PARSONS

100 High Street, 4th Floor • Boston, Massachusetts 02110 • (617) 946-9400 • Fax (617) 946-9777 • www.parsons.com

September 28, 2009

Mr. John Hill
U.S. Air Force Center for Engineering and the Environment
HQ AFCEE/IWP
3300 Sidney Brooks
Brooks City-Base, TX 78235-5112

SUBJECT: Annual Report – Year 2 for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17) Sites at Seneca Army Depot Activity; Contract FA8903-04-D-8675, Delivery Order 0031, CDRL A001G

Dear Mr. Hill:

Parsons Infrastructure & Technology Group Inc. (Parsons) is pleased to submit the final Annual Report – Year 2 for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17) for sites at the Seneca Army Depot Activity (SEDA) in Romulus, New York. Included with this report are responses to USEPA and NYSDEC comments received on the draft document issued April 13, 2009.

This work was performed in accordance with the Scope of Work (SOW) for Contract No. FA8903-04-D-8674, Task Order No. 0031.

Parsons appreciates the opportunity to provide you with the report for this work. Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E., VP
Project Manager

Enclosure
cc: J. Chavez, AFCEE
S. Absolom, SEDA
K. Hoddinott, USACHPPM
R. Walton, USAEC
R. Battaglia, USACE - NY District
T. Battaglia, USACE - NY District
AFCEE Contact Data Library (letter only via email)

PARSONS

100 High Street, 4th Floor • Boston, Massachusetts 02110 • (617) 946-9400 • Fax (617) 946-9777 • www.parsons.com

September 28, 2009

Mr. Julio Vazquez
USEPA Region II
Superfund Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

Mr. Kuldeep K. Gupta, P.E.
New York State Department of Environmental Conservation (NYSDEC)
Division of Environmental Remediation
Remedial Bureau A, Section C
625 Broadway
Albany, NY 12233-7015

Mr. Mark Sergott
Bureau of Environmental Exposure Investigation
Flanigan Square, Room 300
547 River Street
Troy, NY 12180

SUBJECT: Annual Report – Year 2 for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17) Sites at Seneca Army Depot Activity; EPA Site ID# NY0213820830 and NY Site ID# 8-50-006

Dear Mr. Vazquez/Mr. Gupta/Mr. Sergott:

Parsons Infrastructure & Technology Group Inc. (Parsons) is pleased to submit the final Annual Report – Year 2 for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17) sites at the Seneca Army Depot Activity (SEDA) in Romulus, New York (USEPA Site ID# NY0213820830 and NY Site ID# 8-50-006). Included with this report are responses to USEPA and NYSDEC comments received on the draft document issued April 13, 2009.

Parsons appreciates the opportunity to provide you with this report for this work. Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E., VP
Project Manager

Enclosures
cc: M. Heaney, TechLaw
R. Walton, USAEC
J. Chavez, AFCEE
S. Absolom, SEDA
R. Battaglia, USACE-NY
AFCEE CDL (letter only)
K. Hoddinott, USACHPPM
T. Battaglia, USACE-NY

Army's Response to Comments from the New York State Department of Environmental Conservation

Subject: Annual Report - Year 2 for SEAD-16 and SEAD-17
Seneca Army Depot
Romulus, New York

Comments Dated: May 12, 2009

Date of Comment Response: June 15, 2009

Army's Response to Comments

SPECIFIC COMMENTS

Comment 1: Section 3.6.1

The concentration and presence of lead in GW at SEAD 16 were observed to increase in the Year 2 event compared to Year 1. The concentration of Manganese also detected at MW 17-4 increased from 59J ug/L during Year 1 to a concentration of 2,671 ug/L.

Understanding that there will always be some variation and fluctuation in metal concentration observed in the groundwater, but please include explanations where possible whenever these are significant increases.

Response 1: The evaluation completed in the "Annual Report, Year 2" noted in Section 3 and Section 5 that observed increases in some metals' concentrations may be due to the level of turbidity in the samples. In accordance with the recommendation of the Report, annual groundwater monitoring will continue next year and changes in the concentrations of metals and the turbidity levels will be evaluated as more data are collected. Future reports will emphasize significant changes and apparent rational for the change addressed.

Army's Response to Comments from the United States Environmental Protection Agency

Subject: Annual Report - Year 2 for SEAD-16 and SEAD-17
Seneca Army Depot
Romulus, New York

Comments Dated: June 24, 2009

Date of Comment Response: July 29, 2009

Army's Response to Comments

GENERAL COMMENTS

Comment 1: According to the Annual Report, the Record of Decision (ROD) prohibits access to and use of groundwater at SEAD-16 and SEAD-17 "until groundwater cleanup standards are met;" however, it is unclear what these cleanup standards are. According to Section 2.5, Remedial Action Summary, groundwater monitoring results will be screened against New York State Department of Environmental Conservation (NYSDEC) Ambient Water Quality Criteria Class GA Standards (Class GA Standards). However, according to Section 3.4, Year 2 Groundwater Data Analysis for SEAD-16, and Section 3.5, Year 2 Groundwater Data Analysis for SEAD-17, groundwater access and use restrictions will remain in effect "until the groundwater concentrations have been reduced to levels below applicable Class GA and MCL standards, and until data [are provided] that document acceptable groundwater quality is present [at SEAD-16 and SEAD-17]…" Revise the Annual Report to clarify which criteria [e.g., Class GA Standards, federal maximum contaminant levels (MCLs), etc.] the annual groundwater monitoring results will be screened against in order to meet the requirements of the ROD. In addition, ensure that a consistent discussion of and comparison to applicable criteria is provided throughout the Annual Report.

Response 1: The groundwater cleanup standards referenced in the signed ROD for SEAD-16 and SEAD-17 are the EPA MCLs and the NYSDEC AWQC Class GA standards. The more conservative value identified in the two standards is used as the action level for contaminants of concern (COC). Additionally, the MCL value is used when the GA standard is identified only as a guidance value for a COC. Sections of the annual report which reference the cleanup levels will be revised accordingly.

Comment 2: Section 1.0, Introduction, of the Annual Report states that the ROD required the implementation of land use controls (LUCs) which prohibit the use of land at SEAD-16 and SEAD-17 "for residential purposes and access to and use of groundwater until cleanup standards are met." The Annual Report does not describe the mechanism by which LUCs were established (i.e., a legally enforceable and transferable restrictive covenant on the property deed, etc.), and what measures, if any, have been implemented as part of the LUCs to prevent exposure to groundwater. Revise the Annual Report to describe the mechanism by which LUCs were established, and describe all measures that have been implemented as part of the LUCs to restrict access to groundwater.

Response 2: A summary of the LUC Remedial Design Addendum 4 will be included in section 1.0 of the annual report. The text to be included in the report is shown below:

The details of implementing the LUC for SEAD-16 and SEAD-17 will be provided in the Land Use Control Remedial Design (LUC RD) Addendum 4. The LUC objective for SEAD-16 and SEAD-17 is to prevent access to or use of groundwater, and to prevent residential use until cleanup levels are met. The LUC 4 will indicate that the LUC implementation actions at the affected sites may include lease restrictions, an environmental easement, deed restrictions, zoning, annual certification, and a five-year review. The annual certification will be submitted to the NYSDEC and EPA to document that the LUC at SEAD-16 and SEAD-17 is unchanged and that no activities have occurred that impair or violate the ability of the LUC to protect the public health and environment. Additionally, a five-year review will be conducted to evaluate the effectiveness of the selected remedy for SEAD-16 and SEAD-17.

Comment 3: According to Section 3.2, Year 2 Groundwater Sampling, monitoring well MW16-3 was destroyed during the remedial action and was not sampled. No comment on the significance of the exclusion of this well has been provided in the Annual Report, and it is unclear whether a data gap now exists in the monitoring well network at SEAD-16. Provide a discussion in the Annual Report which addresses this issue. In addition, provide the former location of well MW16-3 on Figure 3, SEAD-16 Site Plan.

Response 3: Figure 3 was revised to include the location of former monitoring well MW16-3. Destruction of monitoring well MW16-3 does not present a data gap since there are monitoring wells located down gradient from the location of the former well.

Comment 4: Section 3.4, Year 2 Groundwater Data Analysis for SEAD-16, of the Annual Report states that "identified contaminants are randomly detected in isolated wells." It is unclear what the basis is for this conclusion given that the concentrations of antimony, iron, iron and manganese, lead, and sodium detected in the sample collected from well MW16-7, a well located adjacent to and downgradient of the abandoned deactivation furnace, exceeded the Class GA Standards and/or MCLs. In addition, the concentrations of antimony, iron, and iron and manganese detected in the sample collected from well MW16-5, a well located downgradient of well MW16-7 and the abandoned deactivation furnace exceeded the Class GA Standards. Revise the Annual Report to include further justification for the conclusion that metals concentrations are randomly distributed at SEAD-16, given the exceedances in the source area well (MW16-7) and downgradient well (MW16-5).

Response 4: The conclusion that "identified contaminants are randomly detected in isolated wells" is based on the lack of a clear pattern of contaminant distribution that can not be ascertained from the 2008 groundwater data. The COC were detected in the groundwater above the federal and state standards at a multiplicity of the monitoring wells. The distribution of the COC currently detected in the groundwater is not indicative of a release. Monitoring of the groundwater will be continued and the data will be evaluated in the future. Refer to Comment 5 for text changes.

Comment 5: According to Section 3.4, Year 2 Groundwater Data Analysis for SEAD-16, and Section 3.5, Year 2 Groundwater Data Analysis for SEAD-17, the concentrations of metals detected at SEAD-16 and SEAD-17 may be influenced by the fluctuation of groundwater turbidity levels found in the wells at the time of sampling. An evaluation of the turbidity data in comparison to the detected analytes has not been provided to support the aforementioned assumption. Revise the Annual Report to include an evaluation of turbidity levels in comparison to detected metals concentrations and provide a comparison of data collected in Year 2 versus Year 1 to support the aforementioned assumption. It is also recommended that field sampling forms be provided as supporting documentation, and to show the range of turbidity levels that were observed during sampling.

Response 5: An evaluation of the turbidity data for SEAD-16 and SEAD-17 will be included in the report and the revised text is shown below:

SEAD-16

In general, there does not appear to be evidence of an area-wide or expanding plume at SEAD-16, as identified by the contaminant concentrations detected in the groundwater monitoring wells. The distribution of metal concentrations observed in the SEAD-16 wells may be associated with the fluctuation of the groundwater turbidity levels found in the individual wells during the sampling conducted. Metal concentrations detected in the groundwater from wells MW16-1, MW-16-4, and MW16-6 maybe influenced by turbidity levels since concentrations were observed to have increased with elevated turbidity readings. Turbidity levels did not appear to play a significant factor in the concentrations found in well MW16-2. Turbidity readings for wells MW16-5 and MW16-7 were not reliable due to the meter malfunctioning. Nevertheless, access to and use of the groundwater is restricted at the AOC under the terms of the ROD and the groundwater is not being used as a potable water source. A municipal water supply derived from a non-groundwater source is available for the Depot and its current distribution includes the PID area. The groundwater access/use restriction will remain in effect at SEAD-16 until the groundwater concentrations have been reduced to levels below applicable Class GA and MCL standards, and until data that documents acceptable groundwater quality is present in the AOC is provided to and approved by the oversight agencies.

SEAD-17

Although sample results indicate that iron, manganese, and the combined iron plus manganese analyte exceed GA standards in individual Year 2 samples, there does not appear to be any indication that conditions are deteriorating at SEAD-17. As is the case at SEAD-16, the groundwater concentrations detected in the wells at SEAD-17 may also be associated with the varying levels of turbidity found in the wells at the time of sampling. As similar to SEAD-16, turbidity levels did not play a significant factor in the metal concentrations found in the groundwater from wells MW17-1, and MW17-5. However, turbidity readings for wells MW17-2, MW17-3, and MW17-4 were not reliable due to the meter malfunctioning.

Comment 6: According to Section 3.7, Routine Inspections of Monitoring Wells for SEAD-16 and SEAD-17, damage to the surface seals/concrete pads at several wells was observed, and a small section of riser pipe was removed from wells MW16-2, MW16-5, and MW17-3 during the Year 2 sampling event. It is unclear whether the surface seals/concrete pads have been repaired. Revise the Annual Report to clarify if this issue has been resolved and if not, when it will be. In addition, document how the depth-to-groundwater measurements at the aforementioned wells will be adjusted to account for the removal of a portion of riser.

Response 6: The December 2008 groundwater elevation data summarized on Tables 1 and 2 were revised for the three monitoring wells where a section of the PVC riser pipe was removed. The top of the PVC elevations, depth to groundwater and water table elevations were adjusted to account for the difference of the new PVC elevation as shown on the attached tables.

The surface seals/concrete pads for the three wells have not currently been repaired. Evaluations of the condition of the wells are currently being performed to asses if the seal/concrete pads can be repaired.

Comment 7: Groundwater elevation data for SEAD-16 and SEAD-17 are provided in Tables 1 and 2 of the Annual Report, but figures depicting groundwater flow direction have not been provided. As supporting documentation for the groundwater flow directions described in the text of the document, revise the Annual Report to include site figures which plot the groundwater elevation data and show the direction of groundwater flow.

