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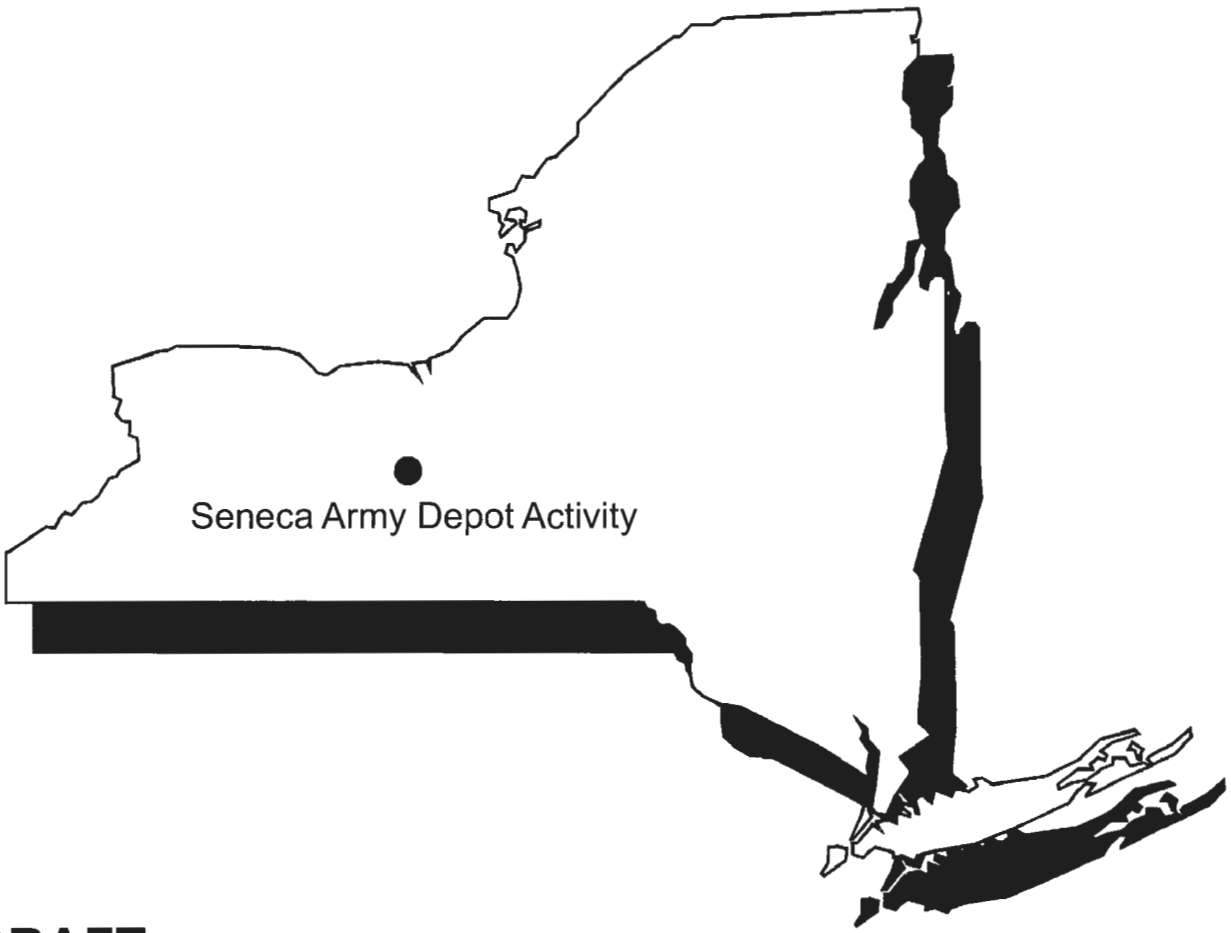
Seneca Army Depot Activity
Romulus, NY



DRAFT
ANNUAL REPORT 2012 – YEAR 5
ABANDONED DEACTIVATION FURNACE (SEAD-16)
AND ACTIVE DEACTIVATION FURNACE (SEAD-17)
SENECA ARMY DEPOT ACTIVITY

Contract No. W912DY-08-D-0003
Task Order No. 0015
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

PARSONS

April 2013

DRAFT

ANNUAL REPORT 2012 – YEAR 5

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

Prepared for:

