PRG, then the value is presented with a bold style.
Result < PRG & Background, then the value is presented with a normal style.
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 LL5-10

Load Line 5

Surface Water and Sediment Sample Locations Exceedences

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

0 75 150 300 Feet

N W E S

LL5mw-001-GW

Analyte	Result	Units	Qualifier
Cobalt	0.86	ug/l	
Nickel	2.2	ug/l	
Potassium	3800	ug/l	
Antimony	4.1	ug/l	
Lead	1.2	ug/l	

LL5mw-002-GW

Analyte	Result	Units	Qualifier
Calcium	67000	ug/l	
Cobalt	4.2	ug/l	
Magnesium	21000	ug/l	
Arsenic	**2.3**	ug/l	

LL5mw-003-GW

Analyte	Result	Units	Qualifier
Copper	2.7	ug/l	
Selenium	3.3	ug/l	

LL5mw-005-GW

Analyte	Result	Units	Qualifier
Calcium	67000	ug/l	
Magnesium	24000	ug/l	
Manganese	**2000**	ug/l	
Antimony	3.3	ug/l	

LL5mw-006-GW

Analyte	Result	Units	Qualifier
Calcium	70000	ug/l	
Copper	2.8	ug/l	
Magnesium	29000	ug/l	
Vanadium	1	ug/l	
Antimony	3.9	ug/l	

LL5mw-004-GW

Analyte	Result	Units	Qualifier
Calcium	71000	ug/l	
Magnesium	31000	ug/l	

LL5mw-004-DUP

Analyte	Result	Units	Qualifier
Calcium	69000	ug/l	
Magnesium	30000	ug/l	

1120

Legend

- Vegetation
- Streams / Ditches
- Piping
- Road
- 10 ft Contour Lines
- 2 ft Contour Lines
- Fence
- Building
- Walkway
- 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 LL5-11

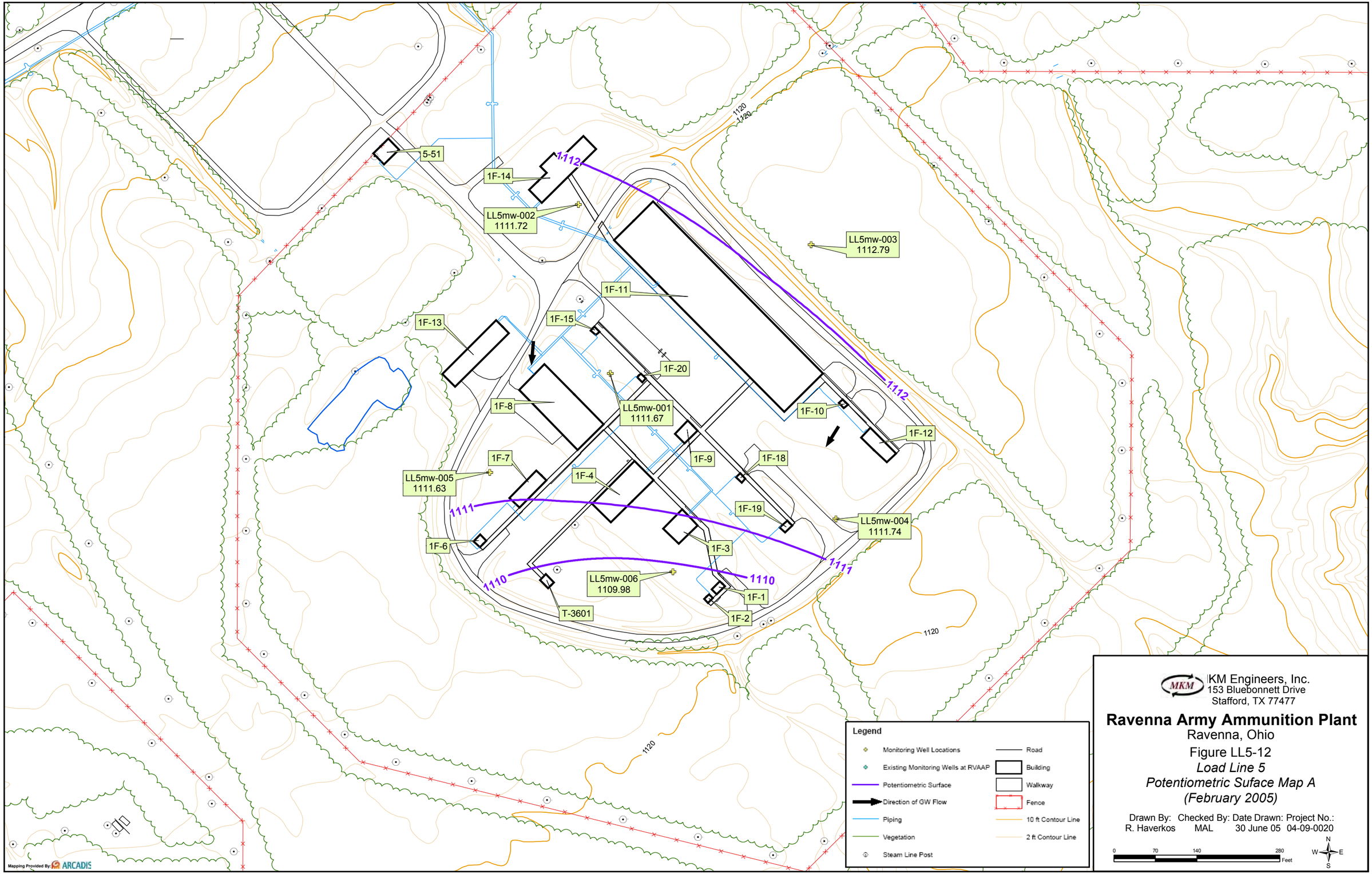
Load Line 5

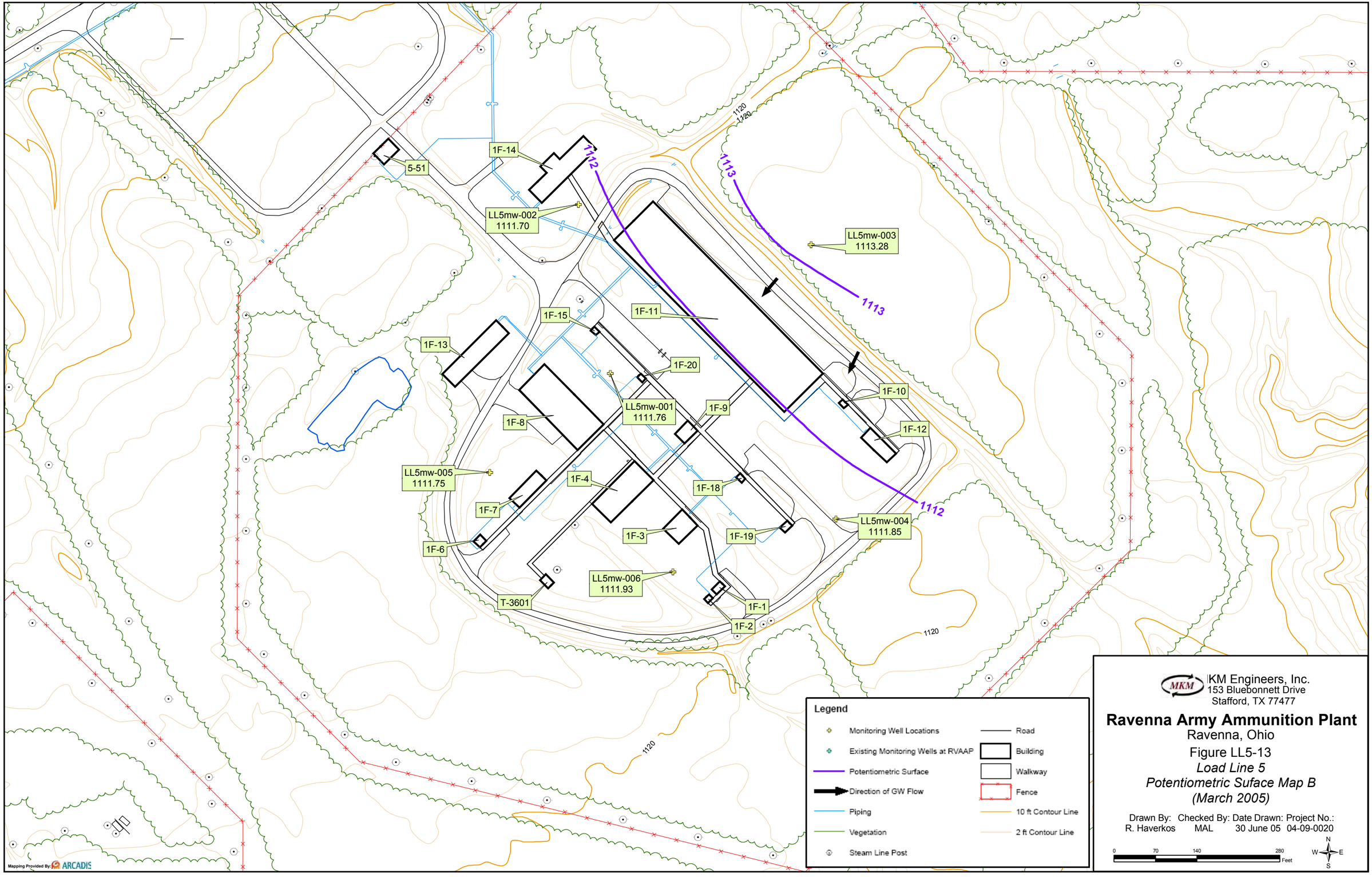
Groundwater Sample Locations Exceedences

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

0 75 150 300 Feet

N W E S


5-51
1F-14
1112
LL5mw-002
1111.72
LL5mw-003
1112.79
1F-11
1F-15
1F-13
1F-20
1F-8
LL5mw-001
1111.67
1F-10
1F-12
1F-7
1F-4
1F-9
1F-18
LL5mw-005
1111.63
1111
1F-19
LL5mw-004
1111.74
1F-6
1F-3
1110
LL5mw-006
1109.98
1F-1
T-3601
1F-2
1120
Mapping Provided By: ARCADIS
Legend
Monitoring Well Locations
Existing Monitoring Wells at RVAAP
Potentiometric Surface
Direction of GW Flow
Piping
Vegetation
Steam Line Post
Road
Building
Walkway
Fence
10 ft Contour Line
2 ft Contour Line
MKM
KM Engineers, Inc.
153 Bluebonnett Drive
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure LL5-12
Load Line 5
Potentiometric Suface Map A
(February 2005)
Drawn By: R. Haverkos
Checked By: MAL
Date Drawn: 30 June 05
Project No.: 04-09-0020
0
70
140
280
Feet
N
W
E
S


1F-14
5-51
LL5mw-002
1111.70
1112
1113
1120
LL5mw-003
1113.28
1113
1F-15
1F-11
1F-13
1F-20
1F-10
LL5mw-001
1111.76
1F-9
1F-8
1F-12
LL5mw-005
1111.75
1F-4
1F-18
1F-7
1112
LL5mw-004
1111.85
1F-3
1F-19
1F-6
LL5mw-006
1111.93
T-3601
1F-1
1F-2
1120
1120
Mapping Provided By: ARCADIS
Legend
Monitoring Well Locations
Existing Monitoring Wells at RVAAP
Potentiometric Surface
Direction of GW Flow
Piping
Vegetation
Steam Line Post
Road
Building
Walkway
Fence
10 ft Contour Line
2 ft Contour Line
KM Engineers, Inc.
153 Bluebonnett Drive
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure LL5-13
Load Line 5
Potentiometric Suface Map B
(March 2005)
Drawn By: R. Haverkos
Checked By: MAL
Date Drawn: 30 June 05
Project No.: 04-09-0020
0
70
140
280
Feet
N
W
E
S

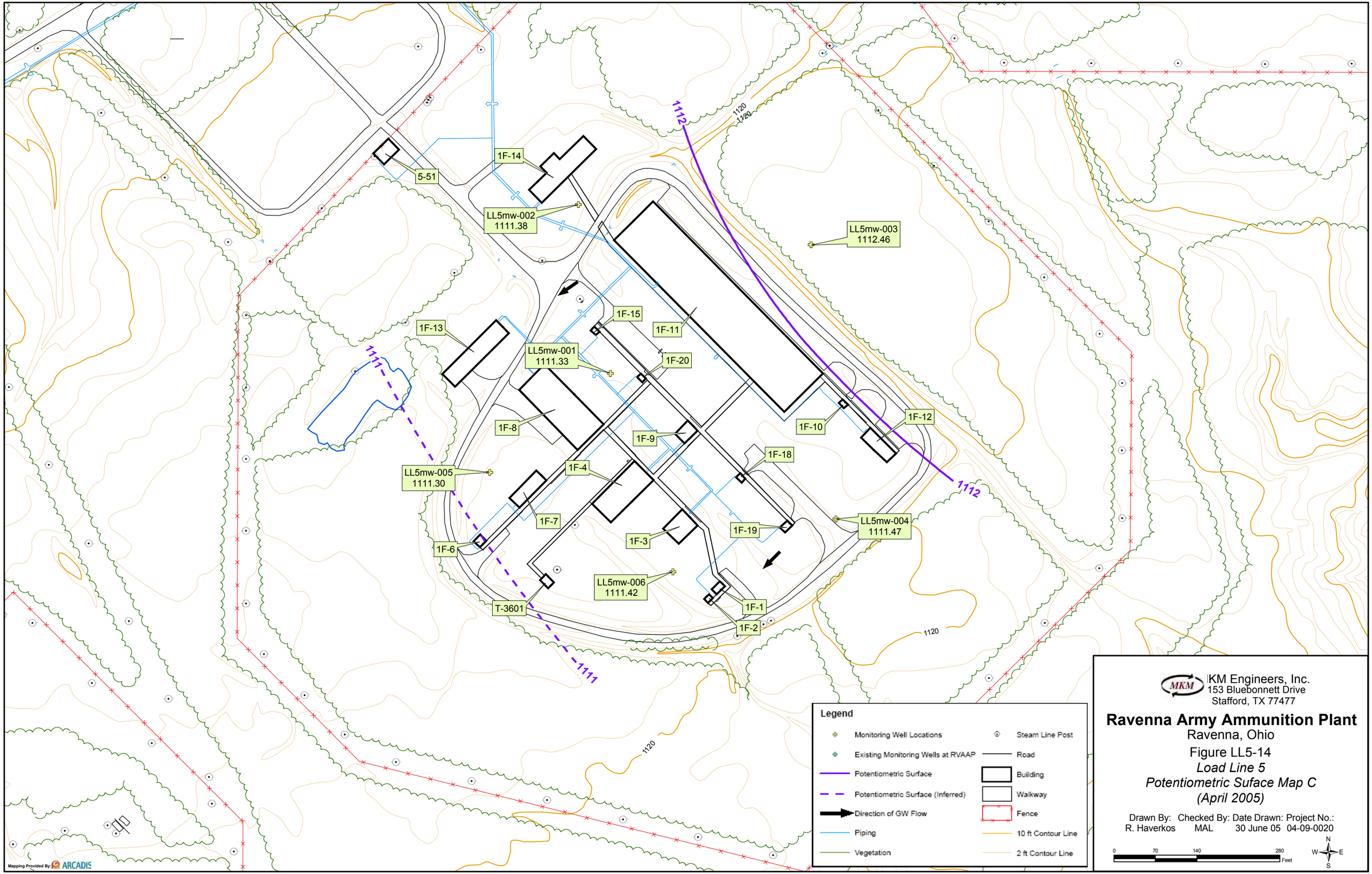

1112
1120
1120
1F-14
5-51
LL5mw-002
1111.38
LL5mw-003
1112.46
1F-15
1F-11
1F-13
LL5mw-001
1111.33
1F-20
1111
1F-8
1F-9
1F-10
1F-12
1F-18
1F-4
LL5mw-005
1111.30
1112
1F-7
1F-19
LL5mw-004
1111.47
1F-3
1F-6
LL5mw-006
1111.42
T-3601
1F-1
1F-2
1120
1111
1120
Mapping Provided By: ARCADIS
Legend
Monitoring Well Locations
Existing Monitoring Wells at RVAAP
Potentiometric Surface
Potentiometric Surface (Inferred)
Direction of GW Flow
Piping
Vegetation
Steam Line Post
Road
Building
Walkway
Fence
10 ft Contour Line
2 ft Contour Line
KM Engineers, Inc.
153 Bluebonnett Drive
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, Ohio
Figure LL5-14
Load Line 5
Potentiometric Suface Map C
(April 2005)
Drawn By: R. Haverkos
Checked By: MAL
Date Drawn: 30 June 05
Project No.: 04-09-0020
0
70
140
280
Feet
N
W
E
S

Table LL5-1
Load Line 5 Summary of Sampling and Analysis
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

SAMPLE PREFIX		VOC	SVOC	Explosives	Propellants	TAL Metals	Chrome +6	Pesticides	PCB	Cyanides	Nitrate	TOC	Geo-Tech	Grain	FIELD QA/QC SAMPLES					
LL5	SAMPLE ID	8260B	8270C	8330	3532/8330	6010/7000	7196A	8081A	8082B	9010A/9012A	EPA 353.2	EPA 415.1	Analysis (Various)	Size ASTM D422	Multi-Incremental QA	Duplicate Sample	Equipment Blank	Trip Blank	MS/MSD	USACE Split
MULTI-INCREMENTAL SOILS																				
Surface Soils	SS-001M			1		1					1									
	SS-002M			1		1					1									
	SS-003M			1		1					1					1				1
	SS-004M			1		1					1									
	SS-005M	1	1	1	1	1		1	1		1									
	SS-006M			1		1					1						1*			
	SS-007M			1		1					1									
	SS-008M			1		1					1									
	SS-009M			1		1					1									
	SS-010M			1		1					1									
	SS-011M			1		1					1					1				1
	SS-012M	1	1	1	1	1		1	1		1									
	SS-013M			1		1					1									
	SS-014M			1		1					1									
	SS-015M			1		1					1									
	SS-016M			1		1					1									
	SS-017M			1		1					1				1					
Dry-Ditch Soils	SS-018M	1	1	1	1	1		1	1		1									
	SS-019M			1		1					1									
	SS-020M			1		1					1									
	SS-021M			1		1					1					1				1
	SS-022M			1		1					1					1				1
	SS-023M			1		1					1								1	
	SS-024M			1		1					1									
	SS-025M			1		1					1									
	SS-026M			1		1					1									
	SS-027M			1		1					1				1					
	SS-028M			1		1					1									1
	SS-029M			1		1					1									
DISCRETE SOILS	SS-030	1																		
		4	3	29	3	29	0	3	3	0	28	0	0	0	2	1				1
GROUNDWATER	MW-001	1	1	1	1	1		1	1		1		1	1		5	0	0	1	6
	MW-002	1	1	1		1		1	1		1									
	MW-003	1	1	1		1		1	1		1		1	1						
	MW-004	1	1	1		1		1	1		1									
	MW-005	1	1	1		1		1	1		1					1	1		1	1
	MW-006	1	1	1		1		1	1		1		1	1						
		6	6	6	1	6	0	6	6	0	6	0	3	3	0	1	1	0	1	1
SURFACE WATER	SW-001	*No sample (no water)*																		
Sanitary Sewers	SW-002	*No sample (no water)*																		
	SW-003	*No sample (no water)*																		
	SW-004	*No sample (no water)*																		
	SW-005	*No sample (no water)*																		
	SW-006	*No sample (no water)*																		
	SW-007	1	1	1		1		1	1		1									
	SW-008	1	1	1	1	1		1	1		1					1			1	1
	SW-009	1	1	1		1		1	1		1									
	SW-010	1	1	1		1		1	1		1									
Basements	SW-011	1	1	1		1		1	1		1									
	SW-012	1	1	1	1	1		1	1		1					1				1
Sumps/Basins	SW-013	*No sample (no water)*																		
		6	6	6	2	6	0	6	6	0	6	0	0	0	0	2	0	0	1	2

Table LL5-1
Load Line 5 Summary of Sampling and Analysis
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

SAMPLE PREFIX		VOC	SVOC	Explosives	Propellants	TAL Metals	Chrome +6	Pesticides	PCB	Cyanides	Nitrate	TOC	Geo-Tech	Grain	FIELD QA/QC SAMPLES					
LL5	SAMPLE ID	8260B	8270C	8330	3532/8330	6010/7000	7196A	8081A	8082B	9010A/9012A	EPA 353.2	EPA 415.1	Analysis (Various)	Size ASTM D422	Multi-Incremental QA	Duplicate Sample	Equipment Blank	Trip Blank	MS/MSD	USACE Split
SEDIMENT	SD-001	*No sample (no sediment)*																		
Sanitary Sewers	SD-002			1		1					1					1			1	1
	SD-003	*No sample (no sediment)*																		
	SD-004	*No sample (no sediment)*																		
	SD-005	*No sample (no sediment)*																		
	SD-006	*No sample (no sediment)*																		
	SD-007	*No sample (no sediment)*																		
	SD-008	*No sample (no sediment)*																		
	SD-009	*No sample (no sediment)*																		
	SD-010	*No sample (no sediment)*																		
Sumps/Basins	SD-013			1		1					1									
		0	0	2	0	2	0	0	0	0	2	0	0	0	0	1	0	0	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
Discrete Sample is taken for VOCs only from Bldg 1F15 doorway
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
* Mislabeled on final results package as LL5sw-005M-ER