Response 7: Figures that show the groundwater flow direction for SEAD-16 and SEAD-17 have been prepared and will be referenced in the report.

Comment 8: Concentrations of lead in groundwater at source area monitoring well MW16-7 at SEAD-16 more than tripled between the Year 1 and Year 2 sampling events (from a concentration of 26.5 micrograms per liter (ug/l) in 2007 to 88.6 ug/l in 2008). The federal groundwater action level for lead is 15 ug/l. Furthermore, the concentrations of lead in this well have increased from the initial pre-remedial sampling rounds summarized in Appendix A, Historic Groundwater Data. During the three pre-remedial sampling rounds, lead was detected in well MW16-7 below the action level. The Annual Report does not address the significance of this increase. An increase in lead concentrations may be indicative of a continuing source of contamination in soil. Revise the Annual Report to address the significance of the increase in lead concentrations in groundwater at monitoring well MW16-7 between the pre-remedial sampling rounds and the Year 1 and 2 sampling rounds.

Response 8: The Army will continue to monitor the distribution of contaminant concentrations detected in the groundwater from the wells located at SEAD 16 and SEAD-17. At this time, additional data are required to evaluate the concentrations trends in the groundwater. The LTM program will be evaluated if future data indicates an increase of concentrations for the COC.

SPECIFIC COMMENTS

Comment 1: Section 3.5, Year 2 Groundwater Data Analysis for SEAD-17, Page 3-3. As stated in this section, monitoring well MW17-3 is described as an upgradient well; however, based on review of the groundwater table elevation data provided and the fact that groundwater flow was cited to be in a general southwesterly direction, it appears that well MW17-3 is not upgradient of the deactivation furnace at SEAD-17. Revise the Annual Report to address this concern or provide a figure which depicts groundwater contours to support this conclusion.

Response 1: The text will be revised to indicate that well MW17-3 is a down gradient monitoring well. The revised text is shown below.

Elevated iron concentrations detected were 1,300 ug/L in MW17-3, and 1,760 ug/L in MW17-4, which are both downgradient wells.

Comment 2: Table 3, SEAD-16 Post-Remedial Action Groundwater Monitoring Summary, and Table 4, SEAD-17 Post-Remedial Action Groundwater Monitoring Summary. The notes on both of these tables incorrectly refer to the MCLs as Maximum Contamination Limits. Please note that MCL stands for Maximum Contaminant Level. Revise the Annual Report accordingly. This comment also applies to notes included on the Appendix A and B summary tables.

Response 2: Maximum Contamination Limits was changed to Maximum Contaminant Level on Tables 3 and 4 and the summary tables included in Appendices A and B.

US Army Corps of Engineers

Air Force Center for Engineering and the Environment

01498

Seneca Army Depot Activity
Romulus, New York

FINAL
ANNUAL REPORT - YEAR 2

THE ABANDONED DEACTIVATION FURNACE (SEAD-16)
AND THE ACTIVE DEACTIVATION FURNACE (SEAD-17)
SENECA ARMY DEPOT ACTIVITY

AFCEE CONTRACT NO. FA8903-04-D-8675
TASK ORDER NO. 0031
CDRL A001G

EPA SITE ID# NY0213820830
NY SITE ID# 8-50-006

PARSONS
SEPTEMBER 2009

FINAL ANNUAL REPORT – YEAR 2

FOR THE ABANDONED DEACTIVATION FURNACE (SEAD-16)
AND THE ACTIVE DEACTIVATION FURNACE (SEAD-17)
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY

Prepared for:

AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT

BROOKS CITY-BASE, TEXAS

and

SENECA ARMY DEPOT ACTIVITY

ROMULUS, NY

Prepared by:

PARSONS
100 High Street
Boston, MA 02110

Contract Number FA8903-04-D-8675
Task Order 0031, CDRL A001G
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

September 2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This second Annual Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17) sites at the Seneca Army Depot Activity (SEDA or the Depot) in Romulus, New York provides a review of annual groundwater monitoring data collected in 2008, recommendations for future long-term monitoring at SEAD-16 and SEAD-17, and the annual review of the effectiveness of the remedy implemented in 2007.

In accordance with the Record of Decision (ROD) for SEAD-16 and SEAD-17 (Parsons, 2006) and the Remedial Design Work Plan and Design Report (Parsons, 2007) (Final Work Plan), a remedial action was completed in August 2007 for both areas of concern (AOCs) and the work is documented in the "Final Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)" (Parsons, 2008) (CCR). The remedial action at SEAD-16 involved the removal of 1,862 cubic yards (cy) of soil impacted with metals and polycyclic aromatic hydrocarbons (PAHs) and the removal of 2,565 cy of metal impacted soil from SEAD-17.

The ROD for both AOCs also required the implementation of land use controls (LUCs) that prohibits use of the land at the AOCs for residential purposes and access to and use of the groundwater until applicable cleanup standards are met [i.e., New York State Class GA Ambient Water Quality Standards (AWQS) and/or United States Environmental Protection Agency (EPA) maximum contaminant levels (MCLs)]. Once groundwater cleanup standards have been achieved, the groundwater use restrictions may be eliminated with approval of the EPA and the New York State Department of Environmental Conservation (NYSDEC). SEAD-16 and SEAD-17 are located within the Planned Industrial/Office Development and Warehousing (PID) area, which has area-wide LUCs that prohibit the development and use of the property for residential housing, elementary or secondary schools, childcare facilities and playgrounds, and prohibits access to and use of groundwater until the concentrations have been reduced to levels that allow for unlimited exposure and unrestricted use.

The details of implementing the LUC for SEAD-16 and SEAD-17 will be provided in the Land Use Control Remedial Design (LUC RD) Addendum 4. The LUC objective for SEAD-16 and SEAD-17 is to prevent access to or use of groundwater, and to prevent residential use until cleanup levels are met. The LUC 4 will indicate that the LUC implementation actions at the affected sites may include lease restrictions, an environmental easement, deed restrictions, zoning, annual certification, and a five-year review. The annual certification will be submitted to the NYSDEC and EPA to document that the LUC at SEAD-16 and SEAD-17 is unchanged and that no activities have occurred that impair or violate the ability of the LUC to protect the public health and environment. Additionally, a five-year review will be conducted to evaluate the effectiveness of the selected remedy for SEAD-16 and SEAD-17.

Long-term groundwater monitoring (LTM) is being performed at SEAD-16 and SEAD-17 as part of the post-closure monitoring and maintenance (PCMM) operations in accordance with the ROD and outlined in the Final Work Plan. The first year (Year 1) groundwater sampling event conducted as part of the LTM for SEAD-16 and SEAD-17 was performed in December 2007 and results were

documented in the CCR. The second year (Year 2) groundwater sampling event was conducted in December 2008 for both of the AOCs for which this report has been prepared.

2.0 SITE BACKGROUND

2.1 Site Description

SEDA is a 10,587-acre former military facility located in Seneca County near Romulus, New York, which was wholly owned by the United States Government and operated by the Department of the Army between 1941 and 2000; since 2000 portions of the former Depot have been transferred to other parties for reuse. SEDA's primary mission was the receipt, storage, maintenance, and supply of military items. A location map for SEDA is shown in **Figure 1**. SEDA is located between Seneca Lake and Cayuga Lake in Seneca County, and is bordered by New York State Highway 96 to the east, New York State Highway 96A to the west, and sparsely populated farmland to the north and south.

SEAD-16 and SEAD-17 are located in the east-central portion of the former Depot, within the Depot's former ammunition storage area where vehicular and pedestrian access is restricted. SEAD-16 and SEAD-17 are now located in the portion of the former Depot where the land is designated for future planned industrial / office development and warehousing uses. The location of SEAD-16 and SEAD-17 is shown on **Figure 2**.

Both AOCs were used for the demilitarization of various small arms munitions. The munitions deactivation process involved heating the munitions within a rotating steel kiln. The heat would cause the munitions to detonate once the detonation temperature was reached. The byproducts produced during this detonation were then either swept out of the kiln through the stack or were expelled from the kiln as bottom ash or debris.

SEAD-16 has been inactive and abandoned since the 1960s and consists of 2.6 acres of fenced land with grasslands in the north, east, and west, and a storage area for empty boxes and wooden debris and an unpaved roadway in the south. Building S-311, which previously housed the deactivation furnace was demolished as part of the remedial action at SEAD-16, and the results are documented in the "Building Cleaning and Building Demolition Completion Report" (Parsons, 2008). Also present on site is a smaller abandoned building known as the Process Support Building (Building S-366), two sets of SEDA railroad tracks, and utilities.

SEAD-17 was constructed to replace the deactivation furnace at SEAD-16. However, SEAD-17 has been inactive since 1989 as a result of Resource Conservation and Recovery Act (RCRA) permitting issues. SEAD-17 formerly consisted of the deactivation furnace building (building S-367) which was also demolished during the remedial action. Details of and the results of the demolition are documented in the Building Cleaning and Building Demolition Completion Report. SEAD-17 is surrounded by a crushed shale road, beyond which are grasslands. Also present on site are two small sheds located in the eastern portion of SEAD-17. Vehicular access to SEAD-17 is via an unpaved road to the north.

2.2 Site Hydrology

The hydrogeologic setting for SEAD-16 and SEAD-17 was described in detail in Sections 3.1.6 and 3.2.6 respectively, of the "Final Remedial Investigation (RI) Report at the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17)" (Parsons, 1999). A brief

summary of hydrogeologic conditions and chemical impacts found in the RI Report is presented below for each site.

2.2.1 SEAD-16

Three groundwater monitoring wells (MW16-1, MW16-2, and MW16-3) were installed as part of the Expanded Site Investigation (ESI) conducted at SEAD-16 in 1993/1994. Four additional groundwater monitoring wells (MW16-4, MW16-5, MW16-6, and MW16-7) were installed during the RI. The locations of the seven groundwater monitoring wells installed at SEAD-16 are shown on **Figure 3**.

The depth to water was measured at SEAD-16 on three different occasions (April 1994, August 1996 and December 1996) prior to the finalization of the RI Report and varied from between 2.20 feet in MW16-5 (December 1996) to 6.45 feet in MW16-1 (August 1996). Groundwater flow direction at SEDA generally trends to the west based on previous subsurface investigations conducted at the Depot. Previous investigation data also suggests that a groundwater divide exists near and approximately parallel to Route 96 near Romulus, New York, indicating that the groundwater in the area encompassing SEAD-16 flows west. The groundwater elevation data are difficult to interpret due to localized areas of roof drain outlets, paved areas, swales, etc. that affect water levels, though all rounds indicated a component of westerly, southwesterly flow at SEAD-16. Available elevation data indicate that there may be a regional groundwater high southwest of the former Building S-311, which could contribute to local fluctuations in groundwater flow.

Horizontal hydraulic conductivities were determined for five wells screened in the till/weathered shale zone at SEAD-16. The saturated thickness in the till/weathered shale aquifer was less than 2 feet when tested in September 1996. Hydraulic conductivity values for the shallow till/weathered shale aquifer range from 2.8×10^{-3} cm/sec to 2.5×10^{-2} cm/sec and the geometric mean was 7.3×10^{-3} cm/sec.

2.2.2 SEAD-17

Four groundwater monitoring wells (MW17-1, MW17-2, MW17-3, and MW17-4) were installed as part of the ESI conducted at SEAD-17. One additional groundwater monitoring well, MW17-5, was installed during the RI. The locations of the five groundwater monitoring wells installed at SEAD-17 are shown on **Figure 4.**

The depth to groundwater was measured at SEAD-17 during the same time as SEAD-16. The depth to water varied between 2.38 feet in MW17-3 (April 1994) to 7.64 feet in MW17-1 (August 1996). Groundwater flow appears to be in a southwesterly direction based on the elevation data.

The horizontal hydraulic gradient was calculated to be 0.01ft/ft between monitoring wells MW17-1 and MW17-3. Hydraulic conductivities were found to range from 2.9×10^{-3} cm/sec to 1.4×10^{-2} cm/sec.

2.3 Pre-Remedial Action Soil and Groundwater Conditions for SEAD-16

Pre-Remedial Action Soil Conditions

The primary historic constituents of concern (COCs) at SEAD-16 for soil included arsenic, copper, lead, and zinc. The highest concentrations of soil contamination resulted from the operations that

were performed within and in close proximity to the Abandoned Deactivation Furnace Building and the Process Support Building. Additionally, carcinogenic PAHs were detected in soils found at discrete locations within the AOC with the highest concentrations detected in the surface soil samples collected adjacent to the northwestern corner of the Abandoned Deactivation Furnace Building.

Metals (antimony, copper, lead, mercury, and zinc) were found at concentrations greater than the site-specific cleanup goals in soils located in portions of the surrounding man-made drainage ditches.

Pre-Remedial Action Groundwater Conditions

Prior to completion of the remedial action, three rounds of groundwater sampling were conducted at SEAD-16. Compounds detected in the groundwater samples collected during the low-flow sampling events in 1996 are presented in **Appendix A** (**Table A-1**). For complete groundwater data results refer to the RI report. Metals were detected above the applicable New York State Class GA standards or EPA MCLs. All of these exceedances were less than or close to SEDA background concentrations, except for sodium. The Final Work Plan summarized that although metals had been detected in the groundwater above their respective standards during previous sampling events, the groundwater was not impacted by site activities based on a comparison to groundwater data collected from unaffected parts of the Depot.