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1.0 INTRODUCTION

This *2012 Annual Report – Year 5* for the former Abandoned Deactivation Furnace (SEAD-16) and the former Active Deactivation Furnace (SEAD-17) sites at the Seneca Army Depot Activity (SEDA or the Depot) in Romulus, Seneca County, New York provides a review of annual groundwater monitoring data collected in December 2012, comparisons of the 2012 data to other pre- and post-remedial action (RA) groundwater sampling events, recommendations for future long-term monitoring (LTM) at SEAD-16 and SEAD-17, and the annual review of the effectiveness of the remedy implemented at the sites 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 RA was completed in August 2007 for SEAD-16 and SEAD-17, or the areas of concern (AOCs). The RA consisted of the excavation, stabilization (as warranted), and disposal of soil contaminated with selected metals (antimony, arsenic, cadmium, copper, lead, mercury, thallium, and zinc) at levels above identified risk-based action levels from both AOCs. In addition, soil at SEAD-16 that was also contaminated with polyaromatic hydrocarbons (PAHs) at concentrations in excess of risk-based action levels was excavated, stabilized (if warranted), and disposed at a licensed landfill. The RA implemented is documented in the *Final Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)* (Parsons, 2008). The RA at SEAD-16 involved the removal of approximately 1,862 cubic yards (cy) of soil impacted with metals and PAHs. The RA at SEAD-17 involved the removal of approximately 2,565 cy of metals-impacted soil.

The ROD for SEAD-16 and SEAD-17 also requires the implementation, maintenance, inspection, and periodic reporting of land use controls (LUCs) prohibiting use of the land at the AOCs for residential purposes and access to and use of groundwater until applicable cleanup standards are met. Applicable cleanup standards refer to the lowest enforceable standard recorded either on New York State Class GA (NYS Class GA) Ambient Water Quality Standards or United States Environmental Protection Agency (EPA) maximum contaminant levels (EPA MCLs). Once groundwater cleanup standards are achieved, the groundwater use restrictions may be eliminated upon 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 and secondary schools, childcare facilities, and playgrounds; and, prohibits access to and use of groundwater until concentrations have been reduced to levels that allow for unlimited exposure and unrestricted use.

The Land Use Control Remedial Design (LUC RD) Addendum #4 identifies and implements the LUCs required by the SEAD-16 and SEAD-17 ROD at the identified AOCs, as well as other AOCs (SEADs 1, 2, 5, 59, 71, 121C, and 121I) in the PID area. The LUC objectives for SEAD-16 and SEAD-17 are to prevent access to or use of groundwater until New York State GA groundwater standards are achieved, and to prohibit residential housing, elementary and secondary schools, child care facilities and playground activities at the sites. Implementation of the LUCs at SEAD-16 and SEAD-17 may include lease restrictions, an environmental easement, deed restrictions, zoning, periodic certification, and a five-year review as is defined in the *Final Land Use Control Design for SEAD-27, 66, and 64A* (Army, 2006). The

LUC RD for SEAD-27, 66 and 64A is also known as the *LUC RD for the Planned Industrial/Office Development or Warehousing Area* that proposed the establishment of an area-wide set of land use restrictions for the PID/Warehouse Area to simplify institutional control implementation by having a single set of land use restrictions for the PID/Warehouse Area, which are consistent with its anticipated industrial land use. The periodic certification will be submitted to the NYSDEC and EPA to document that the LUCs at SEAD-16 and SEAD-17 are unchanged and that no activities have occurred that impair or violate the ability of the LUCs to protect public health and the environment.

Long-term groundwater monitoring 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 as outlined in the Final Work Plan. Results for the first year (Year 1) LTM event performed in December 2007 are documented in the *Final Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)* (Parsons, 2008). The Year 2 LTM event was performed in December 2008, with results documented in the *Final Annual Report – Year 2* (Parsons, 2009). Results for the Year 3 LTM sampling event conducted in November 2009 are documented in the *Final Annual Report – Year 3* (Parsons, 2010). The Year 4 LTM sampling event was conducted in December 2010 for both AOCs, with the results presented in the Draft *Final Annual Report – Year 4* (Parsons, 2011). No LTM sampling event was conducted in 2011 due to budgetary constraints. This report presents and discusses the results for Year 5's LTM event, which was conducted in December 2012.