Table LL5-2
Load Line 5 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-001M-SO	LL5ss-002M-DUP	LL5ss-002M-SO	LL5ss-003M-SO	LL5ss-004M-SO	LL5ss-005D-SO	LL5ss-005M-SO	LL5ss-006M-SO	LL5ss-007M-SO	LL5ss-008M-SO	LL5ss-009M-SO	LL5ss-010M-DUP	LL5ss-010M-SO	LL5ss-011M-SO	LL5ss-012D-SO
						Sample Date:	11/12/2004	11/12/2004	11/12/2004	11/12/2004	11/10/2004	11/19/2004	11/19/2004	11/12/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/12/2004	11/15/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units															
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**11000**	**11000**	**11000**	**11000**	**12000**		**18000**	**10000**	**10000**	7400	**11000**	**12000**	**13000**	**12000**	
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**12**	**12**	**14**	**9.6**	**12**		**4.3**	**10**	**9.2**	**5.5**	**11**	**11**	**11**	**11**	
	6010B	Barium	538	nc	88.4	mg/kg	99	53	50	71	81		220	61	94	40	54	68	62	64	
	6010B	Beryllium	15	nc	0.88	mg/kg	0.82	0.78	0.69	0.75	0.74		4.2	0.65	1	0.54	0.64	0.66	0.68	0.69	
	6010B	Cadmium	3.7	nc	0.00	mg/kg	2.9	0.32	0.37	0.36	0.73		1.9	0.19	0.42		0.79	0.92	0.64	0.45	
	6010B	Calcium	--[n]		15800	mg/kg	5900	5800	4700	7800	2700		140000	2200	43000	840	1900	2000	2100	1800	
	6010B	Chromium	30	ca	17.4	mg/kg	**33**	21	22	17	20		**34**	20	27	18	24	19	19	21	
	6010B	Cobalt	30	ca	10.4	mg/kg	7.2	6.6	6.5	6	8.8		1.9	8.6	6.2	6	7.4	8.8	7.7	7.6	
	6010B	Copper	313	nc	17.7	mg/kg	49	19	19	16	21		19	14	17	9.7	18	20	18	16	
	6010B	Iron	2346	nc	23100	mg/kg	**23000**	**22000**	**21000**	**18000**	**23000**		**11000**	**20000**	**19000**	**17000**	**22000**	**23000**	**22000**	**21000**	
	6010B	Lead	400	pbk	26.1	mg/kg	99	26	25	38	63		170	40	40	17	110	56	54	67	
	6010B	Magnesium	--[n]		3030	mg/kg	3000	3000	2800	2500	2400		16000	2100	4000	1500	2400	2600	2600	2200	
	6010B	Manganese	176	nc	1450	mg/kg	**500**	**380**	**330**	**510**	**800**		**3100**	**650**	**740**	**470**	**380**	**500**	**450**	**430**	
	6010B	Nickel	156	nc	21.1	mg/kg	26	19	19	15	18		13	17	18	12	19	17	17	16	
	6010B	Potassium	--[n]		927	mg/kg	930	1200	1200	1100	1100		1600	790	1100	760	830	1100	1200	1100	
	6010B	Selenium	39	nc	1.4	mg/kg	0.78	0.69	0.54	0.47	0.65		1.8	0.76	0.67	0.6	0.57	0.71	0.77	0.77	
	6010B	Sodium	--[n]		123	mg/kg	290	280	260	270	280		970	230	280	260	230	300	330	280	
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**20**	**19**	**18**	**20**	**23**		**12**	**20**	**18**	**14**	**20**	**23**	**25**	**23**	
	6010B	Zinc	2346	nc	61.8	mg/kg	130	77	78	74	100		140	68	76	68	91	74	72	87	
	7041	Antimony	3.1	nc	0.96	mg/kg													0.46	0.43	
	7841	Thallium	0.52	nc	0.00	mg/kg										0.21					
PCBs	8082	Aroclor 1254	0.22	ca	--	mg/kg							0.038								
SVOCs	8270C	2-Methylnaphthalene	--		--	mg/kg							0.11								
	8270C	Acenaphthene	368	nc	--	mg/kg															
	8270C	Acenaphthylene	--		--	mg/kg							0.016 J								
	8270C	Anthracene	2189	nc	--	mg/kg							0.031 J								
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg							0.12								
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg							**0.15**								
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg							0.19								
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg							0.097								
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg							0.098								
	8270C	Benzyl alcohol	1833	nc	--	mg/kg							1.3								
	8270C	Carbazole	24	ca	--	mg/kg							0.017 J								
	8270C	Chrysene	62	ca	--	mg/kg							0.15								
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg							0.024 J								
	8270C	Dibenzofuran	15	nc	--	mg/kg							0.039 J								
	8270C	Fluoranthene	229	nc	--	mg/kg							0.23								
	8270C	Fluorene	275	nc	--	mg/kg							0.018 J								
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg							0.09								
	8270C	Isophorone	512	ca	--	mg/kg															
	8270C	Naphthalene	5.6	nc	--	mg/kg							0.095								
	8270C	Phenanthrene	--		--	mg/kg							0.18								
	8270C	Phenol	1833	nc	--	mg/kg															
	8270C	Pyrene	232	nc	--	mg/kg							0 17								

Table LL5-2
Load Line 5 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-001M-SO	LL5ss-002M-DUP	LL5ss-002M-SO	LL5ss-003M-SO	LL5ss-004M-SO	LL5ss-005D-SO	LL5ss-005M-SO	LL5ss-006M-SO	LL5ss-007M-SO	LL5ss-008M-SO	LL5ss-009M-SO	LL5ss-010M-DUP	LL5ss-010M-SO	LL5ss-011M-SO	LL5ss-012D-SO
					Sample Date:	11/12/2004	11/12/2004	11/12/2004	11/12/2004	11/10/2004	11/19/2004	11/19/2004	11/12/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/12/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units															
Explosives	8330	4-Nitrotoluene	12 ca	--	mg/kg															

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

Table LL5-2
Load Line 5 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-012M-SO	LL5ss-013M-SO	LL5ss-014M-SO	LL5ss-015M-SO	LL5ss-016M-QA	LL5ss-016M-SO	LL5ss-017M-SO	LL5ss-018D-SO	LL5ss-018M-SO	LL5ss-019M-SO	LL5ss-020M-DUP	LL5ss-020M-SO	LL5ss-021M-DUP	LL5ss-021M-SO	LL5ss-022M-SO
						Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units															
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**11000**	**8300**	**8300**	**8000**	**10000**	**11000**	**11000**		**12000**	**13000**	**11000**	**12000**	**13000**	**13000**	**12000**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**11**	**8.4**	**10**	**8.5**	**9.2**	**9.3**	**9.6**		**12**	**12**	**12**	**12**	**12**	**11**	**13**
	6010B	Barium	538	nc	88.4	mg/kg	57	83	52	51	67	69	66		82	95	76	74	80	77	90
	6010B	Beryllium	15	nc	0.88	mg/kg	0.64	0.83	0.63	0.65	0.8	0.91	0.94		0.82	0.85	0.79	0.78	0.84	0.8	0.86
	6010B	Cadmium	3.7	nc	0.00	mg/kg	0.15	0.43	0.29	0.21	0.41	0.44	0.46		0.51	3	1.1	1.2	0.12	0.081	0.91
	6010B	Calcium	--[n]		15800	mg/kg	3700	66000	3900	3600	17000	16000	9200		2400	9000	18000	19000	13000	14000	3800 J
	6010B	Chromium	30	ca	17.4	mg/kg	19	16	16	15	19	21	18		19	21	21	19	20	20	20
	6010B	Cobalt	30	ca	10.4	mg/kg	7.3	6	6.8	7.5	5.4	5.1	8.9		11	9.7	11	10	12	11	11
	6010B	Copper	313	nc	17.7	mg/kg	22	14	17	15	16	16	17		20	23	21	21	21	20	24
	6010B	Iron	2346	nc	23100	mg/kg	**21000**	**16000**	**18000**	**19000**	**19000**	**18000**	**21000**		**24000**	**24000**	**24000**	**23000**	**25000**	**24000**	**24000**
	6010B	Lead	400	pbk	26.1	mg/kg	56	38	28	32	31	32	39		23	67	35	36	17	17	21
	6010B	Magnesium	--[n]		3030	mg/kg	2700	3500	2100	1800	2600	3200	3300		2900	3400	5200	5400	5300	5100	3100
	6010B	Manganese	176	nc	1450	mg/kg	**410**	**660**	**460**	**670**	**410**	**450**	**660**		**410**	**410**	**380**	**380**	**400**	**380**	**400**
	6010B	Nickel	156	nc	21.1	mg/kg	17	16	15	15	15	15	16		24	25	30	28	29	27	28
	6010B	Potassium	--[n]		927	mg/kg	1100	1200	730	710	840	820	970		1400	1800	1700	2100	2000	2100	1700 J
	6010B	Selenium	39	nc	1.4	mg/kg	0.88	0.72	0.63	0.65	0.69	0.79	0.79			0.7			0.5		0.52
	6010B	Sodium	--[n]		123	mg/kg	290	240	220	220	260	270	280		300	330	280	420	300	310	340
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**21**	**14**	**15**	**16**	**17**	**17**	**18**		**22**	**22**	**19**	**21**	**22**	**22**	**21**
	6010B	Zinc	2346	nc	61.8	mg/kg	78	66	69	77	75	73	76		120	91	81	79	75	72	130
	7041	Antimony	3.1	nc	0.96	mg/kg															
	7841	Thallium	0.52	nc	0.00	mg/kg				0.23			0.28					0.26			
PCBs	8082	Aroclor 1254	0.22	ca	--	mg/kg															
SVOCs	8270C	2-Methylnaphthalene	--		--	mg/kg															
	8270C	Acenaphthene	368	nc	--	mg/kg	0.021 J								0.026 J						
	8270C	Acenaphthylene	--		--	mg/kg															
	8270C	Anthracene	2189	nc	--	mg/kg	0.056														
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg	0.19								0.025 J						
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg	**0.15**								0.033						
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg	0.19								0.053						
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg	0.089								0.026 J						
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg	0.11								0.025 J						
	8270C	Benzyl alcohol	1833	nc	--	mg/kg									0.46 J						
	8270C	Carbazole	24	ca	--	mg/kg	0.038 J														
	8270C	Chrysene	62	ca	--	mg/kg	0.22								0.041						
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg	0.019 J														
	8270C	Dibenzofuran	15	nc	--	mg/kg									0.0099 J						
	8270C	Fluoranthene	229	nc	--	mg/kg	0.42								0.065						
	8270C	Fluorene	275	nc	--	mg/kg	0.014 J														
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg	0.072								0.025 J						
	8270C	Isophorone	512	ca	--	mg/kg															
	8270C	Naphthalene	5.6	nc	--	mg/kg									0.02 J						
	8270C	Phenanthrene	--		--	mg/kg	0.2								0.04 J						
	8270C	Phenol	1833	nc	--	mg/kg									0.046 J						
	8270C	Pyrene	232	nc	--	mg/kg	0 36								0 046 J						

Table LL5-2
Load Line 5 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-012M-SO	LL5ss-013M-SO	LL5ss-014M-SO	LL5ss-015M-SO	LL5ss-016M-QA	LL5ss-016M-SO	LL5ss-017M-SO	LL5ss-018D-SO	LL5ss-018M-SO	LL5ss-019M-SO	LL5ss-020M-DUP	LL5ss-020M-SO	LL5ss-021M-DUP	LL5ss-021M-SO	LL5ss-022M-SO
					Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units															
Explosives	8330	4-Nitrotoluene	12 ca	--	mg/kg														0.066 J	

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

Table LL5-2
Load Line 5 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-023M-SO	LL5ss-024M-SO	LL5ss-025M-SO	LL5ss-026M-QA	LL5ss-026M-SO	LL5ss-027M-SO	LL5ss-028M-SO	LL5ss-029M-SO
					Sample Date:	11/15/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
Metals	6010B	Aluminum	7614 nc	17700	mg/kg	**13000**	**13000**	**13000**	**10000**	**10000**	**12000**	**13000**	**11000**
	6010B	Arsenic	0.39 ca	15.4	mg/kg	**13**	**14**	**11**	**9.4**	**10**	**13**	**13**	**14**
	6010B	Barium	538 nc	88.4	mg/kg	59	79	95	52	47	61	100	72
	6010B	Beryllium	15 nc	0.88	mg/kg	0.73	0.8	0.89	0.59	0.59	0.75	0.99	0.82
	6010B	Cadmium	3.7 nc	0.00	mg/kg	0.084	0.092	0.46	0.12			0.18	
	6010B	Calcium	--[n]	15800	mg/kg	11000	860	8200	3300	3100	2800	4700	1700
	6010B	Chromium	30 ca	17.4	mg/kg	19	22	19	22	22	21	21	23
	6010B	Cobalt	30 ca	10.4	mg/kg	9.1	10	9.4	6.4	5.9	9.4	13	13
	6010B	Copper	313 nc	17.7	mg/kg	20	22	20	15	15	19	21	14
	6010B	Iron	2346 nc	23100	mg/kg	**26000**	**26000**	**23000**	**21000**	**22000**	**25000**	**26000**	**25000**
	6010B	Lead	400 pbk	26.1	mg/kg	19	18	20	22	21	18	21	20
	6010B	Magnesium	--[n]	3030	mg/kg	3300	3200	3300	2000	2200	3100	4600	2400
	6010B	Manganese	176 nc	1450	mg/kg	**300**	**240**	**440**	**400**	**270**	**450**	**390**	**940**
	6010B	Nickel	156 nc	21.1	mg/kg	20	24	25	16	17	23	33	21
	6010B	Potassium	--[n]	927	mg/kg	1300	1700	1600	790	870	1100	1700	980
	6010B	Selenium	39 nc	1.4	mg/kg	0.76	0.6	0.72	0.92	0.58	0.61		0.84
	6010B	Sodium	--[n]	123	mg/kg	310	340	360	220	240	250	280	240
	6010B	Vanadium	7.8 nc	31.1	mg/kg	**22**	**22**	**21**	**19**	**20**	**22**	**22**	**23**
	6010B	Zinc	2346 nc	61.8	mg/kg	70	65	100	120	110	62	71	76
	7041	Antimony	3.1 nc	0.96	mg/kg								
	7841	Thallium	0.52 nc	0.00	mg/kg								0.24
PCBs	8082	Aroclor 1254	0.22 ca	--	mg/kg								
SVOCs	8270C	2-Methylnaphthalene	--	--	mg/kg								
	8270C	Acenaphthene	368 nc	--	mg/kg								
	8270C	Acenaphthylene	--	--	mg/kg								
	8270C	Anthracene	2189 nc	--	mg/kg								
	8270C	Benzo(a)anthracene	0.62 ca	--	mg/kg								
	8270C	Benzo(a)pyrene	0.062 ca	--	mg/kg								
	8270C	Benzo(b)fluoranthene	0.62 ca	--	mg/kg								
	8270C	Benzo(g,h,i)perylene	--	--	mg/kg								
	8270C	Benzo(k)fluoranthene	6.2 ca	--	mg/kg								
	8270C	Benzyl alcohol	1833 nc	--	mg/kg								
	8270C	Carbazole	24 ca	--	mg/kg								
	8270C	Chrysene	62 ca	--	mg/kg								
	8270C	Dibenzo(a,h)anthracene	0.062 ca	--	mg/kg								
	8270C	Dibenzofuran	15 nc	--	mg/kg								
	8270C	Fluoranthene	229 nc	--	mg/kg								
	8270C	Fluorene	275 nc	--	mg/kg								
	8270C	Indeno(1,2,3-cd)pyrene	0.62 ca	--	mg/kg								
	8270C	Isophorone	512 ca	--	mg/kg								
	8270C	Naphthalene	5.6 nc	--	mg/kg								
	8270C	Phenanthrene	--	--	mg/kg								
	8270C	Phenol	1833 nc	--	mg/kg								
	8270C	Pyrene	232 nc	--	mg/kg								

Table LL5-2
Load Line 5 Summary of Surface Soil (0-1 ft) Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-023M-SO	LL5ss-024M-SO	LL5ss-025M-SO	LL5ss-026M-QA	LL5ss-026M-SO	LL5ss-027M-SO	LL5ss-028M-SO	LL5ss-029M-SO
					Sample Date:	11/15/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units								
Explosives	8330	4-Nitrotoluene	12 ca	--	mg/kg								

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

Table LL5-3
Load Line 5 Summary of Sediment Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sd-002-DUP	LL5sd-002-SD	LL5sd-013-SD
					Sample Date:	12/10/2004	12/10/2004	11/18/2004
					Sample Depth:	8 ft	8 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Sediment Background Criteria	Units			
Metals	6010B	Aluminum	7614 nc	13900	mg/kg	**9100**	**9900 J**	4600
	6010B	Arsenic	0.39 ca	19.5	mg/kg	**14**	**14**	**180**
	6010B	Barium	538 nc	123	mg/kg	72	73	220
	6010B	Beryllium	15 nc	0.38	mg/kg	0.63	0.68	0.68
	6010B	Cadmium	3.7 nc	0.00	mg/kg	1.6	1.9 J	**6.4**
	6010B	Calcium	--[n]	5510	mg/kg	3900	5400 J	14000
	6010B	Chromium	30 ca	18.1	mg/kg	19	20 J	**130**
	6010B	Cobalt	30 ca	9.1	mg/kg	9	9.4	8.1
	6010B	Copper	313 nc	27.6	mg/kg	59	44 J	**340**
	6010B	Iron	2346 nc	28200	mg/kg	**43000**	**39000 J**	**100000**
	6010B	Lead	400 pbk	27.4	mg/kg	36	35 J	**1500**
	6010B	Magnesium	--[n]	2760	mg/kg	2700	3200 J	1900
	6010B	Manganese	176 nc	1950	mg/kg	**530**	**510 J**	**1000**
	6010B	Nickel	156 nc	17.7	mg/kg	23	24	33
	6010B	Potassium	--[n]	1950	mg/kg	1500	1700 J	1000
	6010B	Selenium	39 nc	1.7	mg/kg			2.5
	6010B	Sodium	--[n]	112	mg/kg	280	300	730
	6010B	Vanadium	7.8 nc	26.1	mg/kg	**29**	**32**	**16**
	6010B	Zinc	2346 nc	532	mg/kg	140	150 J	1700
	7471A	Mercury	2.3 nc	0.06	mg/kg	0.29	0.2	1.9
	7041	Antimony	3.1 nc	0.00	mg/kg			3.1