2.4 Pre-Remedial Action Soil and Groundwater Conditions for SEAD-17

Pre-Remedial Action Soil Conditions

The primary historic COCs in the soil at SEAD-17 were metals, including antimony, arsenic, copper, lead, mercury, and zinc. The detected concentrations of metals were found to be highest in those samples collected closest to the Active Deactivation Furnace Building, particularly near the southwestern area near the building.

Pre-Remedial Action Groundwater Conditions

Prior to the completion of the remedial action, three rounds of groundwater sampling were conducted at SEAD-17 similar to the sampling that was conducted at SEAD-16 (April 1993 for the ESI and August and December 1996 for the RI). Compounds detected in the groundwater samples collected during the low-flow sampling events in 1996 are presented in **Appendix A** (**Table A-2**). Metals were detected at concentrations above the applicable Class GA or MCL standard levels; however, these levels were less than SEDA background concentrations, except for sodium. The Final Work Plan summarized that although metals had been detected in the groundwater during previous sampling events, the groundwater was not impacted by site activities based on a comparison to groundwater data collected from unaffected parts of the Depot.

2.5 Remedial Action Summary

The selected remedy for SEAD-16 and SEAD-17 consisted of the following elements:

- Excavation of soil impacted with metals and PAHs at concentrations greater than the site-specific cleanup standards;

- Stabilization of excavated soil exceeding the toxicity characterization leaching procedure;
- Disposal of the material in an off-site landfill;
- Backfilling the excavated areas with clean backfill;
- Groundwater monitoring until concentrations are below applicable New York State Class GA or MCL standard levels;
- Establishment and maintenance of LUCs to prevent access to or use of the groundwater and prevent residential use of the land until cleanup standards are met; and
- Performance of a review of the selected remedy every 5 years to evaluate if the remedy remains protective of the public health and the environment in accordance with Section 121(c) of the CERCLA.

The excavation of the impacted soil at SEAD-16 and SEAD-17 began on July 9, 2007 and was completed on August 2, 2007 with 1,862 cy of impacted soil removed from SEAD-16 and 2,565 cy of impacted soil removed from SEAD-17. The limit of the excavations for SEAD-16 is shown on **Figure 3** and for SEAD-17 on **Figure 4**.

Soil was excavated from both SEAD-16 and SEAD-17 until confirmatory soil samples collected from the sidewalls, when appropriate, and the floor of the excavation, and from perimeter samples were below the site specific cleanup standards. The depth of excavation completed at SEAD-16 varied from 1 to 3 feet below ground surface (bgs) and the excavation depth at SEAD-17 varied from 1 to 2 feet bgs. The impacted soil from SEAD-16 and SEAD-17 was transported off-site, and disposed as non-hazardous material at the Ontario County Landfill in Flint, New York.

The deeper excavations at SEAD-16 and SEAD-17, including the excavation areas surrounding the railroad tracks, were backfilled with clean bank-run gravel. SEAD-16 and SEAD-17 were graded to promote positive drainage. The areas at SEAD-17 that were vegetated prior to the remedial action were seeded to restore the vegetation. SEAD-16 was not seeded since it was not previously vegetated.

3.0 Long Term Monitoring Results

3.1 Summary of Year 1 Groundwater Event

The first post-remedial action long-term groundwater monitoring event (Year 1) was performed at SEAD-16 and SEAD-17 from December 19, 2007 through December 21, 2007. The results of the Year 1 event are reported in the CCR.

In brief, at SEAD-16 five metals (antimony, iron, lead, manganese, and sodium) of concern were detected at concentrations above their respective Class GA or MCL standard levels. At SEAD-17, two metals, antimony and sodium, were each detected once at concentrations above their Class GA groundwater standards. All other metals detected at either site were below their respective Class GA groundwater standards. With the noted exception of sodium concentrations detected at SEAD-16, the concentrations detected at both SEAD-16 and SEAD-17 were below SEDA background concentrations. The CCR concluded that the groundwater does not appear to be impacted by historic site activities.

3.2 Year 2 Groundwater Sampling

The Year 2 post-remedial action groundwater sampling event was conducted at SEAD-16 and SEAD-17 from December 9, 2008 through December 11, 2008. Groundwater samples were collected from the six monitoring wells (MW16-1, MW16-2, MW16-4, MW16-5, MW16-6, and MW16-7) located at SEAD-16. Well MW16-3 was destroyed during the remedial action and was not sampled. Groundwater samples were collected from the five original monitoring wells (MW17-1, MW17-2, MW17-3, MW17-4, and MW17-5) located at SEAD-17.

The samples were collected using low flow sampling techniques. A bladder pump was used to collect the samples from the wells. Sampling procedures, sample handling and custody, holding times, and collection of field parameters were conducted in accordance with the "Revised Final Sampling and Analysis Plan for Seneca Army Depot Activity (SAP)" (Parsons, 2006c). Samples were collected from the 11 wells and submitted to TestAmerica for analysis of the following analytes:

- Antimony and Thallium by USEPA SW846 Method 6020;
- Mercury by USEPA SW846 7470A; and
- TAL metals by USEPA SW846 Method 6010B.

Quality controls (QC) samples were also collected including one duplicate and one matrix spike/matrix spike duplicate (MS/MSD) at MW16-4. In the field, pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), conductivity, temperature, and turbidity were also collected from each well during the purging of the well prior to sampling.

3.3 Year 2 Groundwater Elevations for SEAD-16 and SEAD-17

SEAD-16 groundwater elevation data were recorded on December 9, 2008 for Year 2 and are presented on **Table 1**. Groundwater elevation data collected during the pre-remedial action (April 4, 1994, August 1996, December 1996) and Year 1 post remedial action events are also shown on the

table. Based on the most recent elevation data (December 2008), groundwater appears to flow in a westerly direction at SEAD-16 as shown on **Figure 5**.

SEAD-17 groundwater elevation data were recorded on December 9, 2008 for Year 2 and are presented on **Table 2**. Groundwater elevation data also collected during the pre-remedial action (April 4, 1994, August 1996, December 1996) and Year 1 post remedial action events are also shown on the table. Based on the most recent elevation data (December 2008), groundwater appears to flow in a southwesterly direction at SEAD-17 as shown on **Figure 5**.

3.4 Year 2 Groundwater Data Analysis for SEAD-16

A summary of metals detected in the groundwater during the Year 2 annual sampling event for SEAD-16 is presented in **Table 3**. Complete groundwater data results are presented in **Appendix B**. Antimony, iron, lead, and sodium were detected at concentrations above their respective GA or MCL standard levels. Levels of metals above the GA standards were observed at each monitoring well at SEAD-16, with the exception of MW16-6.

The highest concentrations of antimony, iron, and lead were found from the sample collected at MW16-7, which is located within the remedial action excavated area. At MW16-7, antimony was detected at 13.6 µg/L compared to its Class GA standard of 3 µg/L. Antimony was also found at wells MW16-2 and MW16-5, which are located downgradient of MW16-7, at concentrations above the GA standard level. Additionally, antimony was detected in other samples at levels below the GA standard including the two upgradient wells, MW16-1 (0.95 J µg/L) and MW16-4 (2.89 µg/L) and in downgradient well MW16-6 (0.92 J µg/L).

Iron exceeded it GA standard (300 µg/L) in two wells. The highest concentration of iron was also detected at MW16-7 (770 µg/L), followed by a concentration of 699 µg/L detected at well MW16-5 located downgradient of MW16-7. The concentration of iron plus manganese detected in wells MW16-5 and MW16-7 also exceeded its combined GA standard of 500 µg/L, and in both cases the primary contributing metal was iron. Although, manganese was detected in the groundwater samples collected from all of the SEAD-16 wells, it was detected at concentrations below its GA standard level (300 µg/L).

Sodium was detected at concentrations above its Class GA standard (20,000 µg/L) in samples collected from four of the SEAD-16 wells (MW16-1, MW16-2, MW16-4, and MW16-7). The two highest concentrations were found in wells MW16-1 (182,000 µg/L) and MW16-4 (434,000 µg/L) both located in the upgradient area of SEAD-16. The sodium concentrations found in the other two wells, which are located in the downgradient area of SEAD-16, were 63,500 µg/L at MW16-2 and 74,900 µg/L at MW16-7.

The sole exceedance of lead was also detected at well MW16-7 with a concentration of 88.6 µg/L compared to the MCL action level of 15 µg/L and the GA standard of 25 µg/L. Lead was also detected in well MW16-5 (10.1 µg/L) below its MCL action level and GA standard.

In summary, select metals continue to be detected in the groundwater at SEAD-16 at levels that exceed Class GA or MCL standard levels. In general, there does not appear to be evidence of an area-wide or expanding plume at SEAD-16, as identified by the contaminant concentrations detected in the groundwater monitoring wells. The distribution of metal concentrations observed in the SEAD-16 wells may be associated with the fluctuation of the groundwater turbidity levels found in the individual wells during the sampling conducted. Metal concentrations detected in the groundwater from wells MW16-1, MW-16-4, and MW16-6 maybe influenced by turbidity levels since concentrations were observed to have increased with elevated turbidity readings. Turbidity levels did not appear to play a significant factor in the concentrations found in well MW16-2. Turbidity readings for wells MW16-5 and MW16-7 were not reliable due to the meter malfunctioning. Nevertheless, access to and use of the groundwater is restricted at the AOC under the terms of the ROD and the groundwater is not being used as a potable water source. A municipal water supply derived from a non-groundwater source is available for the Depot and its current distribution includes the PID area. The groundwater access/use restriction will remain in effect at SEAD-16 until the groundwater concentrations have been reduced to levels below applicable Class GA and MCL standards, and until data that documents acceptable groundwater quality is present in the AOC is provided to and approved by the oversight agencies..

3.5 Year 2 Groundwater Data Analysis for SEAD-17

A summary of metals detected from the Year 2 groundwater sampling event for SEAD-17 is presented in **Table 4**. Complete groundwater analytical results are presented in **Appendix B**.

Year 2 monitoring samples collected from three (MW17-1, MW17-2, and MW17-5) of the five groundwater monitoring wells at SEAD-17 exhibited concentrations that were below their respective Class GA standards for all metals. The other two wells (MW17-3 and MW17-4) only showed evidence of limited groundwater impacts.

Iron, the combined iron plus manganese analyte, and manganese were detected in all five SEAD-17 samples collected during Year 2, but only the concentrations found in wells MW17-3 and MW17-4 exceeded the iron and iron plus manganese Class GA groundwater standard in both wells, and the manganese Class GA standard in MW17-4. Elevated iron concentrations detected were 1,300 µg/L in MW17-3, and 1,760 µg/L in MW17-4, which are both downgradient wells. Manganese was detected in MW17-4 at 911 µg/L.

Although sample results indicate that iron, manganese, and the combined iron plus manganese analyte exceed GA standards in individual Year 2 samples, there does not appear to be any indication that conditions are deteriorating at SEAD-17. As is the case at SEAD-16, the groundwater concentrations detected in the wells at SEAD-17 may also be associated with the varying levels of turbidity found in the wells at the time of sampling. As similar to SEAD-16, turbidity levels did not play a significant factor in the metal concentrations found in the groundwater from wells MW17-1, and MW17-5. However, turbidity readings for wells MW17-2, MW17-3, and MW17-4 were not reliable due to the meter malfunctioning. Furthermore, access to and use of the groundwater is restricted at the AOC under the terms of the ROD and it is not being used as a potable water source. A municipal water

supply derived from a non-groundwater source is available for the Depot and its current distribution includes the PID area. The groundwater access/use restriction will remain in effect at SEAD-17 until the groundwater concentrations have been reduced to levels below applicable Class GA and MCL standards, and until data that documents acceptable groundwater quality is present in the AOC is provided to and approved by the oversight agencies.

3.6 Groundwater Data Trends

A comparison of data from the Year 1 and Year 2 events as well as an assessment of any trends are discussed below. The complete data set for the Year 1 and Year 2 groundwater monitoring events are included in **Appendix B**.

3.6.1 Comparison of Year 1 and Year 2 Groundwater Data for SEAD-16

The concentrations and presence of lead in the groundwater at SEAD-16 were observed to increase in the Year 2 event compared to Year 1. During the Year 1 event, lead was detected in a single well, MW16-7, at a concentration of 26.8 µg/L; during the Year 2 event, lead was detected at 88.6 µg/L at the same well and at a concentration below the MCL at monitoring well MW16-5 (10.1 µg/L).

The concentrations of antimony, iron, and manganese were generally similar between the Year 1 and Year 2 events, with both increases and decreases observed for three metals at the six wells between the two annual monitoring events. Most notably, at MW16-4, concentrations of antimony decreased from 5.11 µg/L during Year 1 to a concentration below the GA standard of 2.89 µg/L / 2.94 µg/L (sample/duplicate pair) during Year 2. Conversely, the concentration of antimony at MW16-5 increased from 1.82 µg/L during Year 1 to a concentration above the GA standard of 4.23 µg/L in Year 2.