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

Table LL5-4
Load Line 5 Summary of Surface Water Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sw-007-DUP	LL5sw-007-SW	LL5sw-008-SW	LL5sw-009-SW	LL5sw-010-SW	LL5sw-011-DUP	LL5sw-011-SW	LL5sw-012-SW
					Sample Date:	12/6/2004	12/6/2004	12/6/2004	12/7/2004	12/7/2004	11/18/2004	11/18/2004	11/18/2004
					Sample Depth:	13.31 ft.	13.31 ft.	5.38 ft.	13.2 ft.	11.3 ft.	surface	surface	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units								
Metals	6010B	Aluminum	36499 nc	3370	ug/l	430	620	730	730	1900			
	6010B	Arsenic	0.045 ca	3.2	ug/l								
	6010B	Barium	2555 nc	47.5	ug/l	25	28 J	25	27	34	25	25	13
	6010B	Cadmium	18 nc	0.00	ug/l						0.31	0.28	0.33
	6010B	Calcium	--[n]	41400	ug/l	32000	33000	38000	38000	38000	41000	42000	22000
	6010B	Chromium	109 nc	0.00	ug/l	1.2	1.2		1.4	2.9			
	6010B	Copper	1460 nc	7.9	ug/l					3.2	2.7	2.2	2.2
	6010B	Iron	10950 nc	2560	ug/l	350	530	750	990	2700	46	46	
	6010B	Magnesium	--[n]	10800	ug/l	1600	1800	3300	3500	5500	6400	6500	5400
	6010B	Manganese	876 nc	391	ug/l	41	63	9.2	12	75	3.4	3.6	5.5
	6010B	Nickel	730 nc	0.00	ug/l					1.6			
	6010B	Potassium	--[n]	3170	ug/l	1100	1100	1400	1400	1800	27000	28000	16000
	6010B	Selenium	182 nc	0.00	ug/l	3.6							
	6010B	Sodium	--[n]	21300	ug/l	560		810	570	1300	4100	4200	3600
	6010B	Vanadium	36 nc	0.00	ug/l	1.4	1.4	1.5	1.1	3			
	6010B	Zinc	10950 nc	42	ug/l	3.6	4.4	6.6			79	81	24
	7060A	Arsenic	0.045 ca	3.2	ug/l					**1.2**			
	7421	Lead	15 mcl	0.00	ug/l						0.98	0.89	
	7470A	Mercury	11 nc	0.00	ug/l					0.064			
SVOCs	8270C	1,3-Dichlorobenzene	182 nc	--	ug/l					0.44 J			
	8270C	Benzo(a)anthracene	0.092 ca	--	ug/l	**0.17 J**		**0.12 J**					
	8270C	Benzo(a)pyrene	0.0092 ca	--	ug/l	**0.25 J**							
	8270C	Benzo(b)fluoranthene	0.092 ca	--	ug/l	**0.18 J**							
	8270C	Benzo(g,h,i)perylene	--	--	ug/l	0.32 J							
	8270C	Benzo(k)fluoranthene	0.92 ca	--	ug/l	0.36 J		0.2 J					
	8270C	Bis(2-ethylhexyl) phthalate	4.8 ca	--	ug/l	**12 J**			**10 J**		**5.3 J**		
	8270C	Chrysene	9.2 ca	--	ug/l	0.23 J		0.17 J					
	8270C	Dibenzo(a,h)anthracene	0.0092 ca	--	ug/l	**0.31 J**							
	8270C	Indeno(1,2,3-cd)pyrene	0.092 ca	--	ug/l	**0.29 J**		**0.2 J**					
	8270C	Pyrene	182 nc	--	ug/l	0.14 J							
Propellants	8332	Nitroglycerine	4.8 ca	--	ug/l			0.21 J					
Other Analytes	353.2	Nitrate as N (NO3-N)	10000	--	ug/l	1600000	2600000	2500000	160	110	280	270	85

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analyte was a non-detect (with a "U" qualifier) or analysis was not performed
ug/l - means micrograms per Liter (parts per billion - ppb)
PRG - preliminary remediation goals
nc - non-cancer basis
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
U - analyte not detected
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 LL5-5
Load Line 5 Summary of Groundwater Detections
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5mw-001-GW	LL5mw-002-GW	LL5mw-003-GW	LL5mw-004-DUP	LL5mw-004-GW	LL5mw-005-GW	LL5mw-006-GW
						Sample Date:	1/4/2005	1/18/2005	1/18/2005	1/4/2005	1/4/2005	1/4/2005	1/3/2005
						Sample Depth:	22 ft	22 ft	18 ft	21 ft	21 ft	24 ft	17.53 ft
						Description	UC/Filtered	C/Filtered	UC/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						40	
	6010B	Barium	2555 nc	82.1	256	ug/l	50	49	18	25	25	16	24
	6010B	Calcium	--[n]	115000	53100	ug/l	58000	67000	100000	69000	71000	67000	70000
	6010B	Cobalt	730 nc	0.00	0.00	ug/l	0.86	4.2					
	6010B	Copper	1460 nc	0.00	0.00	ug/l			2.7				2.8
	6010B	Iron	10950 nc	279	1430	ug/l		170				66	
	6010B	Magnesium	--[n]	43300	15000	ug/l	23000	21000	23000	30000	31000	24000	29000
	6010B	Manganese	876 nc	1020	1340	ug/l	840	180	1.7	8.5	6.6	**2000**	10
	6010B	Nickel	730 nc	0.00	83.4	ug/l	2.2	11				1.9	
	6010B	Potassium	--[n]	2890	5770	ug/l	3800	2200				5400	480
	6010B	Selenium	182 nc	0.00	0.00	ug/l			3.3				
	6010B	Sodium	--[n]	45700	51400	ug/l	6700	7600	4300	3600	3700	8500	3400
	6010B	Vanadium	36 nc	0.00	0.00	ug/l							1
	6010B	Zinc	10950 nc	60.9	52.3	ug/l		3.4	10				30
	7041	Antimony	15 nc	0.00	0.00	ug/l	4.1					3.3	3.9
	7060A	Arsenic	0.045 ca	11.7	0.00	ug/l		2.3					
	7421	Lead	15 mcl	0.00	0.00	ug/l	1.2						
Other Analytes	353.2	Nitrate as N (NO3-N)	10000 nc	--	--	ug/l	120	0	0	59	58	0	67

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analyte was a non-detect (with a "U" qualifier) or analysis was not performed
ug/l - means micrograms per Liter (parts per billion - ppb)
PRG - preliminary remediation goals
nc - non-cancer basis
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
UC/Filtered – GW sample was filtered for metals and taken from an unconsolidated MW
C/Filtered – GW sample was filtered for metals and taken from a consolidated (bedrock) MW
[n] - nutrient
U - analyte not detected
J - estimated value
If Result = or > Background, then the value is presented with a shaded/highlighted style
If Result = or > Background & PRG, then result is presented with a bold + shaded/highlighted style
If Result = or > PRG, then the value is presented with a bold style
If Result < PRG & Background, then the value is presented with a normal style

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-001M-SO	LL5ss-002M-DUP	LL5ss-002M-SO	LL5ss-003M-SO	LL5ss-004M-SO	LL5ss-005D-SO	LL5ss-005M-SO	LL5ss-006M-SO	LL5ss-007M-SO	LL5ss-008M-SO	LL5ss-009M-SO	LL5ss-010M-DUP	LL5ss-010M-SO	LL5ss-011M-SO	LL5ss-012D-SO	LL5ss-012M-SO	LL5ss-013M-SO
						Sample Date:	11/12/2004	11/12/2004	11/12/2004	11/12/2004	11/10/2004	11/19/2004	11/19/2004	11/12/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																	
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**11000**	**11000**	**11000**	**11000**	**12000**		**18000**	**10000**	**10000**	7400	**11000**	**12000**	**13000**	**12000**		**11000**	**8300**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**12**	**12**	**14**	**9.6**	**12**		**4.3**	**10**	**9.2**	**5.5**	**11**	**11**	**11**	**11**		**11**	**8.4**
	6010B	Barium	538	nc	88.4	mg/kg	99	53	50	71	81		220	61	94	40	54	68	62	64		57	83
	6010B	Beryllium	15	nc	0.88	mg/kg	0.82	0.78	0.69	0.75	0.74		4.2	0.65	1	0.54	0.64	0.66	0.68	0.69		0.64	0.83
	6010B	Cadmium	3.7	nc	0.00	mg/kg	2.9	0.32	0.37	0.36	0.73		1.9	0.12	0.42	0.12 U	0.79	0.92	0.64	0.45		0.15	0.43
	6010B	Calcium	--[n]		15800	mg/kg	5900	5800	4700	7800	2700		140000	2200	43000	840	1900	2000	2100	1800		3700	66000
	6010B	Chromium	30	ca	17.4	mg/kg	**33**	21	22	17	20		**34**	20	27	18	24	19	19	21		19	16
	6010B	Cobalt	30	ca	10.4	mg/kg	7.2	6.6	6.5	6	8.8		1.9	8.6	6.2	6	7.4	8.8	7.7	7.6		7.3	6
	6010B	Copper	313	nc	17.7	mg/kg	49	19	19	16	21		19	14	17	9.7	18	20	18	16		22	14
	6010B	Iron	2346	nc	23100	mg/kg	**23000**	**22000**	**21000**	**18000**	**23000**		**11000**	**20000**	**19000**	**17000**	**22000**	**23000**	**22000**	**21000**		**21000**	**16000**
	6010B	Lead	400	pbk	26.1	mg/kg	99	26	25	38	63		170	40	40	17	110	56	54	67		56	38
	6010B	Magnesium	--[n]		3030	mg/kg	3000	3000	2800	2500	2400		16000	2100	4000	1500	2400	2600	2600	2200		2700	3300
	6010B	Manganese	176	nc	1450	mg/kg	**500**	**380**	**330**	**510**	**800**		**3100**	**650**	**740**	**470**	**380**	**500**	**450**	**430**		**410**	**660**
	6010B	Nickel	156	nc	21.1	mg/kg	26	19	19	15	18		13	17	18	12	19	17	17	16		17	16
	6010B	Potassium	--[n]		927	mg/kg	930	1200	1200	1100	1100		1600	790	1100	760	830	1100	1200	1100		1100	1200
	6010B	Selenium	39	nc	1.4	mg/kg	0.78	0.69	0.54	0.47	0.65		1.8	0.76	0.67	0.6	0.57	0.71	0.77	0.77		0.88	0.72
	6010B	Silver	39	nc	0.00	mg/kg	0.49 U	0.485 U	0.485 U	0.46 U	0.47 U		0.485 U	0.48 U	0.485 U	0.475 U	0.5 U	0.48 U	0.49 U	0.485 U		0.485 U	0.48 U
	6010B	Sodium	--[n]		123	mg/kg	290	280	260	270	280		970	230	280	260	230	300	330	280		290	240
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**20**	**19**	**18**	**20**	**23**		**12**	**20**	**18**	**14**	**20**	**23**	**25**	**23**		**21**	**14**
	6010B	Zinc	2346	nc	61.8	mg/kg	130	77	78	74	100		140	68	76	68	91	74	72	87		78	66
	7041	Antimony	3.1	nc	0.96	mg/kg	0.65 U	0.65 U	0.65 U	0.7 U	0.65 U		0.7 U	0.65 U	0.7 U	0.65 U	0.7 U	0.7 U	0.46	0.43		0.7 U	0.7 U
	7841	Thallium	0.52	nc	0.00	mg/kg	0.275 U	0.285 U	0.28 U	0.295 U	0.275 U		0.295 U	0.275 U	0.3 U	0.21	0.3 U	0.295 U	0.285 U	0.29 U		0.295 U	0.3 U
Pesticides	8081A	4,4'-DDD	2.4	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	4,4'-DDE	1.7	ca	--	mg/kg							0.00205 U									0.001 U	
	8081A	4,4'-DDT	1.7	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Aldrin	0.029	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	alpha-BHC	0.09	sat	--	mg/kg							0.0017 U									0.00085 U	
	8081A	alpha-Chlordane	1.6	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	beta-BHC	0.32	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	delta-BHC	--		--	mg/kg							0.0017 U									0.00085 U	
	8081A	Dieldrin	0.030	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Endosulfan I	37	nc	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Endosulfan II	37	nc	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Endosulfan sulfate	37	nc	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Endrin	1.8	nc	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Endrin aldehyde	--		--	mg/kg							0.0017 U									0.00085 U	
	8081A	Endrin ketone	--		--	mg/kg							0.0017 U									0.00085 U	
	8081A	gamma-BHC	0.44	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	gamma-Chlordane	1.6	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Heptachlor	0.11	ca	--	mg/kg							0.0017 U									0.00085 UJ	
	8081A	Heptachlor epoxide	0.053	ca	--	mg/kg							0.0017 U									0.00085 U	
	8081A	Methoxychlor	31	nc	--	mg/kg							0.0085 U									0.00415 U	
	8081A	Toxaphene	0.44	ca	--	mg/kg							0.017 U									0.0085 U	
PCBs	8082	Aroclor 1016	0.39	nc	--	mg/kg							0.0165 U									0.0165 U	
	8082	Aroclor 1221	0.22	ca	--	mg/kg							0.0165 U									0.0165 U	
	8082	Aroclor 1232	0.22	ca	--	mg/kg							0.0085 U									0.0085 U	
	8082	Aroclor 1242	0.22	ca	--	mg/kg							0.0165 U									0.0165 U	
	8082	Aroclor 1248	0.22	ca	--	mg/kg							0.0085 U									0.0085 U	
	8082	Aroclor 1254	0.22	ca	--	mg/kg							0.038									0.0165 U	
	8082	Aroclor 1260	0.22	ca	--	mg/kg							0.0165 U									0.0165 U	
VOCs	8260B	1,1,1-Trichloroethane	1200	sat	--	mg/kg						0.00425 U									0.0032 U		

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-001M-SO	LL5ss-002M-DUP	LL5ss-002M-SO	LL5ss-003M-SO	LL5ss-004M-SO	LL5ss-005D-SO	LL5ss-005M-SO	LL5ss-006M-SO	LL5ss-007M-SO	LL5ss-008M-SO	LL5ss-009M-SO	LL5ss-010M-DUP	LL5ss-010M-SO	LL5ss-011M-SO	LL5ss-012D-SO	LL5ss-012M-SO	LL5ss-013M-SO
					Sample Date:	11/12/2004	11/12/2004	11/12/2004	11/12/2004	11/10/2004	11/19/2004	11/19/2004	11/12/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																	
	8260B	1,1,2,2-Tetrachloroethane	0.41	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	1,1,2-Trichloroethane	0.73	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	1,1-Dichloroethane	51	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	1,1-Dichloroethene	12	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	1,2-Dibromoethane	0.032	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	1,2-Dichloroethane	0.28	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	1,2-Dichloroethene (total)	6.9	nc	--	mg/kg						0.0085 U								0.0065 U		
	8260B	1,2-Dichloropropane	0.34	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	2-Butanone	2231	nc	--	mg/kg						0.013 U								0.0095 U		
	8260B	2-Hexanone	530	nc	--	mg/kg						0.0085 U								0.0065 U		
	8260B	4-Methyl-2-pentanone	528	nc	--	mg/kg						0.0085 U								0.0065 U		
	8260B	Acetone	1412	nc	--	mg/kg						0.013 U								0.0095 U		
	8260B	Benzene	0.64	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Bromochloromethane	--		--	mg/kg						0.00425 U								0.0032 U		
	8260B	Bromodichloromethane	0.82	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Bromoform	62	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Bromomethane	0.39	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Carbon disulfide	36	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Carbon tetrachloride	0.25	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Chlorobenzene	15	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Chloroethane	3.0	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Chloroform	0.22	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Chloromethane	4.7	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	cis-1,2-Dichloroethene	4.3	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	cis-1,3-Dichloropropene	0.78	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Dibromochloromethane	1.1	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Ethylbenzene	395	sat	--	mg/kg						0.00425 U								0.0032 U		
	8260B	m&p-Xylenes	27	nc	--	mg/kg						0.0085 U								0.0065 U		
	8260B	Methylene chloride	9.1	ca	--	mg/kg						0.0085 U								0.0065 U		
	8260B	o-Xylene	27	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Styrene	1700	sat	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Tetrachloroethene	0.48	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Toluene	520	sat	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Total Xylenes	27	nc	--	mg/kg						0.0085 U								0.0065 U		
	8260B	trans-1,2-Dichloroethene	6.9	nc	--	mg/kg						0.00425 U								0.0032 U		
	8260B	trans-1,3-Dichloropropene	0.78	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Trichloroethene	0.053	ca	--	mg/kg						0.00425 U								0.0032 U		
	8260B	Vinyl chloride	0.079	ca	--	mg/kg						0.00425 U								0.0032 U		
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2	nc	--	mg/kg							0.08 U								0.085 U	
	8270C	1,2-Dichlorobenzene	600	sat	--	mg/kg							0.08 U								0.085 U	
	8270C	1,3-Dichlorobenzene	53	nc	--	mg/kg							0.08 U								0.085 U	
	8270C	1,4-Dichlorobenzene	3.4	ca	--	mg/kg							0.08 U								0.085 U	
	8270C	2,2-oxybis (1-chloropropane)	2.9	ca	--	mg/kg							0.08 U								0.085 U	
	8270C	2,4,5-Trichlorophenol	611	nc	--	mg/kg							0.16 U								0.17 U	
	8270C	2,4,6-Trichlorophenol	0.61	nc	--	mg/kg							0.08 U								0.085 U	
	8270C	2,4-Dichlorophenol	18	nc	--	mg/kg							0.16 U								0.17 U	
	8270C	2,4-Dimethylphenol	122	nc	--	mg/kg							0.16 U								0.17 U	
	8270C	2,4-Dinitrophenol	12	nc	--	mg/kg							- R								- R	
	8270C	2,4-Dinitrotoluene	12	nc	--	mg/kg							0.016 U								0.017 U	
	8270C	2,6-Dinitrotoluene	6.1	nc	--	mg/kg							0.016 U								0.017 U	
	8270C	2-Chloronaphthalene	494	nc	--	mg/kg							0.08 U								0.085 U	

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-001M-SO	LL5ss-002M-DUP	LL5ss-002M-SO	LL5ss-003M-SO	LL5ss-004M-SO	LL5ss-005D-SO	LL5ss-005M-SO	LL5ss-006M-SO	LL5ss-007M-SO	LL5ss-008M-SO	LL5ss-009M-SO	LL5ss-010M-DUP	LL5ss-010M-SO	LL5ss-011M-SO	LL5ss-012D-SO	LL5ss-012M-SO	LL5ss-013M-SO
					Sample Date:	11/12/2004	11/12/2004	11/12/2004	11/12/2004	11/10/2004	11/19/2004	11/19/2004	11/12/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																
	8270C	2-Chlorophenol	6.3	nc	--	mg/kg							0.08 U								0.085 U	
	8270C	2-Methylnaphthalene	--		--	mg/kg							0.11								0.017 U	
	8270C	2-Methylphenol	306	nc	--	mg/kg							0.0325 U								0.034 U	
	8270C	2-Nitroaniline	18.3	nc	--	mg/kg							0.08 U								0.085 U	
	8270C	2-Nitrophenol	--		--	mg/kg							0.16 U								0.17 U	
	8270C	3,3'-Dichlorobenzidine	1.1	ca	--	mg/kg							0.08 U								0.085 U	
	8270C	3-Nitroaniline	1.8	nc	--	mg/kg							0.325 U								0.34 U	
	8270C	4,6-Dinitro-2-methylphenol	0.61	nc	--	mg/kg							- R								- R	
	8270C	4-Bromophenyl phenyl ether	--		--	mg/kg							0.08 U								0.085 U	
	8270C	4-Chloro-3-methylphenol	--		--	mg/kg							0.16 U								0.17 U	
	8270C	4-Chloroaniline	24	nc	--	mg/kg							0.325 U								0.34 U	
	8270C	4-Chlorophenyl phenyl ether	--		--	mg/kg							0.08 U								0.085 U	
	8270C	4-Methylphenol	31	nc	--	mg/kg							0.0325 U								0.034 U	
	8270C	4-Nitroaniline	23	ca	--	mg/kg							0.325 U								0.34 U	
	8270C	4-Nitrophenol	--		--	mg/kg							0.325 U								0.34 U	
	8270C	Acenaphthene	368	nc	--	mg/kg							0.016 U								0.021 J	
	8270C	Acenaphthylene	--		--	mg/kg							0.016 J								0.017 U	
	8270C	Anthracene	2189	nc	--	mg/kg							0.031 J								0.056	
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg							0.12								0.19	
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg							**0.15**								**0.15**	
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg							0.19								0.19	
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg							0.097								0.089	
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg							0.098								0.11	
	8270C	Benzoic acid	100000	max	--	mg/kg							- R								- R	
	8270C	Benzyl alcohol	1833	nc	--	mg/kg							1.3								0.34 U	
	8270C	Bis(2-chloroethoxy)methane	--		--	mg/kg							0.0325 U								0.034 U	
	8270C	Bis(2-chloroethyl) ether	0.22	ca	--	mg/kg							0.0325 U								0.034 U	
	8270C	Bis(2-ethylhexyl) phthalate	35	ca	--	mg/kg							0.08 U								0.085 U	
	8270C	Butylbenzyl phthalate	1222	nc	--	mg/kg							0.0325 U								0.034 U	
	8270C	Carbazole	24	ca	--	mg/kg							0.017 J								0.038 J	
	8270C	Chrysene	62	ca	--	mg/kg							0.15								0.22	
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg							0.024 J								0.019 J	
	8270C	Dibenzofuran	15	nc	--	mg/kg							0.039 J								0.034 U	
	8270C	Diethyl phthalate	4888	nc	--	mg/kg							0.0325 U								0.034 U	
	8270C	Dimethyl phthalate	100000	max	--	mg/kg							0.0325 U								0.034 U	
	8270C	Di-n-butyl phthalate	611	nc	--	mg/kg							0.08 U								0.085 U	
	8270C	Di-n-octyl phthalate	244	nc	--	mg/kg							0.16 U								0.17 U	
	8270C	Fluoranthene	229	nc	--	mg/kg							0.23								0.42	
	8270C	Fluorene	275	nc	--	mg/kg							0.018 J								0.014 J	