The concentration of iron observed in the monitoring wells between the two events varied for each well. Most notably, iron was detected in well MW16-5 during Year 1 at 1,200 µg/L and decreased to 699 µg/L during Year 2; at MW16-7, the concentration of iron increased from 29.2 J µg/L to 770 µg/L from Year 1 to Year 2.

Concentrations of sodium increased at MW16-1, MW16-2, MW16-4, and MW16-7 between the Year 1 event and the Year 2 event. During the Year 1 event, the maximum concentration of sodium detected was 68,400 J µg/L at MW16-7. The maximum sodium concentration detected during Year 2 was 434,000 µg/L at MW16-4.

The fluctuating metals concentrations observed in the groundwater may most likely be attributed to the fluctuation of the groundwater turbidity levels observed during the Year 1 and Year 2 sampling.

3.6.2 Comparison of Year 1 and Year 2 Groundwater Data for SEAD-17

In general, iron, manganese, and sodium were detected in the groundwater samples collected during Year 1 and Year 2 from the five wells located at SEAD-17. The metals were detected below their GA standards at most wells. A summary of the notable changes in concentrations between the two most recent rounds that include exceedances of the GA standards are presented below.

Antimony was detected in wells MW17-2, MW17-4, and MW17-5 and only the Year 1 results for MW17-2 (3.44 µg/L) exceeded the GA groundwater standard of (the concentrate at MW17-2 decreased to 2.76 µg/L in Year 2). Iron and manganese were detected in the five wells during both events and only concentrations of iron detected during Year 2 at two wells (MW17-3 and MW17-4) were above GA groundwater standard of 300 µg/L, increasing from 133 µg/L to 1300 µg/L at MW17-3 and from 45.4 J µg/L to 1760 µg/L at MW17-4 from Year 1 to Year 2. The concentration of manganese detected at MW17-4 increased from 59 J µg/L during Year 1 to a concentration of 2,671 µg/L, which is above manganese's GA standard (300 µg/L) in Year 2. Iron and manganese concentrations found in the other wells decreased or remained similar to the Year 1 results.

Sodium was detected in the samples collected from the five wells during both sampling events; and the only exceedance of the GA standard for sodium was observed during Year 1 at MW17-4. The concentration of sodium detected at MW17-4 decreased from being above the GA standard at 28,500 J µg/L to 15,500 µg/L during Year 2. Sodium concentrations found in the other wells were consistent with the Year 1 results.

The variation in concentrations of antimony, iron, manganese, and sodium observed do not relate to historic site activities. A comparison of the Year 1 and Year 2 post remedial action groundwater data for SEAD-17 indicate that the overall concentrations of metals remained similar and no clear trends have emerged.

3.7 Routine Inspections of Monitoring Wells for SEAD-16 and SEAD-17

There is evidence that wells in SEAD-16 and SEAD-17 have deteriorated since the remedial action was completed. Damage to the surface seal/concrete pad surrounding the well was observed and may result from frost heave at wells MW16-2, MW16-5, MW17-3, and MW-17-4. Also at three of these well locations (MW16-2, MW16-5, and MW17-3), the protective steel casing appears to have settled or slipped so that a portion of the PVC riser pipe was now located within the lid section of the protective casing. This situation prevented the removal and/or opening of the protective casing lid to access the PVC well pipe for sampling. As a result, a small section of the riser piper was removed from these three wells during Year 2 sampling event.

4.0 REMEDY EVALUATION

As discussed in **Section 2.5**, a total of 4,427 cy of metal and PAH impacted soil were removed from SEAD-16 and SEAD-17. The impacted soil was removed to eliminate or minimize the migration of hazardous contaminates from the soil to groundwater. Soil that exceeded the site-specific cleanup standards was removed from SEAD-16 and SEAD-17 based on the confirmatory soil data collected.

The long-term groundwater monitoring performed for the last two years show that the soil removal remedy has been effective in minimizing the migration of identified COCs from soil to the groundwater.

The remedy for SEAD-16 and SEAD-17 includes the implementation and maintenance of LUCs consisting of:

- Prevention of residential housing, elementary and secondary schools, childcare facilities and playground activities, and
- Prevention of access to or uses of the groundwater until concentrations are below the New York State Class GA Groundwater or EPA MCL standard levels.

As part of the LTM program, SEAD-16 and SEAD-17 were inspected to determine that the LUCs are being maintained. During the Year 2 event, it was confirmed that no residential housing, elementary or secondary schools, childcare facilities, or playgrounds have been constructed or established in these AOCs, and no access to or use of groundwater, beyond that which is gained by the exiting monitoring well network, was evident at either SEAD-16 or SEAD-17.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- The soil excavation remedy at SEAD-16 and SEAD-17 has been effective in minimizing the migration of COCs from soil to the groundwater based on the two LTM sampling rounds.
- The fluctuation of the metal concentrations observed in the groundwater at both SEAD-16 and SEAD-17 is most likely attributed to fluctuations in the groundwater turbidity levels. Additional data are required to fully evaluate trends in concentrations.
- The land and groundwater restrictions imposed at SEAD-16 and SEAD-17 continue to be maintained, and there are no signs of unauthorized use or access.

5.2 Recommendations

Based on the pre-remedial groundwater data and the data collected during Years 1 and 2 of LTM program at SEAD-16 and SEAD-17, the Army recommends that the groundwater monitoring continue on an annual basis at SEAD-16 and SEAD-17 for 2009. At that time, the LTM program will be re-evaluated.

6.0 REFERENCES

NYSDEC, 1998 with 2000 and 2004 Addendum. Ambient Water Quality Standard and Guidance Values and Groundwater Effluent Limitations

Parsons 1995. Final Expanded Site Inspection, Seven High Priority SWMUs, SEAD 4, 16, 24, 25, 26, and 45. December, 1995.

Parsons 1999. Final Remedial Investigation (RI) Report at the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17). March, 1999.

Parsons 2006. Record of Decision for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17), Final. March, 2006.

Parsons 2006c. Revised Final Sampling and Analysis Plan for Seneca Army Depot Activity (SAP). 2006c.

Parsons 2007. Remedial Design Work Plan and Design Report for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17), Final. July, 2007.

Parsons 2008. Building Cleaning and Building Demolition Completion Report, SENECA Army Depot Activity, Romulus, New York, Draft Final. November, 2008.

Parsons 2008. Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17), Final. September, 2008.

LIST OF TABLES

Table 1
SEAD-16 - Groundwater Table Elevations Summary
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Monitoring Well	Top of PVC Elevation [(1)] (feet)	April 4, 1994		August 27, 1996		December 6, 1996		December 20, 2007		December 9, 2008	
		Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)
MW 16-1	735.54	3.52	732.02	6.45	729.09	3.25	732.29	4.25	731.29	4.28	731.23
MW 16-2*	734.56	3.65	730.91	4.50	730.06	3.71	730.85	4.20	730.36	4.20	730.26
MW 16-3	735.48	4.60	730.88	5.43	730.05	4.64	730.84	NA	NA	NA	NA
MW 16-4	733.93	NA	NA	4.83	729.10	2.93	731.00	3.00	730.93	3.42	730.48
MW 16-5*	733.40	NA	NA	4.76	728.64	2.20	731.20	1.90	731.50	3.32	730.08
MW 16-6	733.56	NA	NA	4.54	729.02	2.90	730.66	2.66	730.90	3.47	730.09
MW 16-7	734.42	NA	NA	5.06	729.36	4.23	730.19	4.45	729.97	4.63	729.77

Notes:
(1) Elevations are relative to the North American Vertical Datum (NAVD) 1988.
(2) April 4, 1994 data were collected as a part of the ESI and August 1996 and December 1996 were collected during the Remedial Investigation Report.
(3) Monitoring well MW16-3 was destroyed during the remedial action conducted at SEAD-16.
(4) December 2007 and 2008 data collected after the completion of the remedial action.
NA = Not Available.
* indicates that PVC riser pipe was cut during December 2008 sampling event.

Table 2
SEAD-17 - Groundwater Table Elevations Summary
SEAD-16 &SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Monitoring Well	Top of PVC Elevation (1) (feet)	April 4, 1994		August 29, 1996		December 6, 1996		December 19, 2007		December 9, 2008	
		Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)
MW 17-1	736.30	2.80	733.53	7.64	728.69	3.01	733.32	3.33	732.97	4.25	731.97
MW 17-2	733.75	3.19	730.56	7.24	726.51	3.45	730.30	3.31	730.44	4.07	733.70
MW 17-3*	732.15	2.38	729.77	7.14	725.01	2.47	729.68	2.67	729.48	3.96	732.20
MW 17-4	734.59	3.00	731.59	7.23	727.36	3.13	731.46	3.40	731.19	4.05	730.57
MW 17-5	733.58	NA	NA	6.92	726.66	2.65	730.93	2.90	730.68	3.46	730.16

Notes:
(1) Elevations are relative to the North American Vertical Datum (NAVD) 1988.
(2) April 4, 1994 data were collected as a part of the ESI and August 1996 and December 1996 were collected during the Remedial Investigation Report.
(3) December 2007 and 2008 data collected after the completion of the remedial action.
NA = Not Available.
* indicates that PVC riser pipe was cut during December 2008 sampling event.

Table 3
SEAD-16 Post-Remedial Action Groundwater Monitoring Summary
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

SITE LOCATION				SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16	
LOCATION ID				MW16-1		MW16-1		MW16-1		MW16-2		MW16-2		MW16-4		MW16-4		MW16-4		MW16-5		MW16-5		MW16-6		MW16-6		MW16-7		MW16-7	
MATRIX				GW		GW		GW		GW		GW		GW		GW		GW		GW		GW		GW		GW		GW	
SAMPLE ID				16LM20001		16LM20000		16LM20013		16LM20002		16LM20007		16LM20003		16LM20009		16LM20008		16LM20004		16LM20010		16LM20005		16LM20011		16LM20006		16LM20012	
SAMPLE DATE				12/20/2007		12/20/2007		12/9/2008		12/20/2007		12/9/2008		12/20/2007		12/9/2008		12/9/2008		12/20/2007		12/10/2008		12/20/2007		12/9/2008		12/20/2007		12/10/2008	
QC CODE				DU		SA		SA		SA		SA		SA		DU		SA		SA		SA		SA		SA		SA		SA	
STUDY ID				LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM	
			Action																												
Parameter[1]	**Units**	**Criteria**[2]	**Level**	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
Aluminum	UG/L			91.6	J	61.4	J	148	J	98.8	J	97.1	J	167	J	101	J	104	J	160	J	563		168	J	189	J	45.9	J	577	
Antimony	UG/L	GA	3	1.02		1	U	0.95	J	**3.36**		**5.53**		**5.11**		2.94		2.89		1.82		**4.23**		1	U	0.92	J	**9.58**		**13.6**	
Barium	UG/L	GA	1,000	59		60.4		125		64.6		69.7		44.5		279		290		38.9		22		31.8		39.1		170		122	
Cadmium	UG/L	GA	5	0.36	U	0.36	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U	0.46	J	0.33	U
Calcium	UG/L			105000	J	107000	J	176000		143000	J	138000		87100	J	267000		275000		89000	J	53100		80400	J	84300		194000		133000	
Chromium	UG/L	GA	50	0.84	U	0.84	U	0.88	U	0.84	U	0.88	U	1	J	0.88	U	0.88	U	1.1	J	1.2	J	0.84	U	0.88	U	0.84	U	1.6	J
Cobalt	UG/L			0.89	U	0.89	U	1.1	U	0.89	U	1.1	U	0.89	U	1.1	U	1.1	U	0.89	U	1.1	U	0.89	U	1.1	U	1.6	J	1.1	J
Copper	UG/L	GA	200	1.3	U	1.3	U	1.3	U	4.5	J	4	J	5.4	J	4.2	J	4.4	J	3.1	J	10.6		3.4	J	2.1	J	34.7		20.2	
Iron	UG/L	GA	300	68.3		35.8	J	93.3		49.5	J	26.1	J	95.4		38.4	J	57	J	**1200**		**699**		**418**		153		29.2	J	**770**	
Iron+Manganese	UG/L	GA	500	73		39	J	105		53	J	27		127		46	J	65		**1238**		**731**		441		158		**660**	J	**990**	
Lead	UG/L	MCL	15	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	10.1		2.9	U	2.9	U	**26.5**		**88.6**	
Magnesium	UG/L			15900	J	16100	J	25800		15600	J	15700		9440	R	34500		35200		9380	R	6050		7100	R	7380		32000	J	25100	
Manganese	UG/L	GA	300	5		3.3		11.8		3.4		0.84	J	31.2		8		7.7		37.6		32.4		23.3		4.8		**631**		220	
Mercury	UG/L	GA	0.7	0.12	U	0.12	U	0.12	U	0.12	U	0.148	J	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.507		0.12	U
Nickel	UG/L	GA	100	1.2	U	1.2	U	1	U	1.2	U	1.6	J	1.2	U	1.9	J	2.2	J	1.2	U	2.6	J	1.2	U	1	U	5.5	J	2.6	J
Potassium	UG/L			907	R	886	R	1340	J	2050	R	2410	J	1300	R	3690	J	3830	J	4420	R	2610	J	2690	R	2310	J	5480	J	5670	J
Sodium	UG/L	GA	20,000	**25,300**	J	**24,200**	J	**182,000**		**49,600**	J	**63,500**		**40,800**	J	**419,000**		**434,000**		8,410	R	2,180		6,110	R	9,200		**68,400**	J	**74,900**	
Thallium	UG/L	MCL	2	0.03	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	J	0.09	U
Vanadium	UG/L			0.78	U	0.78	U	0.98	U	0.78	U	0.98	U	0.78	U	0.98	U	0.98	U	1.2	J	2.3	J	0.86	J	0.98	U	0.78	U	0.98	U
Zinc	UG/L			7.8	J	4.4	J	5.8	J	8.2	J	10.2		5.3	J	9.8	J	14.6	J	34.4		10.3		5.5	J	3.7	J	3.6	U	8.6	J
Conductivity	S/m			0.838		0.838		1.99		1.49		0.94		1.19		3.83		3.83		0.665		0.339		0.665		0.469		0.96		1.21	
Dissolved Oxygen	MG/L			1.9		1.9		1.26		2.35		3.42		4.01		1.4		1.4		1.2		0.76		1.2		1.51		2.87		1.72	
ORP	mV			95		95		109		13		104		77		61		61		82		-66		82		7		59		63	
Temperature	deg C			6.9		6.9		9		4.2		4.5		3.5		5.1		5.1		2.36		1.2		2.36		7.28		4		7.2	
Turbidity	NTU			0.4		0.4		15.4		7.3		10.1		4.5		0.4		0.4		4.9		29		4.9		11.8		7		3.1	
pH	Std units			6.97		6.97		6.95		7.08		7.21		7.43		7.03		7.03		6.92		7.05		6.92		7.28		7.2		7.32	