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-001M-SO	LL5ss-002M-DUP	LL5ss-002M-SO	LL5ss-003M-SO	LL5ss-004M-SO	LL5ss-005D-SO	LL5ss-005M-SO	LL5ss-006M-SO	LL5ss-007M-SO	LL5ss-008M-SO	LL5ss-009M-SO	LL5ss-010M-DUP	LL5ss-010M-SO	LL5ss-011M-SO	LL5ss-012D-SO	LL5ss-012M-SO	LL5ss-013M-SO
						Sample Date:	11/12/2004	11/12/2004	11/12/2004	11/12/2004	11/10/2004	11/19/2004	11/19/2004	11/12/2004	11/12/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004	11/12/2004	11/15/2004	11/15/2004	11/15/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																	
	8270C	Hexachlorobenzene	0.30	ca	--	mg/kg							0.016 U									0.017 U	
	8270C	Hexachlorobutadiene	6.2	ca	--	mg/kg							0.08 U									0.085 U	
	8270C	Hexachlorocyclopentadiene	37	nc	--	mg/kg							0.485 U									0.5 U	
	8270C	Hexachloroethane	35	ca	--	mg/kg							0.08 U									0.085 U	
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg							0.09									0.072	
	8270C	Isophorone	512	ca	--	mg/kg							0.08 U									0.085 U	
	8270C	Naphthalene	5.6	nc	--	mg/kg							0.095									0.017 U	
	8270C	Nitrobenzene	2	nc	--	mg/kg							0.016 U									0.017 U	
	8270C	n-Nitroso-di-n-propylamine	0.069	ca	--	mg/kg							0.0325 U									0.034 U	
	8270C	n-Nitrosodiphenylamine	99	ca	--	mg/kg							0.016 UJ									0.017 UJ	
	8270C	Pentachlorophenol	3.0	ca	--	mg/kg							0.16 U									0.17 U	
	8270C	Phenanthrene	--		--	mg/kg							0.18									0.2	
	8270C	Phenol	1833	nc	--	mg/kg							0.08 U									0.085 U	
	8270C	Pyrene	232	nc	--	mg/kg							0.17									0.36	
Explosives	8330	1,3,5-Trinitrobenzene	183	nc	--	mg/kg	0.05 U	0.049 U	0.05 U	0.0495 U	0.05 U		0.0495 U	0.0495 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U	0.05 U		0.0495 U	0.05 U
	8330	1,3-Dinitrobenzene	0.61	nc	--	mg/kg	0.05 U	0.049 U	0.05 U	0.0495 U	0.05 U		0.0495 U	0.0495 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U	0.05 U		0.0495 U	0.05 U
	8330	2,4,6-TNT	16	ca	--	mg/kg	0.05 U	0.049 U	0.05 U	0.0495 U	0.05 U		0.0495 U	0.0495 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U	0.05 U		0.0495 U	0.05 U
	8330	2,4-Dinitrotoluene	12	nc	--	mg/kg	0.05 U	0.049 U	0.05 U	0.0495 U	0.05 U		0.0495 U	0.0495 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U	0.05 U		0.0495 U	0.05 U
	8330	2,6-Dinitrotoluene	6.1	nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 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	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	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	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	0.1 U	0.1 U		0.1 U	0.1 U
	8330	4-Amino-2,6-Dinitrotoluene	--		--	mg/kg	0.15 U	0.145 U	0.15 U	0.15 U	0.15 U		0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U		0.15 U	0.15 U
	8330	4-Nitrotoluene	12	ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	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		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	Nitrobenzene	2	nc	--	mg/kg	0.05 U	0.049 U	0.05 U	0.0495 U	0.05 U		0.0495 U	0.0495 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U	0.05 U		0.0495 U	0.05 U
	8330	RDX	4.4	ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 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	Tetryl	61	nc	--	mg/kg	0.2 U	0.195 U	0.2 U	0.2 U	0.2 U		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U		0.195 U	0.2 U
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg							1.1 U									0.5 U	
	8332	Nitroglycerine	35	ca	--	mg/kg							0.25 U									0.25 U	
	SW8330 Modified	Nitroguanidine	611	nc	--	mg/kg							0.125 U									0.125 U	

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

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-014M-SO	LL5ss-015M-SO	LL5ss-016M-QA	LL5ss-016M-SO	LL5ss-017M-SO	LL5ss-018D-SO	LL5ss-018M-SO	LL5ss-019M-SO	LL5ss-020M-DUP	LL5ss-020M-SO	LL5ss-021M-DUP	LL5ss-021M-SO	LL5ss-022M-SO	LL5ss-023M-SO	LL5ss-024M-SO	LL5ss-025M-SO	LL5ss-026M-QA
						Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/12/2004	11/12/2004	11/15/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																	
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**8300**	**8000**	**10000**	**11000**	**11000**		**12000**	**13000**	**11000**	**12000**	**13000**	**13000**	**12000**	**13000**	**13000**	**13000**	**10000**
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**10**	**8.5**	**9.2**	**9.3**	**9.6**		**12**	**12**	**12**	**12**	**12**	**11**	**13**	**13**	**14**	**11**	**9.4**
	6010B	Barium	538	nc	88.4	mg/kg	52	51	67	69	66		82	95	76	74	80	77	90	59	79	95	52
	6010B	Beryllium	15	nc	0.88	mg/kg	0.63	0.65	0.8	0.91	0.94		0.82	0.85	0.79	0.78	0.84	0.8	0.86	0.73	0.8	0.89	0.59
	6010B	Cadmium	3.7	nc	0.00	mg/kg	0.29	0.21	0.41	0.44	0.46		0.51	3	1.1	1.2	0.12	0.081	0.91	0.084	0.092	0.46	0.12
	6010B	Calcium	--[n]		15800	mg/kg	3900	3600	17000	16000	9200		2400	9000	18000	19000	13000	14000	3800 J	11000	860	8200	3300
	6010B	Chromium	30	ca	17.4	mg/kg	16	15	19	21	18		19	21	21	19	20	20	20	19	22	19	22
	6010B	Cobalt	30	ca	10.4	mg/kg	6.8	7.5	5.4	5.1	8.9		11	9.7	11	10	12	11	11	9.1	10	9.4	6.4
	6010B	Copper	313	nc	17.7	mg/kg	17	15	16	16	17		20	23	21	21	21	20	24	20	22	20	15
	6010B	Iron	2346	nc	23100	mg/kg	**18000**	**19000**	**19000**	**18000**	**21000**		**24000**	**24000**	**24000**	**23000**	**25000**	**24000**	**24000**	**26000**	**26000**	**23000**	**21000**
	6010B	Lead	400	pbk	26.1	mg/kg	28	32	31	32	39		23	67	35	36	17	17	21	19	18	20	22
	6010B	Magnesium	--[n]		3030	mg/kg	2100	1800	2600	3200	3300		2900	3400	5200	5400	5300	5100	3100	3300	3200	3300	2000
	6010B	Manganese	176	nc	1450	mg/kg	**460**	**670**	**410**	**450**	**660**		**410**	**410**	**380**	**380**	**400**	**380**	**400**	**300**	**240**	**440**	**400**
	6010B	Nickel	156	nc	21.1	mg/kg	15	15	15	15	16		24	25	30	28	29	27	28	20	24	25	16
	6010B	Potassium	--[n]		927	mg/kg	730	710	840	820	970		1400	1800	1700	2100	2000	2100	1700 J	1300	1700	1600	790
	6010B	Selenium	39	nc	1.4	mg/kg	0.63	0.65	0.69	0.79	0.79		0.75 U	0.7	0.75 U	0.75 U	0.5	0.75 U	0.52	0.76	0.6	0.72	0.92
	6010B	Silver	39	nc	0.00	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.495 U		0.495 U	0.485 U	0.495 U	0.495 U	0.485 U	0.49 U	0.465 U	0.49 U	0.485 U	0.475 U	0.5 U
	6010B	Sodium	--[n]		123	mg/kg	220	220	260	270	280		300	330	280	420	300	310	340	310	340	360	220
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**15**	**16**	**17**	**17**	**18**		**22**	**22**	**19**	**21**	**22**	**22**	**21**	**22**	**22**	**21**	**19**
	6010B	Zinc	2346	nc	61.8	mg/kg	69	77	75	73	76		120	91	81	79	75	72	130	70	65	100	120
	7041	Antimony	3.1	nc	0.96	mg/kg	0.7 U	0.65 U	0.75 U	0.7 U	0.7 U		0.7 U	0.65 U	0.7 U	0.65 U	0.7 U	0.65 U	- R	0.7 U	0.65 U	0.7 U	0.75 U
	7841	Thallium	0.52	nc	0.00	mg/kg	0.3 U	0.25	0.31 U	0.31 U	0.28		0.3 U	0.285 U	0.295 U	0.26	0.3 U	0.29 U	0.28 U	0.305 U	0.275 U	0.29 U	0.32 U
Pesticides	8081A	4,4'-DDD	2.4	ca	--	mg/kg							0.00085 U										
	8081A	4,4'-DDE	1.7	ca	--	mg/kg							0.001 U										
	8081A	4,4'-DDT	1.7	ca	--	mg/kg							0.00085 U										
	8081A	Aldrin	0.029	ca	--	mg/kg							0.00085 U										
	8081A	alpha-BHC	0.09	sat	--	mg/kg							0.00085 U										
	8081A	alpha-Chlordane	1.6	ca	--	mg/kg							0.00085 U										
	8081A	beta-BHC	0.32	ca	--	mg/kg							0.00085 U										
	8081A	delta-BHC	--		--	mg/kg							0.00085 U										
	8081A	Dieldrin	0.030	ca	--	mg/kg							0.00085 U										
	8081A	Endosulfan I	37	nc	--	mg/kg							0.00085 U										
	8081A	Endosulfan II	37	nc	--	mg/kg							0.00085 U										
	8081A	Endosulfan sulfate	37	nc	--	mg/kg							0.00085 U										
	8081A	Endrin	1.8	nc	--	mg/kg							0.00085 U										
	8081A	Endrin aldehyde	--		--	mg/kg							0.00085 U										
	8081A	Endrin ketone	--		--	mg/kg							0.00085 U										
	8081A	gamma-BHC	0.44	ca	--	mg/kg							0.00085 U										
	8081A	gamma-Chlordane	1.6	ca	--	mg/kg							0.00085 U										
	8081A	Heptachlor	0.11	ca	--	mg/kg							0.00085 U										
	8081A	Heptachlor epoxide	0.053	ca	--	mg/kg							0.00085 U										
	8081A	Methoxychlor	31	nc	--	mg/kg							0.0041 U										
	8081A	Toxaphene	0.44	ca	--	mg/kg							0.0085 U										
PCBs	8082	Aroclor 1016	0.39	nc	--	mg/kg							0.0165 U										
	8082	Aroclor 1221	0.22	ca	--	mg/kg							0.0165 U										
	8082	Aroclor 1232	0.22	ca	--	mg/kg							0.0085 U										
	8082	Aroclor 1242	0.22	ca	--	mg/kg							0.0165 U										
	8082	Aroclor 1248	0.22	ca	--	mg/kg							0.0085 U										
	8082	Aroclor 1254	0.22	ca	--	mg/kg							0.0165 U										
	8082	Aroclor 1260	0.22	ca	--	mg/kg							0.0165 U										
VOCs	8260B	1,1,1-Trichloroethane	1200	sat	--	mg/kg						0.00325 U											

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-014M-SO	LL5ss-015M-SO	LL5ss-016M-QA	LL5ss-016M-SO	LL5ss-017M-SO	LL5ss-018D-SO	LL5ss-018M-SO	LL5ss-019M-SO	LL5ss-020M-DUP	LL5ss-020M-SO	LL5ss-021M-DUP	LL5ss-021M-SO	LL5ss-022M-SO	LL5ss-023M-SO	LL5ss-024M-SO	LL5ss-025M-SO	LL5ss-026M-QA
					Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/12/2004	11/12/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																	
	8260B	1,1,2,2-Tetrachloroethane	0.41	ca	--	mg/kg						0.00325 U											
	8260B	1,1,2-Trichloroethane	0.73	ca	--	mg/kg						0.00325 U											
	8260B	1,1-Dichloroethane	51	nc	--	mg/kg						0.00325 U											
	8260B	1,1-Dichloroethene	12	nc	--	mg/kg						0.00325 U											
	8260B	1,2-Dibromoethane	0.032	ca	--	mg/kg						0.00325 U											
	8260B	1,2-Dichloroethane	0.28	ca	--	mg/kg						0.00325 U											
	8260B	1,2-Dichloroethene (total)	6.9	nc	--	mg/kg						0.0065 U											
	8260B	1,2-Dichloropropane	0.34	ca	--	mg/kg						0.00325 U											
	8260B	2-Butanone	2231	nc	--	mg/kg						0.0095 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						0.0095 U											
	8260B	Benzene	0.64	ca	--	mg/kg						0.00325 U											
	8260B	Bromochloromethane	--		--	mg/kg						0.00325 U											
	8260B	Bromodichloromethane	0.82	ca	--	mg/kg						0.00325 U											
	8260B	Bromoform	62	ca	--	mg/kg						0.00325 U											
	8260B	Bromomethane	0.39	nc	--	mg/kg						0.00325 U											
	8260B	Carbon disulfide	36	nc	--	mg/kg						0.00325 U											
	8260B	Carbon tetrachloride	0.25	ca	--	mg/kg						0.00325 U											
	8260B	Chlorobenzene	15	nc	--	mg/kg						0.00325 U											
	8260B	Chloroethane	3.0	ca	--	mg/kg						0.00325 U											
	8260B	Chloroform	0.22	ca	--	mg/kg						0.00325 U											
	8260B	Chloromethane	4.7	nc	--	mg/kg						0.00325 U											
	8260B	cis-1,2-Dichloroethene	4.3	nc	--	mg/kg						0.00325 U											
	8260B	cis-1,3-Dichloropropene	0.78	ca	--	mg/kg						0.00325 U											
	8260B	Dibromochloromethane	1.1	ca	--	mg/kg						0.00325 U											
	8260B	Ethylbenzene	395	sat	--	mg/kg						0.00325 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						0.00325 U											
	8260B	Styrene	1700	sat	--	mg/kg						0.00325 U											
	8260B	Tetrachloroethene	0.48	ca	--	mg/kg						0.00325 U											
	8260B	Toluene	520	sat	--	mg/kg						0.00325 U											
	8260B	Total Xylenes	27	nc	--	mg/kg						0.0065 U											
	8260B	trans-1,2-Dichloroethene	6.9	nc	--	mg/kg						0.00325 U											
	8260B	trans-1,3-Dichloropropene	0.78	ca	--	mg/kg						0.00325 U											
	8260B	Trichloroethene	0.053	ca	--	mg/kg						0.00325 U											
	8260B	Vinyl chloride	0.079	ca	--	mg/kg						0.00325 U											
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2	nc	--	mg/kg							0.08 U										
	8270C	1,2-Dichlorobenzene	600	sat	--	mg/kg							0.08 U										
	8270C	1,3-Dichlorobenzene	53	nc	--	mg/kg							0.08 U										
	8270C	1,4-Dichlorobenzene	3.4	ca	--	mg/kg							0.08 U										
	8270C	2,2-oxybis (1-chloropropane)	2.9	ca	--	mg/kg							0.08 U										
	8270C	2,4,5-Trichlorophenol	611	nc	--	mg/kg							0.16 U										
	8270C	2,4,6-Trichlorophenol	0.61	nc	--	mg/kg							0.08 U										
	8270C	2,4-Dichlorophenol	18	nc	--	mg/kg							0.16 U										
	8270C	2,4-Dimethylphenol	122	nc	--	mg/kg							0.16 U										
	8270C	2,4-Dinitrophenol	12	nc	--	mg/kg							- R										
	8270C	2,4-Dinitrotoluene	12	nc	--	mg/kg							0.016 U										
	8270C	2,6-Dinitrotoluene	6.1	nc	--	mg/kg							0.016 U										
	8270C	2-Chloronaphthalene	494	nc	--	mg/kg							0.08 U										

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-014M-SO	LL5ss-015M-SO	LL5ss-016M-QA	LL5ss-016M-SO	LL5ss-017M-SO	LL5ss-018D-SO	LL5ss-018M-SO	LL5ss-019M-SO	LL5ss-020M-DUP	LL5ss-020M-SO	LL5ss-021M-DUP	LL5ss-021M-SO	LL5ss-022M-SO	LL5ss-023M-SO	LL5ss-024M-SO	LL5ss-025M-SO	LL5ss-026M-QA
					Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/12/2004	11/12/2004	11/15/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																
	8270C	2-Chlorophenol	6.3	nc	--	mg/kg							0.08 U									
	8270C	2-Methylnaphthalene	--		--	mg/kg							0.026 J									
	8270C	2-Methylphenol	306	nc	--	mg/kg							0.0325 U									
	8270C	2-Nitroaniline	18.3	nc	--	mg/kg							0.08 U									
	8270C	2-Nitrophenol	--		--	mg/kg							0.16 U									
	8270C	3,3'-Dichlorobenzidine	1.1	ca	--	mg/kg							0.08 U									
	8270C	3-Nitroaniline	1.8	nc	--	mg/kg							0.325 U									
	8270C	4,6-Dinitro-2-methylphenol	0.61	nc	--	mg/kg							- R									
	8270C	4-Bromophenyl phenyl ether	--		--	mg/kg							0.08 U									
	8270C	4-Chloro-3-methylphenol	--		--	mg/kg							0.16 U									
	8270C	4-Chloroaniline	24	nc	--	mg/kg							0.325 U									
	8270C	4-Chlorophenyl phenyl ether	--		--	mg/kg							0.08 U									
	8270C	4-Methylphenol	31	nc	--	mg/kg							0.0325 U									
	8270C	4-Nitroaniline	23	ca	--	mg/kg							0.325 U									
	8270C	4-Nitrophenol	--		--	mg/kg							0.325 U									
	8270C	Acenaphthene	368	nc	--	mg/kg							0.016 U									
	8270C	Acenaphthylene	--		--	mg/kg							0.016 U									
	8270C	Anthracene	2189	nc	--	mg/kg							0.016 U									
	8270C	Benzo(a)anthracene	0.62	ca	--	mg/kg							0.025 J									
	8270C	Benzo(a)pyrene	0.062	ca	--	mg/kg							0.033									
	8270C	Benzo(b)fluoranthene	0.62	ca	--	mg/kg							0.053									
	8270C	Benzo(g,h,i)perylene	--		--	mg/kg							0.026 J									
	8270C	Benzo(k)fluoranthene	6.2	ca	--	mg/kg							0.025 J									
	8270C	Benzoic acid	100000	max	--	mg/kg							- R									
	8270C	Benzyl alcohol	1833	nc	--	mg/kg							0.46 J									
	8270C	Bis(2-chloroethoxy)methane	--		--	mg/kg							0.0325 U									
	8270C	Bis(2-chloroethyl) ether	0.22	ca	--	mg/kg							0.0325 U									
	8270C	Bis(2-ethylhexyl) phthalate	35	ca	--	mg/kg							0.08 U									
	8270C	Butylbenzyl phthalate	1222	nc	--	mg/kg							0.0325 U									
	8270C	Carbazole	24	ca	--	mg/kg							0.08 U									
	8270C	Chrysene	62	ca	--	mg/kg							0.041									
	8270C	Dibenzo(a,h)anthracene	0.062	ca	--	mg/kg							0.016 U									
	8270C	Dibenzofuran	15	nc	--	mg/kg							0.0099 J									
	8270C	Diethyl phthalate	4888	nc	--	mg/kg							0.0325 U									
	8270C	Dimethyl phthalate	100000	max	--	mg/kg							0.0325 U									
	8270C	Di-n-butyl phthalate	611	nc	--	mg/kg							0.08 U									
	8270C	Di-n-octyl phthalate	244	nc	--	mg/kg							0.16 U									
	8270C	Fluoranthene	229	nc	--	mg/kg							0.065									
	8270C	Fluorene	275	nc	--	mg/kg							0.016 U									