Notes:

1. Only detected metals are included in this summary table.
1. The criteria values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998) and EPA Maximum Contamination Limit (MCL), Source http://www.epa.gov/safewater/mcl.html#inorganic.html
2. Shading indicates a concentration above groundwater standard.
3. A blank in the action level column indicates no Class GA and/or MCL standand or standard is a secondary value.
4. Metal italicized indicated contaminate of concern

U = compound was not detected

J = the reported value is and estimated concentration

R = the compound was rejected

Table 4
SEAD-17 Post-Remedial Action Groundwater Monitoring Summary
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

SITE LOCATION				SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17	
LOCATION ID				MW17-1		MW17-1		MW17-2		MW17-2		MW17-3		MW17-3		MW17-4		MW17-4		MW17-5		MW17-5	
MATRIX				GW		GW		GW		GW		GW		GW		GW		GW		GW		GW	
SAMPLE ID				17LM20000		17LM20005		17LM20001		17LM20006		17LM20002		17LM20007		17LM20003		17LM20008		17LM20004		17LM20009	
SAMPLE DATE				12/20/2007		12/11/2008		12/20/2007		12/10/2008		12/20/2007		12/10/2008		12/20/2007		12/10/2008		12/20/2007		12/11/2008	
QC CODE				SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
STUDY ID				LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM	
			Action																				
Parameter[1]	**Units**	**Criteria**[2]	**Level**	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
Aluminum	UG/L			204		219		110	J	142	J	106	J	386		50.2	J	125	J	98.5	J	125	J
Antimony	UG/L	GA	3	1	U	1	U	**3.44**		2.76		1	U	1	U	1	U	0.62	J	1	U	0.56	J
Barium	UG/L	GA	1,000	70		79		58.8		51.8		39		29.3		32.5		35.9		86.7		82.9	
Calcium	UG/L			98,300	J	95600		110,000	J	112,000		69,000	J	67,200		74,900	J	74,700		97,100	J	97,300	
Chromium	UG/L	GA	50	0.84	U	0.88	U	0.84	U	2.9	J	0.84	U	0.88	U	1	J	0.88	U	0.84	U	0.88	U
Cobalt	UG/L			0.89	U	1.1	U	0.89	U	1.1	U	0.89	U	1.1	U	0.89	U	2.4	J	0.89	U	1.1	U
Copper	UG/L	GA	200	1.3	U	1.3	U	6.2	J	4.4	J	2.6	J	2.8	J	1.8	J	1.8	J	1.3	U	1.5	J
Iron	UG/L	GA	300	106		126		140		115		133		**1,300**		45.4	J	**1,760**		91.7		76	
Iron+Manganese	UG/L	GA	500	119		141		160		121		170		**1,573**		59	J	**2,671**		128		85	
Lead	UG/L	MCL	15	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U
Magnesium	UG/L			21,800	J	20,600		11,000	R	11,200		7,560	R	7,400		10,400	R	10,200		15,800	J	15,600	
Manganese	UG/L	GA	300	13.2		14.9		20.5		6.1		36.7		273		13.7		**911**		36.5		8.9	
Nickel	UG/L	GA	100	1.2	U	1.3	J	1.2	U	2.8	J	1.2	U	1.8	J	1.2	U	2.6	J	1.2	U	1.2	J
Potassium	UG/L			614	R	462	J	1690	R	1260	J	2620	R	1840	J	838	R	1190	J	972	R	824	J
Sodium	UG/L	GA	20,000	7,790	R	8,380		6,620	R	7,860		4,550	R	5,500		**28,500**	J	15,500		7,950	R	7,360	
Thallium	UG/L	MCL	2	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U
Zinc	UG/L			4.7	J	4	J	72	J	27.6		27	J	14.2		5.1	J	6.7	J	4.7	J	41.6	
Conductivity	S/m			0.734		0.62		0.721		0.612		0.475		0.439		1.01		0.504		0.691		0.593	
Dissolved Oxygen	MG/L			4.7		1.63		0.13		2.41		0.19		0.31		2.99		0.6		0.02		0.91	
ORP	mV			185		99		173		81		152		-173		193		-112		96		72	
Temperature	deg C			6.8		9		4.97		6.9		4.9		6.8		5.5		6.6		7.3		9.4	
Turbidity	NTU			4		3		3.3		6.6		1.2		20.8		9.5		4.6		2.4		0.8	
pH	Std units			6.91		7.2		7.24		7.38		7.16		7.15		7.05		7.29		6.9		6.92	

Notes:

1. Only detected metals are included in this summary table.

1. The criteria values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998) and EPA Maximum Contamination Limit (MCL), Source http://www.epa.gov/safewater/mcl.html#inorganic.html

2. Shading indicates a concentration above groundwater standard.

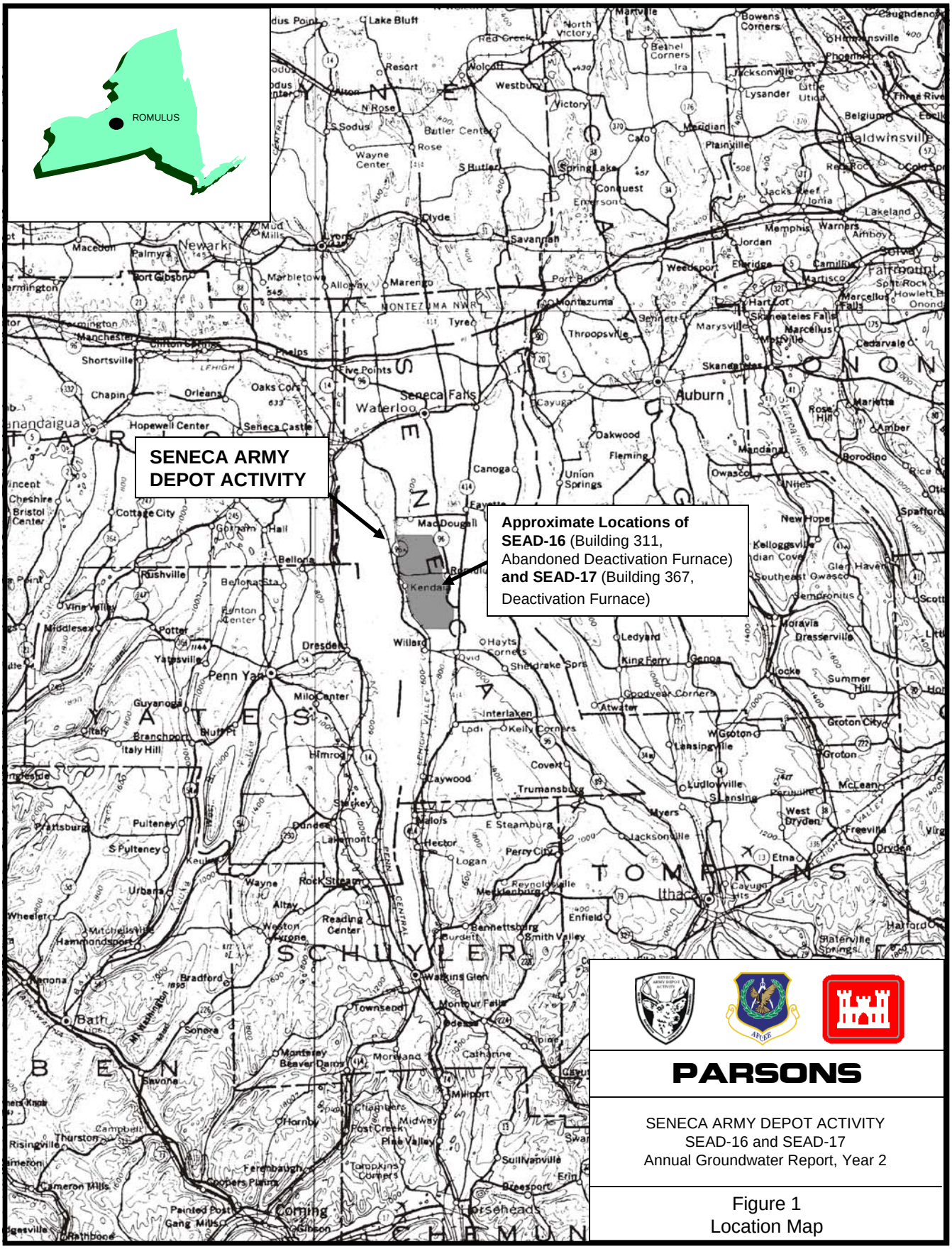
3. A blank in the action level column indicates no Class GA and/or MCL standand or standard is a secondary value.

U = compound was not detected

J = the reported value is and estimated concentration

R = the compound was rejected

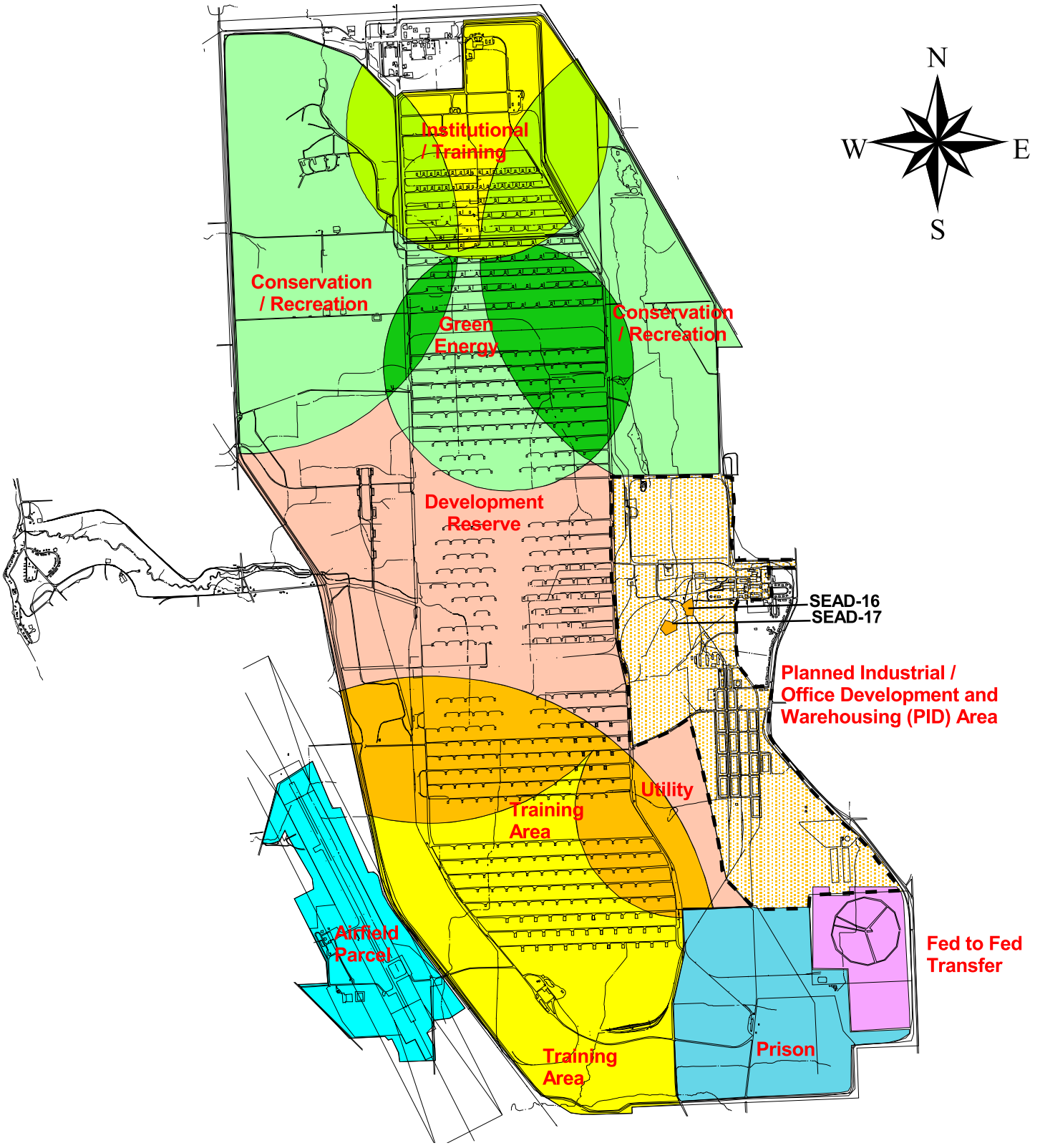
LIST OF FIGURES



PARSONS

SENECA ARMY DEPOT ACTIVITY
SEAD-16 and SEAD-17
Annual Groundwater Report, Year 2

Figure 1
Location Map



1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 Feet

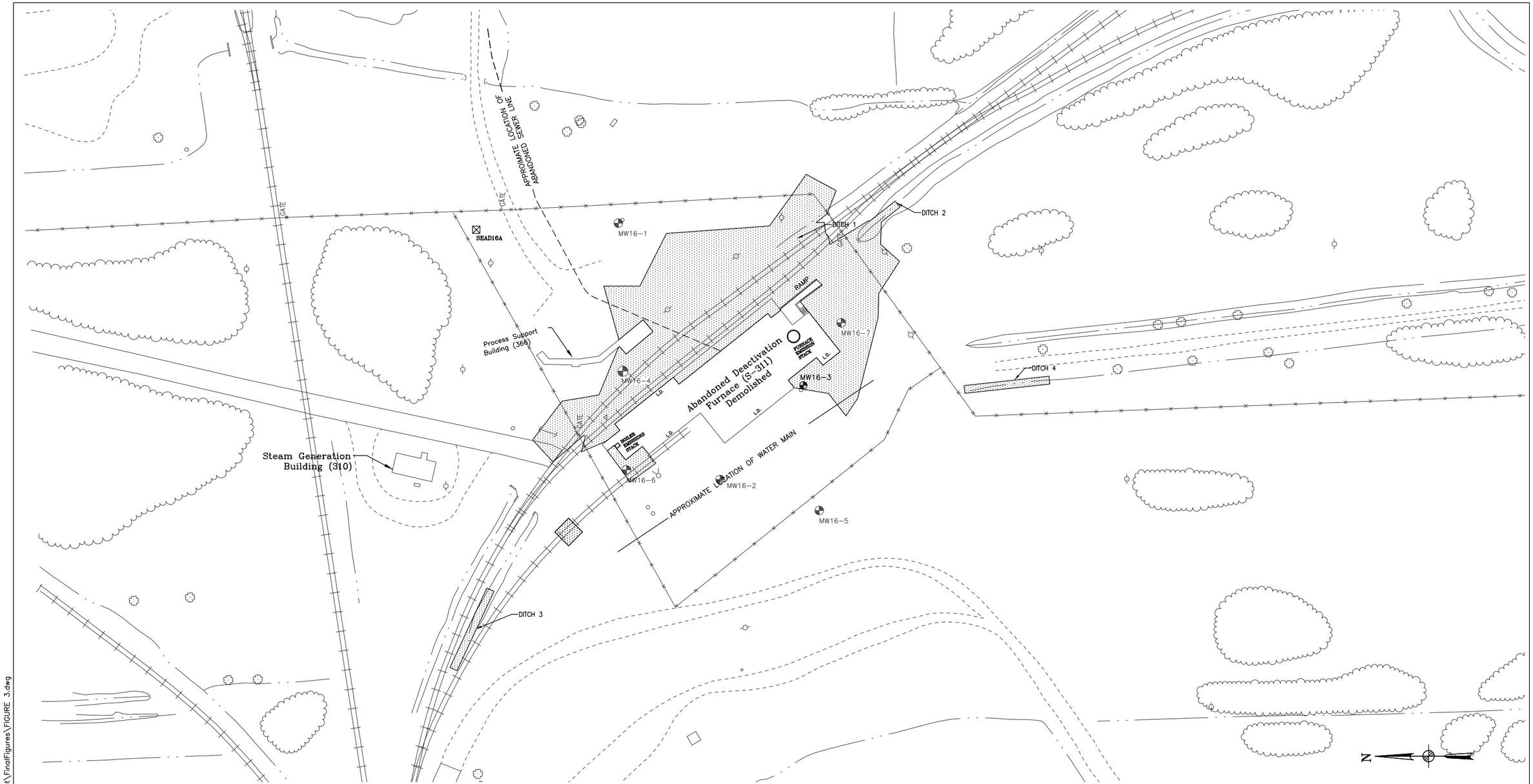
Area Covered by PID-wide Land Use Restrictions
- Prohibit the development and use of property for residential housing, elementary and secondary schools, childcare facilities and playgrounds.
- Prevent access to or use of the groundwater until the Class GA Groundwater Standards are met.

PARSONS

SENECA ARMY DEPOT ACTIVITY
Year 2 Annual Groundwater Report
SEAD-16 and SEAD-17

FIGURE 2
Location of SEAD-16 and SEAD-17
at Seneca Army Depot Activity

o:\seneca\pid luc\sead-16&17 annual report.apr\sead-16&17 Annual Report Figure 2



LEGEND:

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- BRUSH LINE
- RAILROAD
- UNPAVED ROAD
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- L.D. LOADING DOCK
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MW16-5 MONITORING WELL LOCATION
- LIMITS OF EXCAVATION
- MW16-3 DESTROYED MONITORING WELL

NOTE:

MONITORING WELL MW16-3 WAS DESTROYED DURING THE REMEDIAL ACTION.

50 0 50 100

SCALE IN FEET

PARSONS

CLIENT/PROJECT TITLE

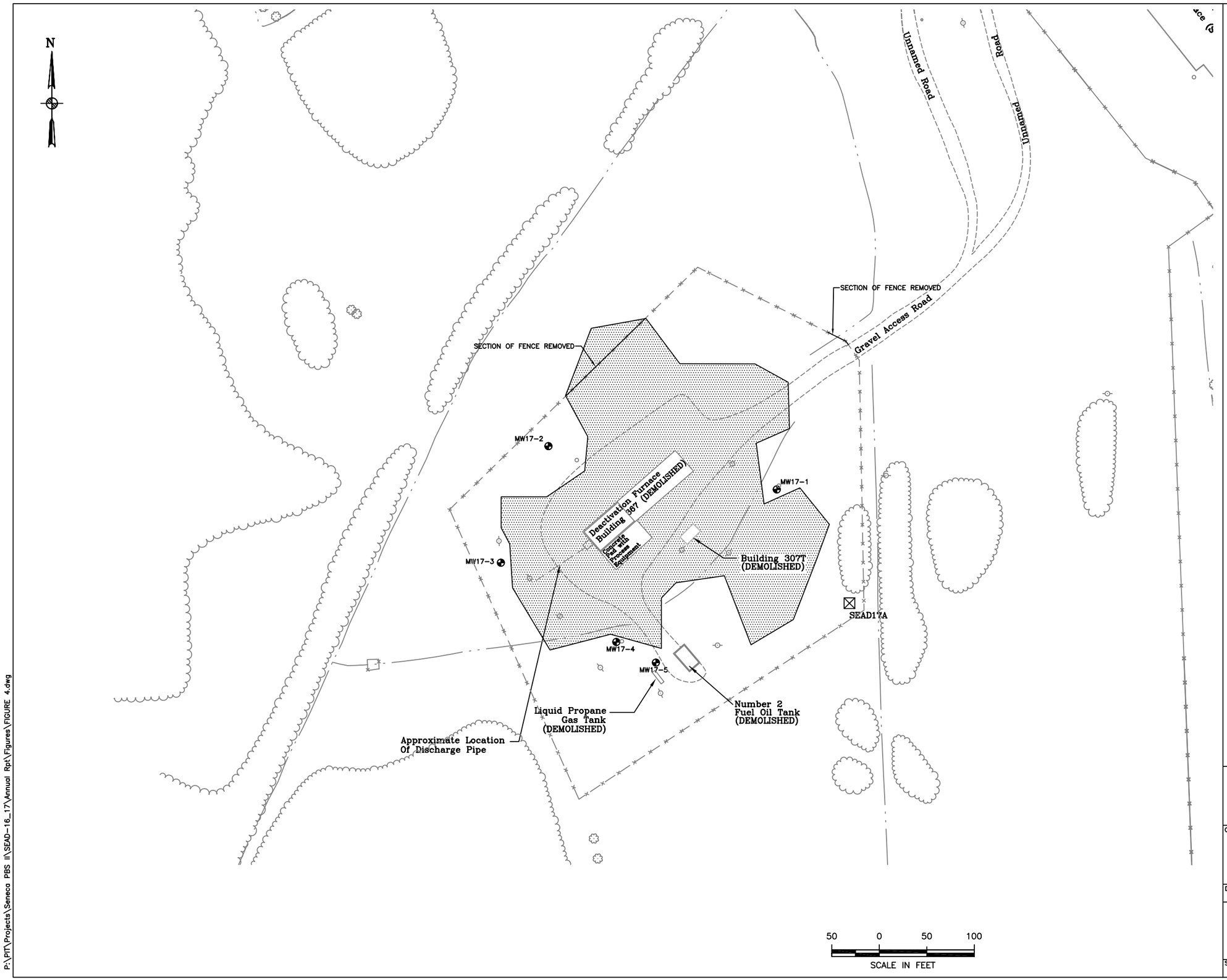
SENECA ARMY DEPOT ACTIVITY
SECOND ANNUAL GROUNDWATER REPORT
SEAD-16 AND SEAD-17

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	745172-01200

FIGURE 3
SEAD-16
SITE PLAN

SCALE	DATE	REV
1" = 100'	SEPTEMBER 2009	1

P:\PIT\Projects\Seneca PBC II\SEAD-16_17\Annual Rpt\FinalFigures\FIGURE 3.dwg



LEGEND:

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- RAILROAD
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- MAILBOX/RR SIGNAL
- POLE
- UTILITY BOX
- OVERHEAD UTILITY POLE
- MW17-5 MONITORING WELL LOCATION
- LIMITS OF EXCAVATION

PARSONS

CLIENT/PROJECT TITLE

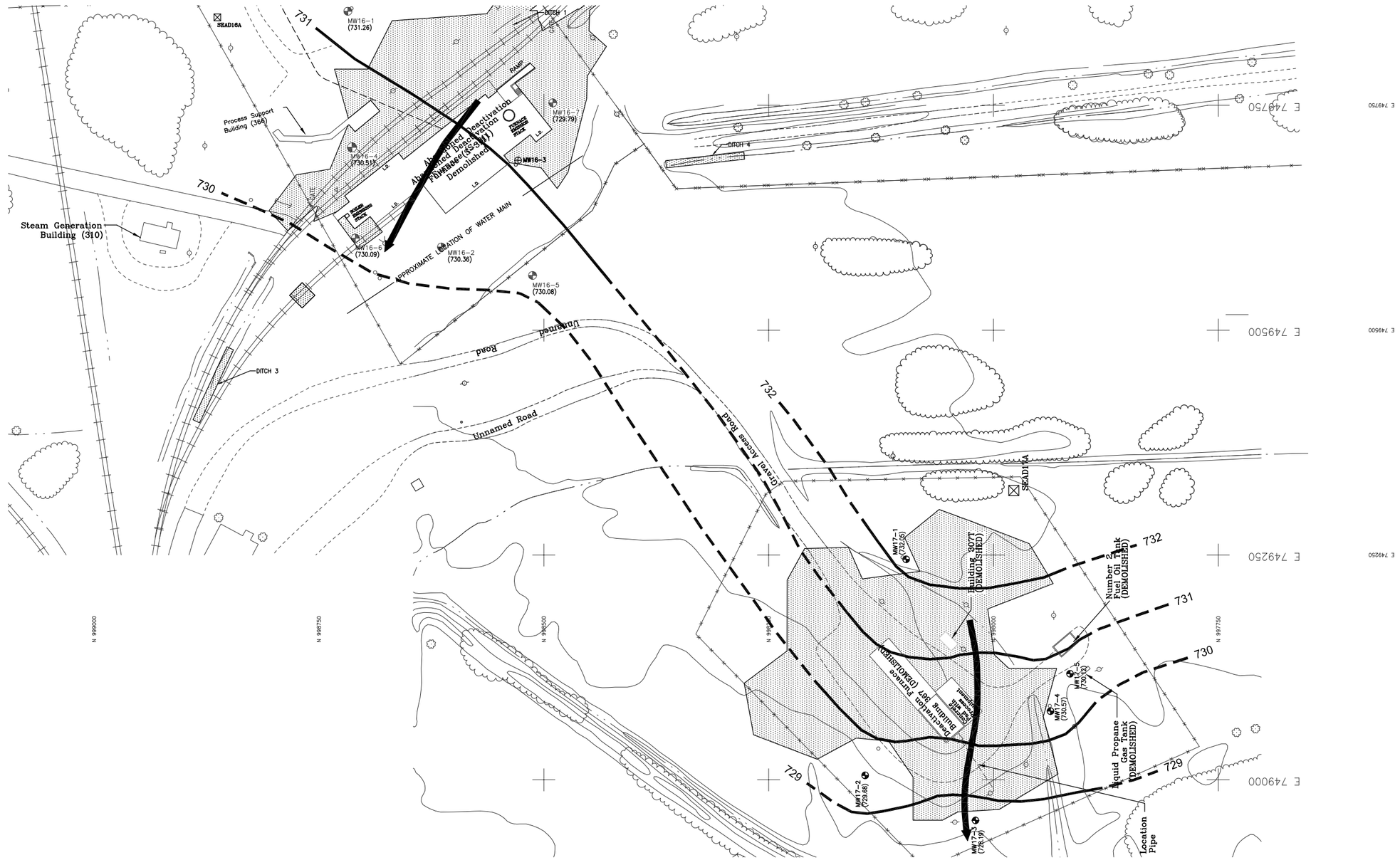
SENECA ARMY DEPOT ACTIVITY
SECOND ANNUAL GROUNDWATER REPORT
SEAD-16 AND SEAD-17

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	745172-01200

FIGURE 4
SEAD-17
SITE PLAN

SCALE	DATE	REV
1" = 100'	FEBRUARY 2009	-

P:\PIT\Projects\Seneca PBS II\SEAD-16_17\Annual Rpt\Figures\FIGURE 4.dwg



LEGEND:

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- BRUSH LINE
- RAILROAD
- UNPAVED ROAD
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- L.D. LOADING DOCK
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- 729 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- MW16-5 MONITORING WELL LOCATION
- LIMITS OF EXCAVATION
- MW16-3 DESTROYED MONITORING WELL
- MW16-1 (731.26) APPROXIMATE GROUNDWATER ELEVATION
- INDICATES APPROXIMATE DIRECTION OF GROUNDWATER FLOW

NOTES:

1. MONITORING WELL MW16-3 WAS DESTROYED DURING THE REMEDIAL ACTION.
2. GROUNDWATER FLOW DIRECTION BASED ON DECEMBER 2008 GROUNDWATER DATA ELEVATION.
3. DATA FROM WELL MW16-7 NOT USED IN OVERALL SITE GROUNDWATER CONTOURING.

60 0 60 120
SCALE IN FEET

N

PARSONS

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
SECOND ANNUAL GROUNDWATER REPORT
SEAD-16 AND SEAD-17

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 745172-01400

FIGURE 5
SEAD-16 AND 17
GROUNDWATER FLOW TREND

SCALE 1" = 120'
DATE AUGUST 2009
REV -

P:\PIT\PROJECTS\SENECA PBC II\SEAD-16_17\ANNUAL REPORT\DRAFT FINAL\FIGURES\FIGURE 5.DWG, DATE: 08/05/2009 03:21:13PM, p0018397

LIST OF APPENDICES

APPENDIX A

HISTORIC GROUNDWATER DATA

Appendix A Table
SEAD-16 Pre Remedial Groundwater Monitoring Results
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

		LOC_ID:		MW16-1		MW16-1		MW16-2		MW16-2		MW16-3		MW16-3		MW16-4		MW16-4		MW16-5		MW16-6		MW16-6		MW16-7		MW16-7		MW16-7		
		SAMP ID:		16101		16152		16102		16150		16110		16165		16105		16156		16162		16111		16155		16104		16158		16159		
		QC CODE:		SA		SA		SA		SA		SA		SA		SA		SA		SA		SA		SA		SA		SA		DU		
		STUDY ID:		RI ROUND1		RI ROUND2		RI ROUND1		RI ROUND2		RI ROUND1		RI ROUND2		RI ROUND1		RI ROUND2		RI ROUND2		RI ROUND1		RI ROUND2		RI ROUND1		RI ROUND2		RI ROUND2		
		MATRIX:		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		
		SAMPLE DATE:		8/27/1996		12/7/1996		8/27/1996		12/6/1996		8/30/1996		12/10/1996		8/28/1996		12/7/1996		12/9/1996		9/3/1996		12/8/1996		8/28/1996		12/8/1996		12/8/1996		
PARAMETER	ACTION LEVEL	SOURCE [1]	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	
SEMIVOLATILE ORGANICS																																
3-Nitroaniline	5	GA	UG/L	26	UJ	25	U	25	U	25	U	25	U	25	U	26	U	25	U	25	U	25	U	25	U	25	J	25	U	25	U	
4-Chloroaniline	5	GA	UG/L	10	UJ	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	J	10	U	10	U	
Benzo[ghi]perylene			UG/L	10	UJ	10	U	10	U	10	U	1	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	
Dibenz[a,h]anthracene			UG/L	10	UJ	10	U	10	U	10	U	0.7	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	
Diethyl phthalate			UG/L	10	UJ	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	
Indeno[1,2,3-cd]pyrene			UG/L	10	UJ	10	U	10	U	10	U	0.6	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	
OTHER ANALYSES																																
Nitrate/Nitrite Nitrogen	10	GA	MG/L	0.02		0.01	U	0.67		2		0.04		0.64		0.29		0.26		1.4		0.01	U	0.01	U	0.83		0.24		0.23		
Percent Solids (Metals)				0		0		0		0		0		0		0		0		0		0		0		0		0		0		
Total Petroleum Hydrocarbons			MG/L	0.44	U	0.4	U	0.4	U	0.36	U	0.41	U	1		0.41	U	0.42	U	0.91		0.89		0.73		0.41	U	0.46	U	1.3		
NITROAROMATICS																																
1,3-Dinitrobenzene	5	GA	UG/L	0.26	U	0.26	U	1.8	J	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26		0.26	U	0.26	U	
2,4-Dinitrotoluene	5	GA	UG/L	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.68	J	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	
METALS																																
Aluminum			UG/L	1850		143	U	1010		490		336		36.1	U	24.9		36.1	U	148	U	208		170	U	12.4		67.4	U	52.9	U	
Antimony	3	GA	UG/L	2	U	3	U	2	U	3	U	**7.5**		5.3	U	2	U	3	U	3	U	2	U	3	U	15.7	U	8.9	U	10	U	
Arsenic	10	MCL	UG/L	2.7	U	4.4	U	2.7	U	4.4	U	2.7	U	4.4	U	2.7	U	4.4	U	4.4	U	2.7	U	4.4	U	4	U	4.4	U	4.4	U	
Barium	1,000	GA	UG/L	74.2		48.2	U	48.1		31.4	U	64.4		57.4	U	97.4		55.2	U	67.6	U	86.4		80.2	U	89.2		59.1	U	60.2	U	
Beryllium	4	MCL	UG/L	0.23		0.2	U	0.22		0.2	U	0.21		0.2	U	0.21		0.2	U	0.2	U	0.1	U	0.2	U	0.21		0.2	U	0.2	U	
Cadmium	5	GA	UG/L	0.3	U	0.6	U	0.3	U	0.6	U	0.3	U	0.6	U	0.3	U	0.6	U	0.6	U	0.3	U	0.6	U	0.3	U	0.6	U	0.6	U	
Calcium			UG/L	157,000		116,000		193,000		164,000		99,800		85,500		130,000		158,000		90,000		44600		84,900		109,000		114,000		117,000		
Chromium	50	GA	UG/L	2.7		1	U	2.3		1.1	U	1	U	1	U	1	U	1	U	1	U	1.5		1	U	1		1	U	1	U	
Cobalt			UG/L	2.1		1.3	U	1.5		1.3	U	1.2	U	1.3	U	1.2	U	1.3	U	1.3	U	1.2		1.3	U	1.2		1.3	U	1.3	U	
Copper	200	GA	UG/L	4.9		1.9	U	7.9		2.9	U	19.2		11.4	U	3.6		1.1	U	1.1	U	4.4		1.1	U	5.1		1.4	U	2.1	U	
Iron	300	GA	UG/L	**2,400**	**J**	296		**1,720**	**J**	**923**	**J**	**432**	**J**	77.8	U	38.2		126		211		273	J	290		23.4		174		160		
Lead	15	MCL	UG/L	1.7	U	1.5	U	5.9		6.8		6.1		1.5	U	1.7	U	1.5	U	3	U	1.7	U	1.5	U	8.4		9.9		9.2		
Magnesium			UG/L	23,300		17,600		23,700		20,900		11,600		10,000		17,700		22,900		11,800		6370		12,800		16,900		22,600		23,200		
Manganese	300	GA	UG/L	210		64.2		129		65.2		130		5.9	U	132		66.9		51		**545**		**1,380**		85.7		43.2		44.3		
Mercury	0.7	GA	UG/L	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	
Nickel	100	GA	UG/L	4.7		2.5	U	11		3.1	U	3		2.5	U	2.2		2.5	U	2.5	U	4.1		2.5	U	2.2		2.5	U	2.5	U	
Potassium			UG/L	1670		998	U	4760		3410	U	2740		1900	U	4040		1660	U	18800		3530		2230	U	3220		2090	U	2160	U	
Selenium	10	GA	UG/L	2.4	U	4.7	UJ	2.4	U	4.7	UJ	2.4	U	4.7	UJ	2.4	U	4.7	UJ	4.7	UJ	2.4	U	4.7	UJ	2.4	U	4.7	UJ	4.7	UJ	
Sodium	20,000	GA	UG/L	8,750		3,870	U	19,100		17,000		9,480		7,660		17,200		12,300		**49,500**		**396000**		**409,000**		12,000		9,940		10,200		
Thallium	2	MCL	UG/L	4.2	U	5.9	U	**9.2**		9.6	U	4.2	U	4.1	U	4.2	U	4.1	U	6.9	U	**6.2**		4.1	U	**4.2**		**11**		4.1	U	
Vanadium			UG/L	3.3		1.6	U	2.9		1.6	U	1.2	U	1.6	U	1.2	U	1.6	U	1.6	U	2.9		1.6	U	1.2		1.6	U	1.6	U	
Zinc			UG/L	15.6	R	5.8	U	37.4	R	13.5	U	32.4	R	42		4.5	R	5.1	U	6.3	U	13.2	R	10.5	U	2.9	R	2.2	U	7.3	U	

Notes:
1. The criteria values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998) and EPA Maximum Contamination Limit (MCL), Source http://www.epa.gov/safewater/mcl.html#inorganic.html
2. Shading indicates a concentration above groundwater standard.
3. A blank in the action level column indicates no Class GA and/or MCL standand or standard is a secondary value.

U = compound was not detected
J = the reported value is and estimated concentration
R = the compound was rejected

Appendix A Table
SEAD-17 Pre Remedial Groundwater Monitoring Results
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoing Report
Seneca Army Depot Activity

			LOC_ID:	MW17-1		MW17-1		MW17-1		MW17-2		MW17-3		MW17-4		MW17-5		MW17-5	
			SAMP ID:	16108		16109		16171		16163		16166		16169		16106		16170	
			QC CODE:	SA		DU		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND2		RI ROUND2		RI ROUND2		RI ROUND2		RI ROUND1		RI ROUND2	
			MATRIX:	Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater	
			SAMPLE DATE:	8/29/1996		8/29/1996		12/11/1996		12/9/1996		12/10/1996		12/11/1996		8/29/1996		12/11/1996	
PARAMETER	ACTION LEVEL	SOURCE [1]	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																			
Benzo[a]pyrene			UG/L	0.7	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo[ghi]perylene			UG/L	2	J	1	J	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz[a,h]anthracene			UG/L	1	J	0.9	J	10	U	10	U	10	U	10	U	10	U	10	U
Indeno[1,2,3-cd]pyrene			UG/L	2	J	1	J	10	U	10	U	10	U	10	U	10	U	10	U
OTHER ANALYSES																			
Nitrate/Nitrite Nitrogen	10	GA	MG/L	0.24		0.23		0.2		0.04		0.05		0.02		0.04		0.02	
Percent Solids (Metals)				0		0		0		0		0		0		0		0	
NITROAROMATICS																			
Tetryl			UG/L	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
METALS																			
Aluminum			UG/L	90.4		54.6		386		85.3	U	36.1	U	41.9	U	39.9		59	U
Antimony	3	GA	UG/L	2	U	2	U	3	U	3	U	3	U	3	U	2	U	3	U
Arsenic	10	MCL	UG/L	2.7	U	2.7	U	4.4	U	4.4	U	4.4	U	4.4	U	2.7	U	4.4	U
Barium	1,000	GA	UG/L	85		87		90.4	U	66.1	U	27.4	U	27.4	U	92.5		62.6	U
Beryllium	4	MCL	UG/L	0.26		0.21		0.2	U	0.2	U	0.2	U	0.2	U	0.23		0.2	U
Cadmium	5	GA	UG/L	0.3	U	0.31		0.6	U	0.6	U	0.6	U	0.6	U	0.3	U	0.6	U
Calcium			UG/L	108000		110000		104000		118000		108000		92000		108000		81100	
Chromium	50	GA	UG/L	1	U	1.5		1	U	1	U	1	U	1	U	1	U	1	U
Cobalt			UG/L	1.2	U	1.4		2	U	1.3	U	1.3	U	1.3	U	1.2	U	1.3	U
Copper	200	GA	UG/L	3.1		4.3		1.1	U	2.6	U	1.1	U	1.1	U	3.3		1.3	U
Iron	300	GA	UG/L	119		90.6		**572**	**J**	214		53.1	U	96.4	U	56.8		134	
Lead	15	MCL	UG/L	1.7	U	1.7	U	1.5	U	1.9	U	1.5	U	3	U	1.7	U	1.5	U
Magnesium			UG/L	22600		23000		22900		14600		15200		14200		17700		13600	
Manganese	300	GA	UG/L	21.3		20		9.7	U	73.8		0.7	U	22.5		73.2		62	
Mercury	0.7	GA	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	100	GA	UG/L	1.8		2.2		2.5	U	2.5	U	2.5	U	2.5	U	2.4		2.5	U
Potassium			UG/L	472		574		843	U	5320		772	U	1330	U	853		1070	U
Selenium	10	GA	UG/L	2.4	U	2.4	U	4.7	UJ	4.7	UJ	4.7	UJ	4.7	UJ	2.4	U	4.7	UJ
Silver	50	GA	UG/L	1.3	U	2.3		1.5	U	1.5	U	1.5	U	1.5	U	1.3	U	1.5	U
Sodium	20,000	GA	UG/L	9,290		9,620		8,190		18,700		**30,100**		**22,300**		11,700		8,970	
Thallium	2	MCL	UG/L	**4.4**		**7.1**		4.1	U	4.7	U	4.4	U	6.2	U	**4.7**		8.6	U
Vanadium			UG/L	1.2	U	1.4		1.6	U	1.6	U	1.6	U	1.6	U	1.2	U	1.6	U
Zinc			UG/L	2.5	R	3.2	R	14.4	U	63.9		7.7	U	8.3	U	6.2	R	4.4	U