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-014M-SO	LL5ss-015M-SO	LL5ss-016M-QA	LL5ss-016M-SO	LL5ss-017M-SO	LL5ss-018D-SO	LL5ss-018M-SO	LL5ss-019M-SO	LL5ss-020M-DUP	LL5ss-020M-SO	LL5ss-021M-DUP	LL5ss-021M-SO	LL5ss-022M-SO	LL5ss-023M-SO	LL5ss-024M-SO	LL5ss-025M-SO	LL5ss-026M-QA
						Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004	11/12/2004	11/15/2004	11/12/2004	11/12/2004	11/15/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units																	
	8270C	Hexachlorobenzene	0.30	ca	--	mg/kg							0.016 U										
	8270C	Hexachlorobutadiene	6.2	ca	--	mg/kg							0.08 U										
	8270C	Hexachlorocyclopentadiene	37	nc	--	mg/kg							0.485 U										
	8270C	Hexachloroethane	35	ca	--	mg/kg							0.08 U										
	8270C	Indeno(1,2,3-cd)pyrene	0.62	ca	--	mg/kg							0.025 J										
	8270C	Isophorone	512	ca	--	mg/kg							0.08 U										
	8270C	Naphthalene	5.6	nc	--	mg/kg							0.02 J										
	8270C	Nitrobenzene	2	nc	--	mg/kg							0.016 U										
	8270C	n-Nitroso-di-n-propylamine	0.069	ca	--	mg/kg							0.0325 U										
	8270C	n-Nitrosodiphenylamine	99	ca	--	mg/kg							0.016 UJ										
	8270C	Pentachlorophenol	3.0	ca	--	mg/kg							0.16 U										
	8270C	Phenanthrene	--		--	mg/kg							0.04 J										
	8270C	Phenol	1833	nc	--	mg/kg							0.046 J										
	8270C	Pyrene	232	nc	--	mg/kg							0.046 J										
Explosives	8330	1,3,5-Trinitrobenzene	183	nc	--	mg/kg	0.05 U	0.05 U	0.0495 U	0.05 U	0.05 U		0.05 U	0.0495 U	0.05 U	0.05 U	0.049 U	0.049 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U
	8330	1,3-Dinitrobenzene	0.61	nc	--	mg/kg	0.05 U	0.05 U	0.0495 U	0.05 U	0.05 U		0.05 U	0.0495 U	0.05 U	0.05 U	0.049 U	0.049 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U
	8330	2,4,6-TNT	16	ca	--	mg/kg	0.05 U	0.05 U	0.0495 U	0.05 U	0.05 U		0.05 U	0.0495 U	0.05 U	0.05 U	0.049 U	0.049 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U
	8330	2,4-Dinitrotoluene	12	nc	--	mg/kg	0.05 U	0.05 U	0.0495 U	0.05 U	0.05 U		0.05 U	0.0495 U	0.05 U	0.05 U	0.049 U	0.049 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U
	8330	2,6-Dinitrotoluene	6.1	nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 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	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	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	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	4-Amino-2,6-Dinitrotoluene	--		--	mg/kg	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U		0.15 U	0.15 U	0.15 U	0.15 U	0.145 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	0.066 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	8330	HMX	306	nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	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	Nitrobenzene	2	nc	--	mg/kg	0.05 U	0.05 U	0.0495 U	0.05 U	0.05 U		0.05 U	0.0495 U	0.05 U	0.05 U	0.049 U	0.049 U	0.0495 U	0.05 U	0.0495 U	0.05 U	0.05 U
	8330	RDX	4.4	ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 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	Tetryl	61	nc	--	mg/kg	0.2 U	0.2 U	0.195 U	0.2 U	0.2 U		0.2 U	0.2 U	0.2 U	0.2 U	0.195 U	0.195 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Propellants	353.2 Modified	Nitrocellulose	--		--	mg/kg							0.75 U										
	8332	Nitroglycerine	35	ca	--	mg/kg							0.25 U										
	SW8330 Modified	Nitroguanidine	611	nc	--	mg/kg							0.125 U										

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

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5ss-026M-SO	LL5ss-027M-SO	LL5ss-028M-SO	LL5ss-029M-SO	LL5ss-030-DUP	LL5ss-030-SO
						Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004
						Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)		Surface Soil Background Criteria	Units						
Metals	6010B	Aluminum	7614	nc	17700	mg/kg	**10000**	**12000**	**13000**	**11000**		
	6010B	Arsenic	0.39	ca	15.4	mg/kg	**10**	**13**	**13**	**14**		
	6010B	Barium	538	nc	88.4	mg/kg	47	61	100	72		
	6010B	Beryllium	15	nc	0.88	mg/kg	0.59	0.75	0.99	0.82		
	6010B	Cadmium	3.7	nc	0.00	mg/kg	0.125 U	0.13 U	0.18	0.13 U		
	6010B	Calcium	--[n]		15800	mg/kg	3100	2800	4700	1700		
	6010B	Chromium	30	ca	17.4	mg/kg	22	21	21	23		
	6010B	Cobalt	30	ca	10.4	mg/kg	5.9	9.4	13	13		
	6010B	Copper	313	nc	17.7	mg/kg	15	19	21	14		
	6010B	Iron	2346	nc	23100	mg/kg	**22000**	**25000**	**26000**	**25000**		
	6010B	Lead	400	pbk	26.1	mg/kg	21	18	21	20		
	6010B	Magnesium	--[n]		3030	mg/kg	2200	3100	4600	2400		
	6010B	Manganese	176	nc	1450	mg/kg	**270**	**450**	**390**	**940**		
	6010B	Nickel	156	nc	21.1	mg/kg	17	23	33	21		
	6010B	Potassium	--[n]		927	mg/kg	870	1100	1700	980		
	6010B	Selenium	39	nc	1.4	mg/kg	0.58	0.61	0.75 U	0.84		
	6010B	Silver	39	nc	0.00	mg/kg	0.5 U	0.5 U	0.495 U	0.5 U		
	6010B	Sodium	--[n]		123	mg/kg	240	250	280	240		
	6010B	Vanadium	7.8	nc	31.1	mg/kg	**20**	**22**	**22**	**23**		
	6010B	Zinc	2346	nc	61.8	mg/kg	110	62	71	76		
	7041	Antimony	3.1	nc	0.96	mg/kg	0.7 U	0.65 U	0.7 U	0.7 U		
	7841	Thallium	0.52	nc	0.00	mg/kg	0.31 U	0.285 U	0.305 U	0.24		
Pesticides	8081A	4,4'-DDD	2.4	ca	--	mg/kg						
	8081A	4,4'-DDE	1.7	ca	--	mg/kg						
	8081A	4,4'-DDT	1.7	ca	--	mg/kg						
	8081A	Aldrin	0.029	ca	--	mg/kg						
	8081A	alpha-BHC	0.09	sat	--	mg/kg						
	8081A	alpha-Chlordane	1.6	ca	--	mg/kg						
	8081A	beta-BHC	0.32	ca	--	mg/kg						
	8081A	delta-BHC	--		--	mg/kg						
	8081A	Dieldrin	0.030	ca	--	mg/kg						
	8081A	Endosulfan I	37	nc	--	mg/kg						
	8081A	Endosulfan II	37	nc	--	mg/kg						
	8081A	Endosulfan sulfate	37	nc	--	mg/kg						
	8081A	Endrin	1.8	nc	--	mg/kg						
	8081A	Endrin aldehyde	--		--	mg/kg						
	8081A	Endrin ketone	--		--	mg/kg						
	8081A	gamma-BHC	0.44	ca	--	mg/kg						
	8081A	gamma-Chlordane	1.6	ca	--	mg/kg						
	8081A	Heptachlor	0.11	ca	--	mg/kg						
	8081A	Heptachlor epoxide	0.053	ca	--	mg/kg						
	8081A	Methoxychlor	31	nc	--	mg/kg						
	8081A	Toxaphene	0.44	ca	--	mg/kg						
PCBs	8082	Aroclor 1016	0.39	nc	--	mg/kg						
	8082	Aroclor 1221	0.22	ca	--	mg/kg						
	8082	Aroclor 1232	0.22	ca	--	mg/kg						
	8082	Aroclor 1242	0.22	ca	--	mg/kg						
	8082	Aroclor 1248	0.22	ca	--	mg/kg						
	8082	Aroclor 1254	0.22	ca	--	mg/kg						
	8082	Aroclor 1260	0.22	ca	--	mg/kg						
VOCs	8260B	1,1,1-Trichloroethane	1200	sat	--	mg/kg					0.0028 U	0.0028 U

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-026M-SO	LL5ss-027M-SO	LL5ss-028M-SO	LL5ss-029M-SO	LL5ss-030-DUP	LL5ss-030-SO
					Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units						
	8260B	1,1,2,2-Tetrachloroethane	0.41 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	1,1,2-Trichloroethane	0.73 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	1,1-Dichloroethane	51 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	1,1-Dichloroethene	12 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	1,2-Dibromoethane	0.032 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	1,2-Dichloroethane	0.28 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	1,2-Dichloroethene (total)	6.9 nc	--	mg/kg					0.0055 U	0.0055 U
	8260B	1,2-Dichloropropane	0.34 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	2-Butanone	2231 nc	--	mg/kg					0.0085 U	0.0085 U
	8260B	2-Hexanone	530 nc	--	mg/kg					0.0055 U	0.0055 U
	8260B	4-Methyl-2-pentanone	528 nc	--	mg/kg					0.0055 U	0.0055 U
	8260B	Acetone	1412 nc	--	mg/kg					0.0085 U	0.0085 U
	8260B	Benzene	0.64 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Bromochloromethane	--	--	mg/kg					0.0028 U	0.0028 U
	8260B	Bromodichloromethane	0.82 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Bromoform	62 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Bromomethane	0.39 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	Carbon disulfide	36 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	Carbon tetrachloride	0.25 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Chlorobenzene	15 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	Chloroethane	3.0 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Chloroform	0.22 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Chloromethane	4.7 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	cis-1,2-Dichloroethene	4.3 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	cis-1,3-Dichloropropene	0.78 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Dibromochloromethane	1.1 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Ethylbenzene	395 sat	--	mg/kg					0.0028 U	0.0028 U
	8260B	m&p-Xylenes	27 nc	--	mg/kg					0.0055 U	0.0055 U
	8260B	Methylene chloride	9.1 ca	--	mg/kg					0.0055 U	0.0055 U
	8260B	o-Xylene	27 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	Styrene	1700 sat	--	mg/kg					0.0028 U	0.0028 U
	8260B	Tetrachloroethene	0.48 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Toluene	520 sat	--	mg/kg					0.0028 U	0.0028 U
	8260B	Total Xylenes	27 nc	--	mg/kg					0.0055 U	0.0055 U
	8260B	trans-1,2-Dichloroethene	6.9 nc	--	mg/kg					0.0028 U	0.0028 U
	8260B	trans-1,3-Dichloropropene	0.78 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Trichloroethene	0.053 ca	--	mg/kg					0.0028 U	0.0028 U
	8260B	Vinyl chloride	0.079 ca	--	mg/kg					0.0028 U	0.0028 U
SVOCs	8270C	1,2,4-Trichlorobenzene	6.2 nc	--	mg/kg						
	8270C	1,2-Dichlorobenzene	600 sat	--	mg/kg						
	8270C	1,3-Dichlorobenzene	53 nc	--	mg/kg						
	8270C	1,4-Dichlorobenzene	3.4 ca	--	mg/kg						
	8270C	2,2-oxybis (1-chloropropane)	2.9 ca	--	mg/kg						
	8270C	2,4,5-Trichlorophenol	611 nc	--	mg/kg						
	8270C	2,4,6-Trichlorophenol	0.61 nc	--	mg/kg						
	8270C	2,4-Dichlorophenol	18 nc	--	mg/kg						
	8270C	2,4-Dimethylphenol	122 nc	--	mg/kg						
	8270C	2,4-Dinitrophenol	12 nc	--	mg/kg						
	8270C	2,4-Dinitrotoluene	12 nc	--	mg/kg						
	8270C	2,6-Dinitrotoluene	6.1 nc	--	mg/kg						
	8270C	2-Chloronaphthalene	494 nc	--	mg/kg						

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-026M-SO	LL5ss-027M-SO	LL5ss-028M-SO	LL5ss-029M-SO	LL5ss-030-DUP	LL5ss-030-SO
					Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units						
	8270C	2-Chlorophenol	6.3 nc	--	mg/kg						
	8270C	2-Methylnaphthalene	--	--	mg/kg						
	8270C	2-Methylphenol	306 nc	--	mg/kg						
	8270C	2-Nitroaniline	18.3 nc	--	mg/kg						
	8270C	2-Nitrophenol	--	--	mg/kg						
	8270C	3,3'-Dichlorobenzidine	1.1 ca	--	mg/kg						
	8270C	3-Nitroaniline	1.8 nc	--	mg/kg						
	8270C	4,6-Dinitro-2-methylphenol	0.61 nc	--	mg/kg						
	8270C	4-Bromophenyl phenyl ether	--	--	mg/kg						
	8270C	4-Chloro-3-methylphenol	--	--	mg/kg						
	8270C	4-Chloroaniline	24 nc	--	mg/kg						
	8270C	4-Chlorophenyl phenyl ether	--	--	mg/kg						
	8270C	4-Methylphenol	31 nc	--	mg/kg						
	8270C	4-Nitroaniline	23 ca	--	mg/kg						
	8270C	4-Nitrophenol	--	--	mg/kg						
	8270C	Acenaphthene	368 nc	--	mg/kg						
	8270C	Acenaphthylene	--	--	mg/kg						
	8270C	Anthracene	2189 nc	--	mg/kg						
	8270C	Benzo(a)anthracene	0.62 ca	--	mg/kg						
	8270C	Benzo(a)pyrene	0.062 ca	--	mg/kg						
	8270C	Benzo(b)fluoranthene	0.62 ca	--	mg/kg						
	8270C	Benzo(g,h,i)perylene	--	--	mg/kg						
	8270C	Benzo(k)fluoranthene	6.2 ca	--	mg/kg						
	8270C	Benzoic acid	100000 max	--	mg/kg						
	8270C	Benzyl alcohol	1833 nc	--	mg/kg						
	8270C	Bis(2-chloroethoxy)methane	--	--	mg/kg						
	8270C	Bis(2-chloroethyl) ether	0.22 ca	--	mg/kg						
	8270C	Bis(2-ethylhexyl) phthalate	35 ca	--	mg/kg						
	8270C	Butylbenzyl phthalate	1222 nc	--	mg/kg						
	8270C	Carbazole	24 ca	--	mg/kg						
	8270C	Chrysene	62 ca	--	mg/kg						
	8270C	Dibenzo(a,h)anthracene	0.062 ca	--	mg/kg						
	8270C	Dibenzofuran	15 nc	--	mg/kg						
	8270C	Diethyl phthalate	4888 nc	--	mg/kg						
	8270C	Dimethyl phthalate	100000 max	--	mg/kg						
	8270C	Di-n-butyl phthalate	611 nc	--	mg/kg						
	8270C	Di-n-octyl phthalate	244 nc	--	mg/kg						
	8270C	Fluoranthene	229 nc	--	mg/kg						
	8270C	Fluorene	275 nc	--	mg/kg						

Table LL5-6
Load Line 5 Summary of All Surface Soil (0-1ft) Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5ss-026M-SO	LL5ss-027M-SO	LL5ss-028M-SO	LL5ss-029M-SO	LL5ss-030-DUP	LL5ss-030-SO
					Sample Date:	11/15/2004	11/15/2004	11/15/2004	11/15/2004	11/19/2004	11/19/2004
					Sample Depth:	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft	0-1 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Surface Soil Background Criteria	Units						
	8270C	Hexachlorobenzene	0.30 ca	--	mg/kg						
	8270C	Hexachlorobutadiene	6.2 ca	--	mg/kg						
	8270C	Hexachlorocyclopentadiene	37 nc	--	mg/kg						
	8270C	Hexachloroethane	35 ca	--	mg/kg						
	8270C	Indeno(1,2,3-cd)pyrene	0.62 ca	--	mg/kg						
	8270C	Isophorone	512 ca	--	mg/kg						
	8270C	Naphthalene	5.6 nc	--	mg/kg						
	8270C	Nitrobenzene	2 nc	--	mg/kg						
	8270C	n-Nitroso-di-n-propylamine	0.069 ca	--	mg/kg						
	8270C	n-Nitrosodiphenylamine	99 ca	--	mg/kg						
	8270C	Pentachlorophenol	3.0 ca	--	mg/kg						
	8270C	Phenanthrene	--	--	mg/kg						
	8270C	Phenol	1833 nc	--	mg/kg						
	8270C	Pyrene	232 nc	--	mg/kg						
Explosives	8330	1,3,5-Trinitrobenzene	183 nc	--	mg/kg	0.0495 U	0.0495 U	0.0495 U	0.05 U		
	8330	1,3-Dinitrobenzene	0.61 nc	--	mg/kg	0.0495 U	0.0495 U	0.0495 U	0.05 U		
	8330	2,4,6-TNT	16 ca	--	mg/kg	0.0495 U	0.0495 U	0.0495 U	0.05 U		
	8330	2,4-Dinitrotoluene	12 nc	--	mg/kg	0.0495 U	0.0495 U	0.0495 U	0.05 U		
	8330	2,6-Dinitrotoluene	6.1 nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U		
	8330	2-Amino-4,6-Dinitrotoluene	--	--	mg/kg	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		
	8330	3-Nitrotoluene	73 nc	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U		
	8330	4-Amino-2,6-Dinitrotoluene	--	--	mg/kg	0.15 U	0.15 U	0.15 U	0.15 U		
	8330	4-Nitrotoluene	12 ca	--	mg/kg	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		
	8330	Nitrobenzene	2 nc	--	mg/kg	0.0495 U	0.0495 U	0.0495 U	0.05 U		
	8330	RDX	4.4 ca	--	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U		
	8330	Tetryl	61 nc	--	mg/kg	0.2 U	0.195 U	0.2 U	0.2 U		
Propellants	353.2 Modified	Nitrocellulose	--	--	mg/kg						
	8332	Nitroglycerine	35 ca	--	mg/kg						
	SW8330 Modified	Nitroguanidine	611 nc	--	mg/kg						

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

Table LL5-7
Load Line 5 Summary of All Sediment Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sd-002-DUP	LL5sd-002-SD	LL5sd-013-SD
					Sample Date:	12/10/2004	12/10/2004	11/18/2004
					Sample Depth:	8 ft	8 ft	0-0.5 ft
Group	Method	Parameter	Region 9 PRG (Res Soil)	Sediment Background Criteria	Units			
Metals	6010B	Aluminum	7614 nc	13900	mg/kg	**9100**	**9900 J**	4600
	6010B	Arsenic	0.39 ca	19.5	mg/kg	**14**	**14**	**180**
	6010B	Barium	538 nc	123	mg/kg	72	73	220
	6010B	Beryllium	15 nc	0.38	mg/kg	0.63	0.68	0.68
	6010B	Cadmium	3.7 nc	0.00	mg/kg	1.6	1.9 J	6.4
	6010B	Calcium	--[n]	5510	mg/kg	3900	5400 J	14000
	6010B	Chromium	30 ca	18.1	mg/kg	19	20 J	**130**
	6010B	Cobalt	30 ca	9.1	mg/kg	9	9.4	8.1
	6010B	Copper	313 nc	27.6	mg/kg	59	44 J	**340**
	6010B	Iron	2346 nc	28200	mg/kg	**43000**	**39000 J**	**100000**
	6010B	Lead	400 pbk	27.4	mg/kg	36	35 J	**1500**
	6010B	Magnesium	--[n]	2760	mg/kg	2700	3200 J	1900
	6010B	Manganese	176 nc	1950	mg/kg	**530**	**510 J**	**1000**
	6010B	Nickel	156 nc	17.7	mg/kg	23	24	33
	6010B	Potassium	--[n]	1950	mg/kg	1500	1700 J	1000
	6010B	Selenium	39 nc	1.7	mg/kg	0.9 U	0.9 U	2.5
	6010B	Silver	39 nc	0.00	mg/kg	0.6 U	0.6 U	1.65 U
	6010B	Sodium	--[n]	112	mg/kg	280	300	730
	6010B	Vanadium	7.8 nc	26.1	mg/kg	**29**	**32**	**16**
	6010B	Zinc	2346 nc	532	mg/kg	140	150 J	1700
	7041	Antimony	3.1 nc	0.00	mg/kg	0.75 U	- R	3.1
	7471A	Mercury	2.3 nc	0.06	mg/kg	0.29	0.2	1.9
	7841	Thallium	0.52 nc	0.89	mg/kg	0.33 U	0.335 U	1.05 U
Explosives	8330	1,3,5-Trinitrobenzene	183 nc	--	mg/kg	0.25 U	0.25 U	0.0495 U
	8330	1,3-Dinitrobenzene	0.61 nc	--	mg/kg	0.25 U	0.25 U	0.0495 U
	8330	2,4,6-TNT	16 ca	--	mg/kg	0.25 U	0.25 U	0.0495 U
	8330	2,4-Dinitrotoluene	12 nc	--	mg/kg	0.25 U	0.25 U	0.0495 U
	8330	2,6-Dinitrotoluene	6.1 nc	--	mg/kg	0.5 U	0.495 U	0.1 U
	8330	2-Amino-4,6-Dinitrotoluene	--	--	mg/kg	0.5 U	0.495 U	0.1 U
	8330	2-Nitrotoluene	0.88 ca	--	mg/kg	0.5 U	0.495 U	0.1 U
	8330	3-Nitrotoluene	73 nc	--	mg/kg	0.5 U	0.495 UJ	0.1 U
	8330	4-Amino-2,6-Dinitrotoluene	--	--	mg/kg	0.75 U	0.75 U	0.15 U
	8330	4-Nitrotoluene	12 ca	--	mg/kg	0.5 U	0.495 U	0.1 U
	8330	HMX	306 nc	--	mg/kg	0.5 U	0.495 U	0.1 U
	8330	Nitrobenzene	2 nc	--	mg/kg	0.25 U	0.25 U	0.0495 U
	8330	RDX	4.4 ca	--	mg/kg	0.5 U	0.495 U	0.1 U
	8330	Tetryl	61 nc	--	mg/kg	1 U	1 UJ	0.2 U

Notes:
-- - no background/PRG value is available for this analyte
blank cell indicates that the analysis was not performed
mg/kg - means milligrams per Kilogram (parts per million - ppm)
PRG - preliminary remediation goals
nc - non-cancer basis, value is 1/10 the published PRG
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
sat - soil saturation
[n] - nutrient
U - analyte not detected
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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 LL5-8
Load Line 5 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sw-007-DUP	LL5sw-007-SW	LL5sw-008-SW	LL5sw-009-SW	LL5sw-010-SW	LL5sw-011-DUP	LL5sw-011-SW	LL5sw-012-SW
					Sample Date:	12/6/2004	12/6/2004	12/6/2004	12/7/2004	12/7/2004	11/18/2004	11/18/2004	11/18/2004
					Sample Depth:	13.31 ft	13.31 ft	5.38 ft	13.2 ft	11.3 ft	surface	surface	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units								
Metals	6010B	Aluminum	36499 nc	3370	ug/l	430	620	730	730	1900	75 U	75 U	75 U
	6010B	Barium	2555 nc	47.5	ug/l	25	28 J	25	27	34	25	25	13
	6010B	Beryllium	73 nc	0.00	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	6010B	Cadmium	18 nc	0.00	ug/l	1 U	1 U	1 U	1 U	1 U	0.31	0.28	0.33
	6010B	Calcium	--[n]	41400	ug/l	32000	33000	38000	38000	38000	41000	42000	22000
	6010B	Chromium	109 nc	0.00	ug/l	1.2	1.2	5 U	1.4	2.9	5 U	5 U	5 U
	6010B	Cobalt	730 nc	0.00	ug/l	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
	6010B	Copper	1460 nc	7.9	ug/l	5 U	5 U	5 U	5 U	3.2	2.7	2.2	2.2
	6010B	Iron	10950 nc	2560	ug/l	350	530	750	990	2700	46	46	60 U
	6010B	Magnesium	--[n]	10800	ug/l	1600	1800	3300	3500	5500	6400	6500	5400
	6010B	Manganese	876 nc	391	ug/l	41	63	9.2	12	75	3.4	3.6	5.5
	6010B	Nickel	730 nc	0.00	ug/l	5 U	5 U	5 U	5 U	1.6	5 U	5 U	5 U
	6010B	Potassium	--[n]	3170	ug/l	1100	1100	1400	1400	1800	27000	28000	16000
	6010B	Selenium	182 nc	0.00	ug/l	3.6	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U
	6010B	Silver	182 nc	0.00	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	6010B	Sodium	--[n]	21300	ug/l	560	750 U	810	570	1300	4100	4200	3600
	6010B	Vanadium	36 nc	0.00	ug/l	1.4	1.4	1.5	1.1	3	5 U	5 U	5 U
	6010B	Zinc	10950 nc	42	ug/l	3.6	4.4	6.6	3.2 U	7 U	79	81	24
	7041	Antimony	15 nc	0.00	ug/l	3.75 U	3.75 UJ	3.75 U	3.75 U	3.75 U	3.75 U	3.75 U	3.75 U
	7060A	Arsenic	0.045 ca	3.2	ug/l	1 U	1 U	1 U	1 U	**1.2**	1 U	1 U	1 U
	7421	Lead	15 mcl	0.00	ug/l	1.5 U	1.5 UJ	1.5 U	0.8 U	1.7 U	0.98	0.89	1.5 U
	7470A	Mercury	11 nc	0.00	ug/l	0.1 U	0.1 UJ	0.1 U	0.1 U	0.064	0.1 U	0.1 U	0.1 U
	7841	Thallium	2.4 nc	0.00	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Pesticides	8081A	4,4'-DDD	0.28 ca	--	ug/l	0.055 U	0.055 U	0.055 U	0.055 U	0.05 U	0.05 U	0.055 U	0.055 U
	8081A	4,4'-DDE	0.20 ca	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	4,4'-DDT	0.20 ca	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	Aldrin	0.0040 ca	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	alpha-BHC	0.011 nc	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	alpha-Chlordane	0.19 ca	--	ug/l	0.0245 U	0.024 U	0.0245 U	0.024 U	0.0235 U	0.0235 U	0.0245 U	0.0245 U
	8081A	beta-BHC	0.037 ca	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	delta-BHC	--	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	Dieldrin	0.0042 ca	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	Endosulfan I	220 nc	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	Endosulfan II	220 nc	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	Endosulfan sulfate	220 nc	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	Endrin	11 nc	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	Endrin aldehyde	--	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	Endrin ketone	--	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	gamma-BHC	0.052 ca	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	gamma-Chlordane	0.19 ca	--	ug/l	0.0485 U	0.048 U	0.049 U	0.048 U	0.0465 U	0.047 U	0.049 U	0.0485 U
	8081A	Heptachlor	0.015 ca	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	Heptachlor epoxide	0.0074 ca	--	ug/l	0.075 U	0.07 U	0.075 U	0.07 U	0.07 U	0.07 U	0.075 U	0.075 U
	8081A	Methoxychlor	182 nc	--	ug/l	0.29 U	0.29 U	0.295 U	0.29 U	0.28 U	0.285 U	0.295 U	0.29 U

Table LL5-8
Load Line 5 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sw-007-DUP	LL5sw-007-SW	LL5sw-008-SW	LL5sw-009-SW	LL5sw-010-SW	LL5sw-011-DUP	LL5sw-011-SW	LL5sw-012-SW
					Sample Date:	12/6/2004	12/6/2004	12/6/2004	12/7/2004	12/7/2004	11/18/2004	11/18/2004	11/18/2004
					Sample Depth:	13.31 ft	13.31 ft	5.38 ft	13.2 ft	11.3 ft	surface	surface	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units								
	8081A	Toxaphene	0.061 ca	--	ug/l	0.245 U	0.24 U	0.245 U	0.24 U	0.235 U	0.235 U	0.245 U	0.245 U
PCBs	8082	Aroclor 1016	0.96 ca	--	ug/l	0.29 U	0.29 U	0.295 U	0.29 U	0.28 U	0.285 U	0.295 U	0.29 U
	8082	Aroclor 1221	0.034 ca	--	ug/l	0.65 U	0.6 U	0.65 U	0.6 U	0.6 U	0.6 U	0.65 U	0.65 U
	8082	Aroclor 1232	0.034 ca	--	ug/l	0.65 U	0.6 U	0.65 U	0.6 U	0.6 U	0.6 U	0.65 U	0.65 U
	8082	Aroclor 1242	0.034 ca	--	ug/l	0.65 U	0.6 U	0.65 U	0.6 U	0.6 U	0.6 U	0.65 U	0.65 U
	8082	Aroclor 1248	0.034 ca	--	ug/l	0.75 U	0.7 U	0.75 U	0.7 U	0.7 U	0.7 U	0.75 U	0.75 U
	8082	Aroclor 1254	0.034 ca	--	ug/l	0.65 U	0.6 U	0.65 U	0.6 U	0.6 U	0.6 U	0.65 U	0.65 U
	8082	Aroclor 1260	0.034 ca	--	ug/l	0.29 U	0.29 U	0.295 U	0.29 U	0.28 U	0.285 U	0.295 U	0.29 U
VOCs	8260B	1,1,1-Trichloroethane	3172 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1,2,2-Tetrachloroethane	0.055 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1,2-Trichloroethane	0.20 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1-Dichloroethane	811 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1-Dichloroethene	339 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dibromoethane	0.0056 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloroethane	0.12 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloroethene (total)	120 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloropropane	0.16 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	2-Butanone	6968 nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	2-Hexanone	2000 nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	4-Methyl-2-pentanone	1993 nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	Acetone	5475 nc	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	Benzene	0.35 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromochloromethane	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromodichloromethane	0.18 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromoform	8.5 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromomethane	8.7 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Carbon disulfide	1043 nc	--	ug/l	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
	8260B	Carbon tetrachloride	0.17 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chlorobenzene	106 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloroethane	4.6 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloroform	0.17 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloromethane	158 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	cis-1,2-Dichloroethene	61 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	cis-1,3-Dichloropropene	0.40 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Dibromochloromethane	0.13 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Ethylbenzene	1340 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	m&p-Xylenes	206 nc	--	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	8260B	Methylene chloride	4.3 ca	--	ug/l	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
	8260B	o-Xylene	206 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Styrene	1641 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Tetrachloroethene	0.10 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Toluene	723 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Total Xylenes	206 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table LL5-8
Load Line 5 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sw-007-DUP	LL5sw-007-SW	LL5sw-008-SW	LL5sw-009-SW	LL5sw-010-SW	LL5sw-011-DUP	LL5sw-011-SW	LL5sw-012-SW
					Sample Date:	12/6/2004	12/6/2004	12/6/2004	12/7/2004	12/7/2004	11/18/2004	11/18/2004	11/18/2004
					Sample Depth:	13.31 ft	13.31 ft	5.38 ft	13.2 ft	11.3 ft	surface	surface	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units								
	8260B	trans-1,2-Dichloroethene	122 nc	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	trans-1,3-Dichloropropene	0.40 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Trichloroethene	0.028 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Vinyl chloride	0.020 ca	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs	8270C	1,2,4-Trichlorobenzene	7.2 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	1,2-Dichlorobenzene	370 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	1,3-Dichlorobenzene	182 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.44 J	1 U	0.95 U	1 U
	8270C	1,4-Dichlorobenzene	0.50 ca	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	2,2-oxybis (1-chloropropane)	0.27 ca	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	2,4,5-Trichlorophenol	3650 nc	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	2,4,6-Trichlorophenol	3.6 nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	2,4-Dichlorophenol	109 nc	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	2,4-Dimethylphenol	730 nc	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	2,4-Dinitrophenol	73 nc	--	ug/l	9.5 U	9.5 U	10 U	10 U	9.5 U	10 U	9.5 U	10 U
	8270C	2,4-Dinitrotoluene	73 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	2,6-Dinitrotoluene	36 nc	--	ug/l	0.245 U	0.245 U	0.245 U	0.25 U	0.235 U	0.245 U	0.24 U	0.25 U
	8270C	2-Chloronaphthalene	487 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	2-Chlorophenol	30 nc	--	ug/l	2.45 U	2.45 UJ	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	2-Methylnaphthalene	--	--	ug/l	0.245 U	0.245 U	0.245 U	0.25 U	0.235 U	0.245 U	0.24 U	0.25 U
	8270C	2-Methylphenol	1825 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	2-Nitroaniline	109 nc	--	ug/l	2.45 U	2.45 UJ	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	2-Nitrophenol	--	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	3,3'-Dichlorobenzidine	0.15 ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	3-Nitroaniline	3.2 ca	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	4,6-Dinitro-2-methylphenol	3.6 nc	--	ug/l	9.5 U	9.5 U	10 U	10 U	9.5 U	10 U	9.5 U	10 U
	8270C	4-Bromophenyl phenyl ether	--	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	4-Chloro-3-methylphenol	--	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	4-Chloroaniline	146 nc	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	4-Chlorophenyl phenyl ether	--	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	4-Methylphenol	182 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	4-Nitroaniline	3.2 ca	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	4-Nitrophenol	--	--	ug/l	9.5 U	9.5 U	10 U	10 U	9.5 U	10 U	9.5 U	10 U
	8270C	Acenaphthene	365 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Acenaphthylene	--	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Anthracene	1825 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Benzo(a)anthracene	0.092 ca	--	ug/l	**0.17 J**	0.095 U	**0.12 J**	0.1 U	0.095 U	0.1 U	0.095 U	0.1 U
	8270C	Benzo(a)pyrene	0.0092 ca	--	ug/l	**0.25 J**	0.195 U	0.195 U	0.2 U	0.19 U	0.195 U	0.19 U	0.2 U
	8270C	Benzo(b)fluoranthene	0.092 ca	--	ug/l	**0.18 J**	0.195 U	0.195 U	0.2 U	0.19 U	0.195 U	0.19 U	0.2 U
	8270C	Benzo(g,h,i)perylene	--	--	ug/l	0.32 J	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Benzo(k)fluoranthene	0.92 ca	--	ug/l	0.36 J	0.195 U	0.2 J	0.2 U	0.19 U	0.195 U	0.19 U	0.2 U
	8270C	Benzoic acid	145979 nc	--	ug/l	9.5 U	9.5 U	10 U	10 U	- R	10 U	9.5 U	10 U
	8270C	Benzyl alcohol	10950 nc	--	ug/l	9.5 U	9.5 U	10 U	10 U	9.5 U	10 U	9.5 U	10 U
	8270C	Bis(2-chloroethoxy)methane	--	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	Bis(2-chloroethyl) ether	0.010 ca	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U

Table LL5-8
Load Line 5 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sw-007-DUP	LL5sw-007-SW	LL5sw-008-SW	LL5sw-009-SW	LL5sw-010-SW	LL5sw-011-DUP	LL5sw-011-SW	LL5sw-012-SW
					Sample Date:	12/6/2004	12/6/2004	12/6/2004	12/7/2004	12/7/2004	11/18/2004	11/18/2004	11/18/2004
					Sample Depth:	13.31 ft	13.31 ft	5.38 ft	13.2 ft	11.3 ft	surface	surface	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units								
	8270C	Bis(2-ethylhexyl) phthalate	4.8 ca	--	ug/l	**12 J**	7.5 U	7.5 U	**10 J**	7 U	**5.3 J**	7 U	7.5 U
	8270C	Butylbenzyl phthalate	7300 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	Carbazole	3.4 ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	Chrysene	9.2 ca	--	ug/l	0.23 J	0.245 U	0.17 J	0.25 U	0.235 U	0.245 U	0.24 U	0.25 U
	8270C	Dibenzo(a,h)anthracene	0.0092 ca	--	ug/l	**0.31 J**	0.195 U	0.195 U	0.2 U	0.19 U	0.195 U	0.19 U	0.2 U
	8270C	Dibenzofuran	12 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	Diethyl phthalate	29199 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	Dimethyl phthalate	364867 nc	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	Di-n-butyl phthalate	3650 nc	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	Di-n-octyl phthalate	1460 nc	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 UJ	4.8 UJ	4.95 UJ
	8270C	Fluoranthene	1460 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Fluorene	243 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Hexachlorobenzene	0.042 ca	--	ug/l	0.245 U	0.245 U	0.245 U	0.25 U	0.235 U	0.245 U	0.24 U	0.25 U
	8270C	Hexachlorobutadiene	0.86 ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	Hexachlorocyclopentadiene	219 nc	--	ug/l	- R	- R	- R	10 U	9.5 U	- R	- R	- R
	8270C	Hexachloroethane	4.8 ca	--	ug/l	2.45 U	2.45 U	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	Indeno(1,2,3-cd)pyrene	0.092 ca	--	ug/l	**0.29 J**	0.195 U	**0.2 J**	0.2 U	0.19 U	0.195 U	0.19 U	0.2 U
	8270C	Isophorone	71 ca	--	ug/l	0.95 U	0.95 U	1 U	1 U	0.95 U	1 U	0.95 U	1 U
	8270C	Naphthalene	6.2 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Nitrobenzene	3.4 nc	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	n-Nitroso-di-n-propylamine	0.0096 ca	--	ug/l	0.245 U	0.245 U	0.245 U	0.25 U	0.235 U	0.245 U	0.24 U	0.25 U
	8270C	n-Nitrosodiphenylamine	14 ca	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Pentachlorophenol	0.56 ca	--	ug/l	4.85 U	4.85 U	4.9 U	4.95 U	4.7 U	4.9 U	4.8 U	4.95 U
	8270C	Phenanthrene	--	--	ug/l	0.485 U	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
	8270C	Phenol	10950 nc	--	ug/l	2.45 U	2.45 UJ	2.45 U	2.5 U	2.35 U	2.45 U	2.4 U	2.5 U
	8270C	Pyrene	182 nc	--	ug/l	0.14 J	0.485 U	0.49 U	0.495 U	0.47 U	0.49 U	0.48 U	0.495 U
Explosives	8330	1,3,5-Trinitrobenzene	1095 nc	--	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.14 U	0.345 U	0.1 U	0.2 U
	8330	1,3-Dinitrobenzene	3.6 nc	--	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.14 U	0.345 U	0.1 U	0.2 U
	8330	2,4,6-TNT	2.2 ca	--	ug/l	0.125 U	0.125 U	0.125 U	0.125 U	0.175 U	0.43 U	0.125 U	0.25 U
	8330	2,4-Dinitrotoluene	73 nc	--	ug/l	0.18 U	0.18 U	0.18 U	0.18 U	0.25 U	0.6 U	0.18 U	0.355 U
	8330	2,6-Dinitrotoluene	36 nc	--	ug/l	0.215 U	0.215 U	0.215 U	0.215 U	0.3 U	0.75 U	0.215 U	0.425 U
	8330	2-Amino-4,6-Dinitrotoluene	--	--	ug/l	0.18 U	0.18 U	0.18 U	0.18 U	0.25 U	0.6 U	0.18 U	0.355 U
	8330	2-Nitrotoluene	0.049 ca	--	ug/l	0.155 U	0.155 U	0.155 U	0.155 U	0.215 U	0.55 U	0.155 U	0.305 U
	8330	3-Nitrotoluene	122 nc	--	ug/l	0.155 U	0.155 U	0.155 U	0.155 U	0.215 U	0.55 U	0.155 U	0.305 U
	8330	4-Amino-2,6-Dinitrotoluene	--	--	ug/l	0.165 U	0.165 U	0.165 U	0.165 U	0.23 U	0.55 U	0.165 U	0.325 U
	8330	4-Nitrotoluene	0.66 ca	--	ug/l	0.155 U	0.155 U	0.155 U	0.155 U	0.215 U	0.55 U	0.155 U	0.305 U
	8330	HMX	1825 nc	--	ug/l	0.155 U	0.155 U	0.155 U	0.155 U	0.215 U	0.55 U	0.155 U	0.305 U
	8330	Nitrobenzene	3.4 nc	--	ug/l	0.08 U	0.08 U	0.08 U	0.08 U	0.11 U	0.275 U	0.08 U	0.16 U
	8330	RDX	0.61 ca	--	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.14 U	0.345 U	0.1 U	0.2 U
	8330	Tetryl	365 nc	--	ug/l	0.39 U	0.39 U	0.39 U	0.39 U	0.55 U	1.35 U	0.39 U	0.75 U
Propellants	353.2 Modified	Nitrocellulose	--	--	ug/l			250 U					250 U
	8332	Nitroglycerine	4.8 ca	--	ug/l			0.21 J					1 U
	SW8330 Modified	Nitroguanidine	3650 nc	--	ug/l			10 U					10 U

Table LL5-8
Load Line 5 Summary of All Surface Water Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

						LL5sw-007-DUP	LL5sw-007-SW	LL5sw-008-SW	LL5sw-009-SW	LL5sw-010-SW	LL5sw-011-DUP	LL5sw-011-SW	LL5sw-012-SW
					Sample Date:	12/6/2004	12/6/2004	12/6/2004	12/7/2004	12/7/2004	11/18/2004	11/18/2004	11/18/2004
					Sample Depth:	13.31 ft	13.31 ft	5.38 ft	13.2 ft	11.3 ft	surface	surface	surface
Group	Method	Parameter	Region 9 PRG (Tap Water)	Surface Water Background Criteria	Units								
Other Analytes	353.2	Nitrate as N (NO3-N)	10000 nc	--	ug/l	1600000	2600000	2500000	160	110	280	270	85