Notes:
1. The criteria values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998) and EPA Maximum Contamination Limit (MCL), Source http://www.epa.gov/safewater/mcl.html#inorganic.html
2. Shading indicates a concentration above groundwater standard.
3. A blank in the action level column indicates no Class GA and/or MCL standand or standard is a secondary value.
4. Wells MW17-2, MW17-3, and MW17-4 were not sampled in August 1996 since they were dry.

U = compound was not detected
J = the reported value is and estimated concentration
R = the compound was rejected

APPENDIX B

COMPLETE GROUNDWATER DATA RESULTS FOR YEAR 1 AND YEAR 2

Appendix B Table
SEAD-16 Post-Remedial Action Groundwater Monitoring Results
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

SITE LOCATION				SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16		SEAD-16	
LOCATION ID				MW16-1		MW16-1		MW16-1		MW16-2		MW16-2		MW16-4		MW16-4		MW16-4		MW16-5		MW16-5		MW16-6		MW16-6		MW16-7		MW16-7	
MATRIX				GW		GW		GW		GW		GW		GW		GW		GW		GW		GW		GW		GW		GW	
SAMPLE ID				16LM20001		16LM20000		16LM20013		16LM20002		16LM20007		16LM20003		16LM20009		16LM20008		16LM20004		16LM20010		16LM20005		16LM20011		16LM20006		16LM20012	
SAMPLE DATE				12/20/2007		12/20/2007		12/9/2008		12/20/2007		12/9/2008		12/20/2007		12/9/2008		12/9/2008		12/20/2007		12/10/2008		12/20/2007		12/9/2008		12/20/2007		12/10/2008	
QC CODE				DU		SA		SA		SA		SA		SA		DU		SA		SA		SA		SA		SA		SA		SA	
STUDY ID				LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM	
			Action																												
Parameter[1]	**Units**	**Criteria**[2]	**Level**	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
Aluminum	UG/L			91.6	J	61.4	J	148	J	98.8	J	97.1	J	167	J	101	J	104	J	160	J	563		168	J	189	J	45.9	J	577	
Antimony	UG/L	GA	3	1.02		1	U	0.95	J	**3.36**		**5.53**		**5.11**		2.94		2.89		1.82		**4.23**		1	U	0.92	J	**9.58**		**13.6**	
Arsenic	UG/L	MCL	10	4.2	U	4.2	U	3.7	U	4.2	U	3.7	U	4.2	U	3.7	U	3.7	U	4.2	U	3.7	U	4.2	U	3.7	U	4.2	U	3.7	U
Barium	UG/L	GA	1,000	59		60.4		125		64.6		69.7		44.5		279		290		38.9		22		31.8		39.1		170		122	
Beryllium	UG/L	MCL	4	0.27	U	0.27	U	0.33	U	0.27	U	0.33	U	0.27	U	0.33	U	0.33	U	0.27	U	0.33	U	0.27	U	0.33	U	0.27	U	0.33	U
Cadmium	UG/L	GA	5	0.36	U	0.36	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U	0.46	J	0.33	U
Calcium	UG/L			105000	J	107000	J	176000		143000	J	138000		87100	J	267000		275000		89000	J	53100		80400	J	84300		194000		133000	
Chromium	UG/L	GA	50	0.84	U	0.84	U	0.88	U	0.84	U	0.88	U	1	J	0.88	U	0.88	U	1.1	J	1.2	J	0.84	U	0.88	U	0.84	U	1.6	J
Cobalt	UG/L			0.89	U	0.89	U	1.1	U	0.89	U	1.1	U	0.89	U	1.1	U	1.1	U	0.89	U	1.1	U	0.89	U	1.1	U	1.6	J	1.1	J
Copper	UG/L	GA	200	1.3	U	1.3	U	1.3	U	4.5	J	4	J	5.4	J	4.2	J	4.4	J	3.1	J	10.6		3.4	J	2.1	J	34.7		20.2	
Iron	UG/L	GA	300	68.3		35.8	J	93.3		49.5	J	26.1	J	95.4		38.4	J	57	J	**1200**		**699**		**418**		153		29.2	J	**770**	
Iron+Manganese	UG/L	GA	500	73		39	J	105		53	J	27		127		46	J	65		**1238**		**731**		441		158		**660**	J	**990**	
Lead	UG/L	MCL	15	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	10.1		2.9	U	2.9	U	**26.5**		**88.6**	
Magnesium	UG/L			15900	J	16100	J	25800		15600	J	15700		9440	R	34500		35200		9380	R	6050		7100	R	7380		32000	J	25100	
Manganese	UG/L	GA	300	5		3.3		11.8		3.4		0.84	J	31.2		8		7.7		37.6		32.4		23.3		4.8		**631**		220	
Mercury	UG/L	GA	0.7	0.12	U	0.12	U	0.12	U	0.12	U	0.148	J	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.507		0.12	U
Nickel	UG/L	GA	100	1.2	U	1.2	U	1	U	1.2	U	1.6	J	1.2	U	1.9	J	2.2	J	1.2	U	2.6	J	1.2	U	1	U	5.5	J	2.6	J
Potassium	UG/L			907	R	886	R	1340	J	2050	R	2410	J	1300	R	3690	J	3830	J	4420	R	2610	J	2690	R	2310	J	5480	J	5670	J
Selenium	UG/L	GA	10	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U
Silver	UG/L	GA	50	1	U	1	U	1.3	U	1	U	1.3	U	1	U	1.3	U	1.3	U	1	U	1.3	U	1	U	1.3	U	1	U	1.3	U
Sodium	UG/L	GA	20,000	**25,300**	J	**24,200**	J	**182,000**		**49,600**	J	**63,500**		**40,800**	J	**419,000**		**434,000**		8,410	R	2,180		6,110	R	9,200		**68,400**	J	**74,900**	
Thallium	UG/L	MCL	2	0.03	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	J	0.09	U
Vanadium	UG/L			0.78	U	0.78	U	0.98	U	0.78	U	0.98	U	0.78	U	0.98	U	0.98	U	1.2	J	2.3	J	0.86	J	0.98	U	0.78	U	0.98	U
Zinc	UG/L			7.8	J	4.4	J	5.8	J	8.2	J	10.2		5.3	J	9.8	J	14.6	J	34.4		10.3		5.5	J	3.7	J	3.6	U	8.6	J

Notes:

1. The criteria values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998) and EPA Maximum Contamination Limit (MCL), Source http://www.epa.gov/safewater/mcl.html#inorganic.html

2. Shading indicates a concentration above groundwater standard.

3. A blank in the action level column indicates no Class GA and/or MCL standand or standard is a secondary value.

U = compound was not detected

J = the reported value is and estimated concentration

R = the compound was rejected

Appendix B Table
SEAD-17 Post-Remedial Action Groundwater Monitoring Results
SEAD-16 & SEAD-17 Second Annual Groundwater Monitoring Report
Seneca Army Depot Activity

SITE LOCATION				SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17		SEAD-17	
LOCATION ID				MW17-1		MW17-1		MW17-2		MW17-2		MW17-3		MW17-3		MW17-4		MW17-4		MW17-5		MW17-5	
MATRIX				GW		GW		GW		GW		GW		GW		GW		GW		GW		GW	
SAMPLE ID				17LM20000		17LM20005		17LM20001		17LM20006		17LM20002		17LM20007		17LM20003		17LM20008		17LM20004		17LM20009	
SAMPLE DATE				12/20/2007		12/11/2008		12/20/2007		12/10/2008		12/20/2007		12/10/2008		12/20/2007		12/10/2008		12/20/2007		12/11/2008	
QC CODE				SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
STUDY ID				LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM		LTM	
			Action																				
Parameter[1]	**Units**	**Criteria**[2]	**Level**	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
Aluminum	UG/L			204		219		110	J	142	J	106	J	386		50.2	J	125	J	98.5	J	125	J
Antimony	UG/L	GA	3	1	U	1	U	**3.44**		2.76		1	U	1	U	1	U	0.62	J	1	U	0.56	J
Arsenic	UG/L	MCL	10	4.2	U	3.7	U	4.2	U	3.7	U	4.2	U	3.7	U	4.2	U	3.7	U	4.2	U	3.7	U
Barium	UG/L	GA	1,000	70		79		58.8		51.8		39		29.3		32.5		35.9		86.7		82.9	
Beryllium	UG/L	MCL	4	0.27	U	0.33	U	0.27	U	0.33	U	0.27	U	0.33	U	0.27	U	0.33	U	0.27	U	0.33	U
Cadmium	UG/L	GA	5	0.36	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U	0.36	U	0.33	U
Calcium	UG/L			98300	J	95600		110000	J	112000		69000	J	67200		74900	J	74700		97100	J	97300	
Chromium	UG/L	GA	50	0.84	U	0.88	U	0.84	U	2.9	J	0.84	U	0.88	U	1	J	0.88	U	0.84	U	0.88	U
Cobalt	UG/L			0.89	U	1.1	U	0.89	U	1.1	U	0.89	U	1.1	U	0.89	U	2.4	J	0.89	U	1.1	U
Copper	UG/L	GA	200	1.3	U	1.3	U	6.2	J	4.4	J	2.6	J	2.8	J	1.8	J	1.8	J	1.3	U	1.5	J
Iron	UG/L	GA	300	106		126		140		115		133		**1,300**		45.4	J	**1,760**		91.7		76	
Iron+Manganese	UG/L	GA	500	119		141		160		121		170		**1,573**		59	J	**2,671**		128		85	
Lead	UG/L	MCL	15	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U
Magnesium	UG/L			21,800	J	20,600		11,000	R	11,200		7,560	R	7,400		10,400	R	10,200		15,800	J	15,600	
Manganese	UG/L	GA	300	13.2		14.9		20.5		6.1		36.7		273		13.7		911		36.5		8.9	
Mercury	UG/L	GA	0.7	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
Nickel	UG/L	GA	100	1.2	U	1.3	J	1.2	U	2.8	J	1.2	U	1.8	J	1.2	U	2.6	J	1.2	U	1.2	J
Potassium	UG/L			614	R	462	J	1690	R	1260	J	2620	R	1840	J	838	R	1190	J	972	R	824	J
Selenium	UG/L	GA	10	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U	6.1	U
Silver	UG/L	GA	50	1	U	1.3	U	1	U	1.3	U	1	U	1.3	U	1	U	1.3	U	1	U	1.3	U
Sodium	UG/L	GA	20,000	7,790	R	8,380		6,620	R	7,860		4,550	R	5,500		**28,500**	J	15,500		7,950	R	7,360	
Thallium	UG/L	MCL	2	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U	0.03	U	0.09	U
Vanadium	UG/L			0.78	U	0.98	U	0.78	U	0.98	U	0.78	U	0.98	U	0.78	U	0.98	U	0.78	U	0.98	U
Zinc	UG/L			4.7	J	4	J	72	J	27.6		27	J	14.2		5.1	J	6.7	J	4.7	J	41.6	

Notes:

1. The criteria values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998) and EPA Maximum Contamination Limit (MCL), Source http://www.epa.gov/safewater/mcl.html#inorganic.html
2. Shading indicates a concentration above groundwater standard.
3. A blank in the action level column indicates no Class GA and/or MCL standand or standard is a secondary value.

U = compound was not detected
J = the reported value is and estimated concentration
R = the compound was rejected