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
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 LL5-9
Load Line 5 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5mw-001-GW	LL5mw-002-GW	LL5mw-003-GW	LL5mw-004-DUP	LL5mw-004-GW	LL5mw-005-GW	LL5mw-006-GW
						Sample Date:	1/4/2005	1/18/2005	1/18/2005	1/4/2005	1/4/2005	1/4/2005	1/3/2005
						Sample Depth:	22 ft	22 ft	18 ft	21 ft	21 ft	24 ft	17.53 ft
						Description	UC/Filtered	C/Filtered	UC/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	75 U	75 U	75 U	75 U	75 U	40	75 U
	6010B	Barium	2555 nc	82.1	256	ug/l	50	49	18	25	25	16	24
	6010B	Beryllium	73 nc	0.00	0.00	ug/l	1 U	1 U	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	1 U	1 U	1 U	1 U
	6010B	Calcium	--[n]	115000	53100	ug/l	58000	67000	100000	69000	71000	67000	70000
	6010B	Chromium	109 nc	7.3	0.00	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	6010B	Cobalt	730 nc	0.00	0.00	ug/l	0.86	4.2	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
	6010B	Copper	1460 nc	0.00	0.00	ug/l	5 U	5 U	2.7	5 U	5 U	5 U	2.8
	6010B	Iron	10950 nc	279	1430	ug/l	60 U	170	60 U	60 U	60 U	66	60 U
	6010B	Magnesium	--[n]	43300	15000	ug/l	23000	21000	23000	30000	31000	24000	29000
	6010B	Manganese	876 nc	1020	1340	ug/l	840	180	1.7	8.5	6.6	**2000**	10
	6010B	Nickel	730 nc	0.00	83.4	ug/l	2.2	11	1.05 U	5 U	5 U	1.9	5 U
	6010B	Potassium	--[n]	2890	5770	ug/l	3800	2200	225 U	220 U	210 U	5400	480
	6010B	Selenium	182 nc	0.00	0.00	ug/l	7.5 U	7.5 U	3.3	7.5 U	7.5 U	7.5 U	7.5 U
	6010B	Silver	182 nc	0.00	0.00	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	6010B	Sodium	--[n]	45700	51400	ug/l	6700	7600	4300	3600	3700	8500	3400
	6010B	Vanadium	36 nc	0.00	0.00	ug/l	5 U	5 U	0.55 U	5 U	5 U	5 U	1
	6010B	Zinc	10950 nc	60.9	52.3	ug/l	10.5 U	3.4	10	4.8 U	1.7 U	9 U	30
	7041	Antimony	15 nc	0.00	0.00	ug/l	4.1	3.75 U	3.75 U	3.75 U	3.75 U	3.5	3.9
	7060A	Arsenic	0.045 ca	11.7	0.00	ug/l	1 U	**2.3**	1 U	1 U	1 U	1 U	1 U
	7421	Lead	15 mcl	0.00	0.00	ug/l	1.2	1.5 U	1.5 U	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	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	2 U	2 U
Pesticides	8081A	4,4'-DDD	0.28 ca	--	--	ug/l	0.05 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U
	8081A	4,4'-DDE	0.20 ca	--	--	ug/l	0.047 U	0.05 U	0.05 U	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	4,4'-DDT	0.20 ca	--	--	ug/l	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Aldrin	0.0040 ca	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	alpha-BHC	0.011 nc	--	--	ug/l	0.07 U	0.075 UJ	0.075 UJ	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	alpha-Chlordane	0.19 ca	--	--	ug/l	0.0235 U	0.0255 UJ	0.025 UJ	0.0245 U	0.025 U	0.0245 U	0.024 U
	8081A	beta-BHC	0.037 ca	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	delta-BHC	--	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	Dieldrin	0.0042 ca	--	--	ug/l	0.047 U	0.05 U	0.05 U	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	Endosulfan I	220 nc	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	Endosulfan II	220 nc	--	--	ug/l	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Endosulfan sulfate	220 nc	--	--	ug/l	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Endrin	11 nc	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	Endrin aldehyde	--	--	--	ug/l	0.07 U	0.075 U	0.075 U	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Endrin ketone	--	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	gamma-BHC	0.052 ca	--	--	ug/l	0.07 U	0.075 UJ	0.075 UJ	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	gamma-Chlordane	0.19 ca	--	--	ug/l	0.047 U	0.05 UJ	0.05 UJ	0.049 U	0.0495 U	0.0485 U	0.048 U
	8081A	Heptachlor	0.015 ca	--	--	ug/l	0.07 U	0.075 UJ	0.075 UJ	0.075 U	0.075 U	0.075 U	0.07 U
	8081A	Heptachlor epoxide	0.0074 ca	--	--	ug/l	0.07 U	0.075 UJ	0.075 UJ	0.075 U	0.075 U	0.075 U	0.07 U

Table LL5-9
Load Line 5 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5mw-001-GW	LL5mw-002-GW	LL5mw-003-GW	LL5mw-004-DUP	LL5mw-004-GW	LL5mw-005-GW	LL5mw-006-GW
						Sample Date:	1/4/2005	1/18/2005	1/18/2005	1/4/2005	1/4/2005	1/4/2005	1/3/2005
						Sample Depth:	22 ft	22 ft	18 ft	21 ft	21 ft	24 ft	17.53 ft
						Description	UC/Filtered	C/Filtered	UC/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							
	8081A	Methoxychlor	182 nc	--	--	ug/l	0.285 U	0.305 U	0.3 U	0.295 U	0.295 U	0.29 U	0.29 U
	8081A	Toxaphene	0.061 ca	--	--	ug/l	0.235 U	0.255 U	0.25 U	0.245 U	0.25 U	0.245 U	0.24 U
PCBs	8082	Aroclor 1016	0.96 ca	--	--	ug/l	0.285 U	0.305 U	0.3 U	0.295 U	0.295 U	0.29 U	0.29 U
	8082	Aroclor 1221	0.034 ca	--	--	ug/l	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1232	0.034 ca	--	--	ug/l	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1242	0.034 ca	--	--	ug/l	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1248	0.034 ca	--	--	ug/l	0.7 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.7 U
	8082	Aroclor 1254	0.034 ca	--	--	ug/l	0.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.6 U
	8082	Aroclor 1260	0.034 ca	--	--	ug/l	0.285 U	0.305 U	0.3 U	0.295 U	0.295 U	0.29 U	0.29 U
VOCs	8260B	1,1,1-Trichloroethane	3172 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1,2,2-Tetrachloroethane	0.055 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1,2-Trichloroethane	0.20 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1-Dichloroethane	811 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,1-Dichloroethene	339 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dibromoethane	0.0056 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloroethane	0.12 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloroethene (total)	120 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	1,2-Dichloropropane	0.16 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	2-Butanone	6968 nc	--	--	ug/l	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
	8260B	2-Hexanone	2000 nc	--	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	4-Methyl-2-pentanone	1993 nc	--	--	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	8260B	Acetone	5475 nc	--	--	ug/l	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
	8260B	Benzene	0.35 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromochloromethane	--	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromodichloromethane	0.18 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromoform	8.5 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Bromomethane	8.7 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
	8260B	Carbon disulfide	1043 nc	--	--	ug/l	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
	8260B	Carbon tetrachloride	0.17 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chlorobenzene	106 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloroethane	4.6 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloroform	0.17 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Chloromethane	158 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	cis-1,2-Dichloroethene	61 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	cis-1,3-Dichloropropene	0.40 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Dibromochloromethane	0.13 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Ethylbenzene	1340 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	m&p-Xylenes	206 nc	--	--	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	8260B	Methylene chloride	4.3 ca	--	--	ug/l	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
	8260B	o-Xylene	206 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Styrene	1641 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table LL5-9
Load Line 5 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5mw-001-GW	LL5mw-002-GW	LL5mw-003-GW	LL5mw-004-DUP	LL5mw-004-GW	LL5mw-005-GW	LL5mw-006-GW
						Sample Date:	1/4/2005	1/18/2005	1/18/2005	1/4/2005	1/4/2005	1/4/2005	1/3/2005
						Sample Depth:	22 ft	22 ft	18 ft	21 ft	21 ft	24 ft	17.53 ft
						Description	UC/Filtered	C/Filtered	UC/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							
	8260B	Tetrachloroethene	0.10 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Toluene	723 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Total Xylenes	206 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	trans-1,2-Dichloroethene	122 nc	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	trans-1,3-Dichloropropene	0.40 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Trichloroethene	0.028 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	8260B	Vinyl chloride	0.020 ca	--	--	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SVOCs	8270C	1,2,4-Trichlorobenzene	7.2 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	1,2-Dichlorobenzene	370 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	1,3-Dichlorobenzene	182 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	1,4-Dichlorobenzene	0.50 ca	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	2,2-oxybis (1-chloropropane)	0.27 ca	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	2,4,5-Trichlorophenol	3650 nc	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	2,4,6-Trichlorophenol	3.6 nc	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	2,4-Dichlorophenol	109 nc	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	2,4-Dimethylphenol	730 nc	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	2,4-Dinitrophenol	73 nc	--	--	ug/l	9.5 U	10 U	9.5 U	9.5 U	9.5 U	10 U	10 U
	8270C	2,4-Dinitrotoluene	73 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	2,6-Dinitrotoluene	36 nc	--	--	ug/l	0.245 U	0.255 U	0.245 U	0.235 U	0.235 U	0.245 U	0.255 U
	8270C	2-Chloronaphthalene	487 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	2-Chlorophenol	30 nc	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	2-Methylnaphthalene	--	--	--	ug/l	0.245 U	0.255 U	0.245 U	0.235 U	0.235 U	0.245 U	0.255 U
	8270C	2-Methylphenol	1825 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	2-Nitroaniline	109 nc	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	2-Nitrophenol	--	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	3,3'-Dichlorobenzidine	0.15 ca	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 UJ	2.45 U	2.55 U
	8270C	3-Nitroaniline	3.2 ca	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	4,6-Dinitro-2-methylphenol	3.6 nc	--	--	ug/l	9.5 U	10 U	9.5 U	9.5 U	9.5 U	10 U	10 U
	8270C	4-Bromophenyl phenyl ether	--	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	4-Chloro-3-methylphenol	--	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	4-Chloroaniline	146 nc	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	4-Chlorophenyl phenyl ether	--	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	4-Methylphenol	182 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	4-Nitroaniline	3.2 ca	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	4-Nitrophenol	--	--	--	ug/l	9.5 U	10 U	9.5 U	9.5 U	9.5 U	10 U	10 U
	8270C	Acenaphthene	365 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Acenaphthylene	--	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Anthracene	1825 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Benzo(a)anthracene	0.092 ca	--	--	ug/l	0.095 U	0.1 U	0.095 U	0.095 U	0.095 U	0.1 U	0.1 U
	8270C	Benzo(a)pyrene	0.0092 ca	--	--	ug/l	0.195 U	0.2 U	0.195 U	0.19 U	0.185 U	0.195 U	0.205 U
	8270C	Benzo(b)fluoranthene	0.092 ca	--	--	ug/l	0.195 U	0.2 U	0.195 U	0.19 U	0.185 UJ	0.195 U	0.205 U
	8270C	Benzo(g,h,i)perylene	--	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U

Table LL5-9
Load Line 5 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5mw-001-GW	LL5mw-002-GW	LL5mw-003-GW	LL5mw-004-DUP	LL5mw-004-GW	LL5mw-005-GW	LL5mw-006-GW
						Sample Date:	1/4/2005	1/18/2005	1/18/2005	1/4/2005	1/4/2005	1/4/2005	1/3/2005
						Sample Depth:	22 ft	22 ft	18 ft	21 ft	21 ft	24 ft	17.53 ft
						Description	UC/Filtered	C/Filtered	UC/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							
	8270C	Benzo(k)fluoranthene	0.92 ca	--	--	ug/l	0.195 U	0.2 U	0.195 U	0.19 U	0.185 U	0.195 U	0.205 U
	8270C	Benzoic acid	145979 nc	--	--	ug/l	9.5 U	10 U	9.5 U	9.5 U	9.5 U	10 U	10 U
	8270C	Benzyl alcohol	10950 nc	--	--	ug/l	9.5 U	10 U	9.5 U	9.5 U	9.5 U	10 U	10 U
	8270C	Bis(2-chloroethoxy)methane	--	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	Bis(2-chloroethyl) ether	0.010 ca	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 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 U	7.5 U	7.5 U
	8270C	Butylbenzyl phthalate	7300 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	Carbazole	3.4 ca	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	Chrysene	9.2 ca	--	--	ug/l	0.245 U	0.255 U	0.245 U	0.235 U	0.235 U	0.245 U	0.255 U
	8270C	Dibenzo(a,h)anthracene	0.0092 ca	--	--	ug/l	0.195 U	0.2 U	0.195 U	0.19 U	0.185 U	0.195 U	0.205 U
	8270C	Dibenzofuran	12 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	Diethyl phthalate	29199 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	Dimethyl phthalate	364867 nc	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	Di-n-butyl phthalate	3650 nc	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	Di-n-octyl phthalate	1460 nc	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	Fluoranthene	1460 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Fluorene	243 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Hexachlorobenzene	0.042 ca	--	--	ug/l	0.245 U	0.255 U	0.245 U	0.235 U	0.235 U	0.245 U	0.255 U
	8270C	Hexachlorobutadiene	0.86 ca	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	Hexachlorocyclopentadiene	219 nc	--	--	ug/l	9.5 U	10 UJ	9.5 UJ	9.5 U	9.5 UJ	10 U	10 U
	8270C	Hexachloroethane	4.8 ca	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	Indeno(1,2,3-cd)pyrene	0.092 ca	--	--	ug/l	0.195 U	0.2 U	0.195 U	0.19 U	0.185 U	0.195 U	0.205 U
	8270C	Isophorone	71 ca	--	--	ug/l	0.95 U	1 U	0.95 U	0.95 U	0.95 U	1 U	1 U
	8270C	Naphthalene	6.2 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Nitrobenzene	3.4 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	n-Nitroso-di-n-propylamine	0.0096 ca	--	--	ug/l	0.245 U	0.255 U	0.245 U	0.235 U	0.235 U	0.245 U	0.255 U
	8270C	n-Nitrosodiphenylamine	14 ca	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Pentachlorophenol	0.56 ca	--	--	ug/l	4.85 U	5 U	4.85 U	4.7 U	4.65 U	4.9 U	5 U
	8270C	Phenanthrene	--	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
	8270C	Phenol	10950 nc	--	--	ug/l	2.45 U	2.55 U	2.45 U	2.35 U	2.35 U	2.45 U	2.55 U
	8270C	Pyrene	182 nc	--	--	ug/l	0.485 U	0.5 U	0.485 U	0.47 U	0.465 U	0.49 U	0.5 U
Explosives	8330	1,3,5-Trinitrobenzene	1095 nc	--	--	ug/l	0.13 U	0.175 U	0.16 U	0.17 U	0.17 U	0.175 U	0.17 U
	8330	1,3-Dinitrobenzene	3.6 nc	--	--	ug/l	0.13 U	0.175 U	0.16 U	0.17 U	0.17 U	0.175 U	0.17 U
	8330	2,4,6-TNT	2.2 ca	--	--	ug/l	0.165 U	0.215 U	0.2 U	0.215 U	0.21 U	0.22 U	0.215 U
	8330	2,4-Dinitrotoluene	73 nc	--	--	ug/l	0.235 U	0.31 U	0.285 U	0.31 U	0.305 U	0.315 U	0.31 U
	8330	2,6-Dinitrotoluene	36 nc	--	--	ug/l	0.285 U	0.375 U	0.34 U	0.37 U	0.36 U	0.375 U	0.37 U
	8330	2-Amino-4,6-Dinitrotoluene	--	--	--	ug/l	0.235 U	0.31 U	0.285 U	0.31 U	0.305 U	0.315 U	0.31 U
	8330	2-Nitrotoluene	0.049 ca	--	--	ug/l	0.205 U	0.27 U	0.245 U	0.265 U	0.26 U	0.27 U	0.265 U
	8330	3-Nitrotoluene	122 nc	--	--	ug/l	0.205 U	0.27 U	0.245 U	0.265 U	0.26 U	0.27 U	0.265 U
	8330	4-Amino-2,6-Dinitrotoluene	--	--	--	ug/l	0.215 U	0.285 U	0.26 U	0.285 U	0.28 U	0.29 U	0.285 U
	8330	4-Nitrotoluene	0.66 ca	--	--	ug/l	0.205 U	0.27 U	0.245 U	0.265 U	0.26 U	0.27 U	0.265 U
	8330	HMX	1825 nc	--	--	ug/l	0.205 U	0.27 U	0.245 U	0.265 U	0.26 U	0.27 U	0.265 U

Table LL5-9
Load Line 5 Summary of All Groundwater Results
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

							LL5mw-001-GW	LL5mw-002-GW	LL5mw-003-GW	LL5mw-004-DUP	LL5mw-004-GW	LL5mw-005-GW	LL5mw-006-GW
						Sample Date:	1/4/2005	1/18/2005	1/18/2005	1/4/2005	1/4/2005	1/4/2005	1/3/2005
						Sample Depth:	22 ft	22 ft	18 ft	21 ft	21 ft	24 ft	17.53 ft
						Description	UC/Filtered	C/Filtered	UC/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	0.105 U	0.14 U	0.125 U	0.135 U	0.135 U	0.14 U	0.135 U
	8330	RDX	0.61 ca	--	--	ug/l	0.13 U	0.175 U	0.16 U	0.17 U	0.17 U	0.175 U	0.17 U
	8330	Tetryl	365 nc	--	--	ug/l	0.5 U	0.7 U	0.6 U	0.65 U	0.65 U	0.7 U	0.65 U
Propellants	353.2 Modified	Nitrocellulose	--	--	--	ug/l	65 U						
	8332	Nitroglycerine	4.8 ca	--	--	ug/l	0.65 U						
	SW8330 Modified	Nitroguanidine	3650 nc	--	--	ug/l	10 U						
Other Analytes	353.2	Nitrate as N (NO3-N)	10000 nc	--	--	ug/l	120	100 U	100 U	59	58	100 U	67

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
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 LL5-13
Load Line 5 Human Health Risk Screening Tables for Groundwater
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Parameter	Region 9 PRG (Tap Water)		Un-consolidated Filtered Groundwater Background	Consolidated Filtered Groundwater Background	Maximum Detected UC/Filtered	Maximum Detected C/Filtered	Frequency of Detection	COPC
Aluminum	36499	nc	--	--	--	40	1 / 7	No
Barium	2555	nc	82.1	256	50	49	7 / 7	No
Calcium	--[n]		115000	53100	100000	71000	7 / 7	No
Cobalt	730	nc	0.00	0.00	0.86	4.2	2 / 7	No
Copper	1460	nc	0.00	0.00	2.7	2.8	2 / 7	No
Iron	10950	nc	279	1430	--	170	2 / 7	No
Magnesium	--[n]		43300	15000	23000	31000	7 / 7	No
Manganese	876	nc	1020	1340	840	2000	7 / 7	Yes, > BKG & PRG
Nickel	730	nc	0.00	83.4	2.2	11	3 / 7	No
Potassium	--[n]		2890	5770	3800	5400	4 / 7	No
Selenium	182	nc	0.00	0.00	3.3	--	1 / 7	No
Sodium	--[n]		45700	51400	6700	8500	7 / 7	No
Vanadium	36	nc	0.00	0.00	--	1	1 / 7	No
Zinc	10950	nc	60.9	52.3	10	30	3 / 7	No
Antimony	15	nc	0.00	0.00	4.1	3.9	3 / 7	No
Arsenic	0.045	ca	11.7	0.00	--	2.3	1 / 7	Yes, > BKG & PRG
Lead	15	mcl	0.00	0.00	1.2	--	1 / 7	No
Nitrate as N (NO3-N)	10000	nc	--	--	120	67	4 / 7	No

Notes:
-- - no value available
BKG - site specific background
PRG - USEPA Region 9 Preliminary Remediation Goals
NTX - no toxicity screening value available
nc - non-cancer basis
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
[n] - nutrient
*Concentration Units ug/L

Table LL5-12
Load Line 5 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	1900	5 / 8	No
Barium	2555	nc	47.5	34	8 / 8	No
Cadmium	18	nc	0.00	0.33	3 / 8	No
Calcium	--[n]		41400	42000	8 / 8	No
Chromium	109	nc	0.00	2.9	4 / 8	No
Copper	1460	nc	7.9	3.2	4 / 8	No
Iron	10950	nc	2560	2700	7 / 8	No
Magnesium	--[n]		10800	6500	8 / 8	No
Manganese	876	nc	391	75	8 / 8	No
Nickel	730	nc	0.00	1.6	1 / 8	No
Potassium	--[n]		3170	28000	8 / 8	No
Selenium	182	nc	0.00	3.6	1 / 8	No
Sodium	--[n]		21300	4200	7 / 8	No
Vanadium	36	nc	0.00	3	5 / 8	No
Zinc	10950	nc	42	81	6 / 8	No
Arsenic	0.045	ca	3.2	1.2	1 / 8	No
Lead	15	mcl	0.00	0.98	2 / 8	No
Mercury	11	nc	0.00	0.064	1 / 8	No
1,3-Dichlorobenzene	182	nc	--	0.44	1 / 8	No
Benzo(a)anthracene	0.092	ca	--	0.17	2 / 8	Yes, > PRG
Benzo(a)pyrene	0.0092	ca	--	0.25	1 / 8	Yes, > PRG
Benzo(b)fluoranthene	0.092	ca	--	0.18	1 / 8	Yes, > PRG
Benzo(g,h,i)perylene	--		--	0.32	1 / 8	Yes, NTX
Benzo(k)fluoranthene	0.92	ca	--	0.36	2 / 8	No
Bis(2-ethylhexyl) phthalate	4.8	ca	--	12	3 / 8	Yes, > PRG
Chrysene	9.2	ca	--	0.23	2 / 8	No
Dibenzo(a,h)anthracene	0.0092	ca	--	0.31	1 / 8	Yes, > PRG
Indeno(1,2,3-cd)pyrene	0.092	ca	--	0.29	2 / 8	Yes, > PRG
Pyrene	182	nc	--	0.14	1 / 8	No
Nitroglycerine	4.8	ca	--	0.21	1 / 2	No
Nitrate as N (NO3-N)	10000	nc	--	2600000	8 / 8	Yes, > PRG

Notes:
-- - no value available
BKG - site specific background
PRG - USEPA Region 9 Preliminary Remediation Goals
NTX - no toxicity screening value available
nc - non-cancer basis
ca - cancer basis
pbk - based on PBK modeling
mcl - based on CWA maximum contaminant level
max - ceiling limit
[n] - nutrient
*Concentration Units ug/L

Table LL5-11
Load Line 5 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	9900	3 / 3	No
Arsenic	0.39	ca	19.5	180	3 / 3	Yes, > BKG & PRG
Barium	538	nc	123	220	3 / 3	No
Beryllium	15	nc	0.38	0.68	3 / 3	No
Cadmium	3.7	nc	0.00	6.4	3 / 3	Yes, > BKG & PRG
Calcium	--[n]		5510	14000	3 / 3	No
Chromium	30	ca	18.1	130	3 / 3	Yes, > BKG & PRG
Cobalt	30	ca	9.1	9.4	3 / 3	No
Copper	313	nc	27.6	340	3 / 3	Yes, > BKG & PRG
Iron	2346	nc	28200	100000	3 / 3	Yes, > BKG & PRG
Lead	400	pbk	27.4	1500	3 / 3	Yes, > BKG & PRG
Magnesium	--[n]		2760	3200	3 / 3	No
Manganese	176	nc	1950	1000	3 / 3	No
Nickel	156	nc	17.7	33	3 / 3	No
Potassium	--[n]		1950	1700	3 / 3	No
Selenium	39	nc	1.7	2.5	1 / 3	No
Silver	39	nc	0.00	--	/ 3	
Sodium	--[n]		112	730	3 / 3	No
Vanadium	7.8	nc	26.1	32	3 / 3	Yes, > BKG & PRG
Zinc	2346	nc	532	1700	3 / 3	No
Antimony	3.1	nc	0.00	3.1	1 / 2	No
Mercury	2.3	nc	0.06	1.9	3 / 3	No
Nitrate as N (NO3-N)	NA	0	--	4.4	1 / 3	No

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

Table LL5-10
Load Line 5 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	18000	35 / 35	Yes, > BKG & PRG
Arsenic	0.39	ca	15.4	14	35 / 35	No
Barium	538	nc	88.4	220	35 / 35	No
Beryllium	15	nc	0.88	4.2	35 / 35	No
Cadmium	3.7	nc	0.00	3	31 / 35	No
Calcium	--[n]		15800	140000	35 / 35	No
Chromium	30	ca	17.4	34	35 / 35	Yes, > BKG & PRG
Cobalt	30	ca	10.4	13	35 / 35	No
Copper	313	nc	17.7	49	35 / 35	No
Iron	2346	nc	23100	26000	35 / 35	Yes, > BKG & PRG
Lead	400	pbk	26.1	170	35 / 35	No
Magnesium	--[n]		3030	16000	35 / 35	No
Manganese	176	nc	1450	3100	35 / 35	Yes, > BKG & PRG
Nickel	156	nc	21.1	33	35 / 35	No
Potassium	--[n]		927	2100	35 / 35	No
Selenium	39	nc	1.4	1.8	30 / 35	No
Sodium	--[n]		123	970	35 / 35	No
Vanadium	7.8	nc	31.1	25	35 / 35	No
Zinc	2346	nc	61.8	140	35 / 35	No
Antimony	3.1	nc	0.96	0.46	2 / 34	No
Mercury	2.3	nc	0.04	3	21 / 35	Yes, > BKG & PRG
Thallium	0.52	nc	0.00	0.28	5 / 35	No
Aroclor 1254	0.22	ca	--	0.038	1 / 3	No
2-Methylnaphthalene	--		--	0.11	2 / 3	Yes, NTX
Acenaphthene	368	nc	--	0.021	1 / 3	No
Acenaphthylene	--		--	0.016	1 / 3	Yes, NTX
Anthracene	2189	nc	--	0.056	2 / 3	No
Benzo(a)anthracene	0.62	ca	--	0.19	3 / 3	No
Benzo(a)pyrene	0.062	ca	--	0.15	3 / 3	Yes, > PRG
Benzo(b)fluoranthene	0.62	ca	--	0.19	3 / 3	No
Benzo(g,h,i)perylene	--		--	0.097	3 / 3	Yes, NTX
Benzo(k)fluoranthene	6.2	ca	--	0.11	3 / 3	No
Benzyl alcohol	1833	nc	--	1.3	2 / 3	No
Carbazole	24	ca	--	0.038	2 / 3	No
Chrysene	62	ca	--	0.22	3 / 3	No
Dibenzo(a,h)anthracene	0.062	ca	--	0.024	2 / 3	No
Dibenzofuran	15	nc	--	0.039	2 / 3	No
Fluoranthene	229	nc	--	0.42	3 / 3	No
Fluorene	275	nc	--	0.018	2 / 3	No
Indeno(1,2,3-cd)pyrene	0.62	ca	--	0.09	3 / 3	No
Naphthalene	5.6	nc	--	0.095	2 / 3	No
Phenanthrene	--		--	0.2	3 / 3	Yes, NTX
Phenol	1833	nc	--	0.046	1 / 3	No
Pyrene	232	nc	--	0.36	3 / 3	No
4-Nitrotoluene	12	ca	--	0.066	1 / 35	No
Nitrate as N (NO3-N)	NA	0	--	32	24 / 35	No

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

Table LL5-14
Load Line 5 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	35 / 35	11371	18000	mg/kg	17700	Yes	600 ss2	Yes	No	Yes	ASL
	Arsenic	35 / 35	11	14	mg/kg	15.4	No	9.9 ss1	Yes	No	No	BLBKG
	Barium	35 / 35	74	220	mg/kg	88.4	Yes	283 ss1	No	No	No	BSL
	Beryllium	35 / 35	0.86	4.2	mg/kg	0.88	Yes	10 ss1	No	No	No	BSL
	Cadmium	31 / 35	0.59	3	mg/kg	0.00	Yes	4 ss1	No	No	No	BSL
	Calcium	35 / 35	13000	140000	mg/kg	15800	Yes	NUT	No	No	No	BSL
	Chromium	35 / 35	21	34	mg/kg	17.4	Yes	0.4 ss1	Yes	No	Yes	ASL
	Cobalt	35 / 35	8.2	13	mg/kg	10.4	Yes	20 ss1	No	No	No	BSL
	Copper	35 / 35	19	49	mg/kg	17.7	Yes	60 ss1	No	No	No	BSL
	Iron	35 / 35	21600	26000	mg/kg	23100	Yes	200 ss2	Yes	No	Yes	ASL
	Lead	35 / 35	41	170	mg/kg	26.1	Yes	40.5 ss1	Yes	No	Yes	ASL
	Magnesium	35 / 35	3451	16000	mg/kg	3030	Yes	NUT	No	No	No	BSL
	Manganese	35 / 35	547	3100	mg/kg	1450	Yes	100 ss2	Yes	No	Yes	ASL
	Nickel	35 / 35	20	33	mg/kg	21.1	Yes	30 ss1	Yes	No	Yes	ASL
	Potassium	35 / 35	1235	2100	mg/kg	927	Yes	NUT	No	No	No	BSL
	Selenium	30 / 35	0.73	1.8	mg/kg	1.4	Yes	0.21 ss1	Yes	No	Yes	ASL
	Sodium	35 / 35	302	970	mg/kg	123	Yes	NUT	No	No	No	BSL
	Vanadium	35 / 35	20	25	mg/kg	31.1	No	2 ss1	Yes	No	No	BLBKG
	Zinc	35 / 35	85	140	mg/kg	61.8	Yes	8.5 ss1	Yes	No	Yes	ASL
	Antimony	2 / 34	0.67	0.46	mg/kg	0.96	No	5 ss1	No	No	No	BLBKG
	Mercury	21 / 35	0.26	3	mg/kg	0.04	Yes	0.00051 ss1	Yes	Yes	Yes	ASL
	Thallium	5 / 35	0.29	0.28	mg/kg	0.00	Yes	1 ss1	No	No	No	BSL
PCBs	Aroclor 1254	1 / 3	0.024	0.038	mg/kg	--	NA	0.000332 ss4	Yes	No	Yes	ASL
SVOCs	2-Methylnaphthalene	2 / 3	0.051	0.11	mg/kg	--	NA	3.24 ss4	No	No	No	BSL
	Acenaphthene	1 / 3	0.018	0.021	mg/kg	--	NA	20 ss1	No	No	No	BSL
	Acenaphthylene	1 / 3	0.016	0.016	mg/kg	--	NA	628 ss4	No	No	No	BSL
	Anthracene	2 / 3	0.034	0.056	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Benzo(a)anthracene	3 / 3	0.11	0.19	mg/kg	--	NA	5.21 ss4	No	No	No	BSL
	Benzo(a)pyrene	3 / 3	0.11	0.15	mg/kg	--	NA	1.52 ss4	No	No	No	BSL
	Benzo(b)fluoranthene	3 / 3	0.14	0.19	mg/kg	--	NA	59.8 ss4	No	No	No	BSL
	Benzo(g,h,i)perylene	3 / 3	0.071	0.097	mg/kg	--	NA	119 ss4	No	No	No	BSL
	Benzo(k)fluoranthene	3 / 3	0.078	0.11	mg/kg	--	NA	148 ss4	No	No	No	BSL
	Benzyl alcohol	2 / 3	0.70	1.3	mg/kg	--	NA	658 ss4	No	No	No	BSL
	Carbazole	2 / 3	0.045	0.038	mg/kg	--	NA	--	NSL	No	Yes	NSL
	Chrysene	3 / 3	0.14	0.22	mg/kg	--	NA	4.73 ss4	No	No	No	BSL
	Dibenzo(a,h)anthracene	2 / 3	0.020	0.024	mg/kg	--	NA	18.4 ss4	No	No	No	BSL
	Dibenzofuran	2 / 3	0.028	0.039	mg/kg	--	NA	--	NSL	No	Yes	NSL
	Fluoranthene	3 / 3	0.24	0.42	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Fluorene	2 / 3	0.016	0.018	mg/kg	--	NA	122 ss4	No	No	No	BSL
	Indeno(1,2,3-cd)pyrene	3 / 3	0.062	0.09	mg/kg	--	NA	109 ss4	No	No	No	BSL
	Naphthalene	2 / 3	0.044	0.095	mg/kg	--	NA	0.0994 ss4	No	No	No	BSL
	Phenanthrene	3 / 3	0.14	0.2	mg/kg	--	NA	45.7 ss4	No	No	No	BSL
	Phenol	1 / 3	0.070	0.046	mg/kg	--	NA	30 ss1	No	No	No	BSL
	Pyrene	3 / 3	0.19	0.36	mg/kg	--	NA	78.5 ss4	No	No	No	BSL
Explosives	4-Nitrotoluene	1 / 35	0.099	0.066	mg/kg	--	NA	--	NSL	No	Yes	NSL
Other Analytes	Nitrate as N (NO3-N)	24 / 35	1.8	32	mg/kg	--	NA	--	NSL	No	Yes	NSL

Notes:
-- - no value available
mg/kg - means milligrams per Kilogram (parts per million - ppm)
ss1 - Preliminary Remediation Goals (Efroymson et al , 1997a)
ss2 - Toxiclogolgical Benchmarks for Soil and Litter Invertebrates (Efrymonson et al. 1997b)
ss3 - Toxiclogolgical Benchmarks for Terrestrial Plants (Efrymonson et al. 1997c)
ss4- Ecological Data Quality Level (USEPA Region 5, 1999)
NA - not applicable

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

Table LL5-15
Load Line 5 Ecological Risk Screening Tables for Sediment
RVAAP 14 AOC Characterization
Ravenna Army Ammunition Plant, Ravenna, Ohio

Group	Parameter	Frequency of Detection	Average Concentration	Maximum Detected Concentration	Units	Sediment Background Concentration	Maximum Concentration > Background	SRV	Maximum Concentration > SRV	Screening Value	Maximum Concentration > Screening value	PBT	COPC	COPC Rationale
Metals	Aluminum	3 / 3	7867	9900	mg/kg	13900	No	29000	No	--	NSL	No	No	BLBKG
	Arsenic	3 / 3	69	180	mg/kg	19.5	Yes	25	Yes	9.79 sd1	Yes	No	Yes	ASL
	Barium	3 / 3	122	220	mg/kg	123	Yes	190	Yes	--	NSL	No	Yes	NSL
	Beryllium	3 / 3	0.66	0.68	mg/kg	0.38	Yes	0.8	No	--	NSL	No	No	BLSRV
	Cadmium	3 / 3	3.3	6.4	mg/kg	0.00	Yes	0.79	Yes	0.99 sd1	Yes	No	Yes	ASL
	Calcium	3 / 3	7767	14000	mg/kg	5510	Yes	21000	No	NUT	No	No	No	BLSRV
	Chromium	3 / 3	56	130	mg/kg	18.1	Yes	29	Yes	43.4 sd1	Yes	No	Yes	ASL
	Cobalt	3 / 3	8.8	9.4	mg/kg	9.1	Yes	12	No	50 sd2	No	No	No	BLSRV
	Copper	3 / 3	148	340	mg/kg	27.6	Yes	32	Yes	31.6 sd1	Yes	No	Yes	ASL
	Iron	3 / 3	60667	100000	mg/kg	28200	Yes	41000	Yes	--	NSL	No	Yes	NSL
	Lead	3 / 3	524	1500	mg/kg	27.4	Yes	47	Yes	35.8 sd1	Yes	No	Yes	ASL
	Magnesium	3 / 3	2600	3200	mg/kg	2760	Yes	7100	No	NUT	No	No	No	BLSRV
	Manganese	3 / 3	680	1000	mg/kg	1950	No	1500	No	--	NSL	No	No	BLBKG
	Nickel	3 / 3	27	33	mg/kg	17.7	Yes	33	Yes	22.7 sd1	Yes	No	Yes	ASL
	Potassium	3 / 3	1400	1700	mg/kg	1950	No	6800	No	NUT	No	No	No	BLBKG
	Selenium	1 / 3	1.4	2.5	mg/kg	1.7	Yes	1.7	Yes	--	NSL	No	Yes	NSL
	Sodium	3 / 3	437	730	mg/kg	112	Yes	NA	NA	NUT	No	No	No	BSL
	Vanadium	3 / 3	26	32	mg/kg	26.1	Yes	40	No	--	NSL	No	No	BLSRV
	Zinc	3 / 3	663	1700	mg/kg	532	Yes	160	Yes	121 sd1	Yes	No	Yes	ASL
	Antimony	1 / 2	1.9	3.1	mg/kg	0.00	Yes	1.3	Yes	--	NSL	No	Yes	NSL
	Mercury	3 / 3	0.80	1.9	mg/kg	0.06	Yes	0.12	Yes	0.18 sd1	Yes	Yes	Yes	ASL
Other Analytes	Nitrate as N (NO3-N)	1 / 3	2.2	4.4	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
PBT- persistent, bioaccumulative and toxic
NSL - no screening level
ASL- above screening level
BSL - below screening level
SRV-Sediment Reference Value

Table LL5-16
Load Line 5 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	5 / 8	579	1900	ug/l	3370	No	--	NSL	No	No	BLBKG
	Barium	8 / 8	25	34	ug/l	47.5	No	2000 sw1	No	No	No	BLBKG
	Cadmium	3 / 8	0.74	0.33	ug/l	0.00	Yes	4.8 sw1[H]	No	No	No	BSL
	Calcium	8 / 8	35500	42000	ug/l	41400	Yes	NUT	No	No	No	BSL
	Chromium	4 / 8	3.3	2.9	ug/l	0.00	Yes	1891 sw1[H]	No	No	No	BSL
	Copper	4 / 8	3.8	3.2	ug/l	7.9	No	15 sw1[H]	No	No	No	BLBKG
	Iron	7 / 8	684	2700	ug/l	2560	Yes	--	NSL	No	Yes	NSL
	Magnesium	8 / 8	4250	6500	ug/l	10800	No	NUT	No	No	No	BLBKG
	Manganese	8 / 8	27	75	ug/l	391	No	--	NSL	No	No	BLBKG
	Nickel	1 / 8	4.6	1.6	ug/l	0.00	Yes	493 sw1[H]	No	No	No	BSL
	Potassium	8 / 8	9725	28000	ug/l	3170	Yes	NUT	No	No	No	BSL
	Selenium	1 / 8	7.0	3.6	ug/l	0.00	Yes	--	NSL	No	Yes	NSL
	Sodium	7 / 8	1986	4200	ug/l	21300	No	NUT	No	No	No	BLBKG
	Vanadium	5 / 8	2.9	3	ug/l	0.00	Yes	150 sw1	No	No	No	BSL
	Zinc	6 / 8	26	81	ug/l	42	Yes	126 sw1[H]	No	No	No	BSL
	Arsenic	1 / 8	1.0	1.2	ug/l	3.2	No	340 sw1	No	No	No	BLBKG
	Lead	2 / 8	1.3	0.98	ug/l	0.00	Yes	132 sw1[H]	No	No	No	BSL
	Mercury	1 / 8	0.096	0.064	ug/l	0.00	Yes	1.7 sw1	No	Yes	Yes	PBT
SVOCs	1,3-Dichlorobenzene	1 / 8	0.91	0.44	ug/l	--	NA	79 sw1	No	No	No	BSL
	Benzo(a)anthracene	2 / 8	0.11	0.17	ug/l	--	NA	--	NSL	No	Yes	NSL
	Benzo(a)pyrene	1 / 8	0.20	0.25	ug/l	--	NA	--	NSL	No	Yes	NSL
	Benzo(b)fluoranthene	1 / 8	0.19	0.18	ug/l	--	NA	--	NSL	No	Yes	NSL
	Benzo(g,h,i)perylene	1 / 8	0.47	0.32	ug/l	--	NA	--	NSL	No	Yes	NSL
	Benzo(k)fluoranthene	2 / 8	0.22	0.36	ug/l	--	NA	--	NSL	No	Yes	NSL
	Bis(2-ethylhexyl) phthalate	3 / 8	8.0	12	ug/l	--	NA	1100 sw1	No	No	No	BSL
	Chrysene	2 / 8	0.23	0.23	ug/l	--	NA	--	NSL	No	Yes	NSL
	Dibenzo(a,h)anthracene	1 / 8	0.21	0.31	ug/l	--	NA	--	NSL	No	Yes	NSL
	Indeno(1,2,3-cd)pyrene	2 / 8	0.21	0.29	ug/l	--	NA	--	NSL	No	Yes	NSL
	Pyrene	1 / 8	0.44	0.14	ug/l	--	NA	42 sw1	No	No	No	BSL
Propellants	Nitroglycerine	1 / 2	0.60	0.21	ug/l	--	NA	160 sw1	No	No	No	BSL
Other Analytes	Nitrate as N (NO3-N)	8 / 8	837613	2600000	ug/l	--	NA	--	NSL	No	Yes	NSL

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 106 (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 LL5-17
Load Line 5 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	Arsenic		X	
	Beryllium			
	Cadmium		X	
	Chromium	X	X	
	Copper		X	
	Iron	X		Q
	Lead	X	X	
	Magnesium			
	Nickel	X	X	
	Selenium	X		Q
	Vanadium			
	Zinc	X	X	
	Antimony			
	Arsenic		X	
	Lead	X	X	
	Mercury	X	X	X
PCBs	Aroclor 1254	X		
SVOCs	Benzo(a)anthracene			Q
	Benzo(a)pyrene			Q
	Benzo(b)fluoranthene			Q
	Benzo(g,h,i)perylene			Q
	Benzo(k)fluoranthene			Q
	Carbazole	Q		
	Chrysene			Q
	Dibenzo(a,h)anthracene			Q
	Dibenzofuran	Q		
	Indeno(1,2,3-cd)pyrene			Q
Explosives	4-Nitrotoluene	Q		
Other Analytes	Nitrate as N (NO3-N)	Q		Q

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