2.0 SITE BACKGROUND

2.1 Site Description

SEDA, a 10,587-acre former military facility located in Seneca County near Romulus, New York, 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. The facility was wholly owned by the United States Government and was operated by the Department of the Army between 1941 and 2000; since 2000, portions of the 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 presented as **Figure 1**.

SEAD-16 and SEAD-17 are located in the east-central portion of the SEDA, within SEDA's former ammunition storage area in an area where vehicular and pedestrian access is restricted. SEAD-16 and SEAD-17 are located in the portion of SEDA where land is presently designated for future PID uses. The locations of SEAD-16 and SEAD-17 are shown in **Figure 2**.

Both AOCs were historically used for the demilitarization of various small arms munitions. The munitions deactivation process involved heating the munitions in 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 expelled from the kiln as bottom ash or debris.

SEAD-16, the former Abandoned Deactivation Furnace, was used from approximately 1945 until the mid 1960s when its use ceased and the site was vacated. The site consisted of 2.6 acres of fenced land with grasslands in the north, east, and west; a storage area for empty boxes and wooden debris located to the west; and an unpaved roadway in the south. Building S-311, which previously housed the deactivation furnace, was located at the approximate center of this area, and was demolished as part of the RA at SEAD-16. Documentation of demolition activities is presented in the *Building Cleaning and Building Demolition Completion Report* (Parsons, 2008). Building S-366, known as the Process Support Building, is located to the northeast of former Building S-311, and is currently unused and vacant. In addition to Building S-366, two sets of SEDA railroad tracks and utilities are presently on-site.

SEAD-17, the former Active Deactivation Furnace, was constructed to replace the Abandoned Deactivation Furnace at SEAD-16. However, SEAD-17 was inactive after 1989 as a result of Resource Conservation and Recovery Act (RCRA) permitting issues. SEAD-17 formerly consisted of the deactivation furnace, associated air pollution control equipment, and a support building (Building S-367), which were demolished or dismantled during the RA. Details and results of the demolition are documented in the *Building Cleaning and Building Demolition Completion Report* (Parsons, 2008). The former SEAD-17 deactivation furnace facility and support building were surrounded by a crushed shale road, beyond which lie grasslands. An unpaved gravel road to the north permits vehicular access to SEAD-17.

2.2 Site Hydrology

The hydrogeologic setting of SEAD-16 and SEAD-17 is 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 as described in the RI Report is presented below.

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. As summarized in the *Final Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)* (Parsons, 2008), MW16-3 was destroyed during the RA construction activities, and was not replaced as groundwater conditions on the southwest side of Building S-311 are adequately characterized by MW16-2 and MW16-5. The locations of the six existing groundwater monitoring wells and the former MW16-3 are shown on **Figure 3**.

Prior to the completion of the RA in August 2007, depth to groundwater was measured at SEAD-16 three times (April 1994, August 1996, and December 1996). Groundwater flow generally trends to the west based on previous subsurface investigations conducted at SEDA. Data from previous investigations suggest that a groundwater divide exists near, and approximately parallel to, Route 96 near Romulus, New York, indicating that the groundwater in the SEAD-16 area flows west. Based on available groundwater elevation data, it appears that there may be a regional groundwater high southwest of former Building S-311, which may 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 measured less than 2 feet when tested in September 1996. Hydraulic conductivity values for the shallow till/weathered shale aquifer ranged from 2.8×10^{-3} cm/sec to 2.5×10^{-2} cm/sec; 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**. Prior to the completion of the RA, depth to groundwater was measured at SEAD-17 in April 1994, August 1996, and December 1996 (the same time groundwater levels were measured at SEAD-16). Interpretation of groundwater elevation data indicates that groundwater flows to the southwest.

A horizontal hydraulic gradient of 0.01ft/ft was calculated 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 operations that were performed within and in close proximity to the former Abandoned Deactivation Furnace Building (S-311) and the Process Support Building (Bld. 366). 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 former Abandoned Deactivation Furnace Building. Metals (antimony, copper, lead, mercury, and zinc) were found at concentrations greater than the site-specific cleanup goals in soil located in portions of the surrounding man-made drainage ditches.

Pre-Remedial Action Groundwater Conditions

Prior to completion of the RA, three rounds of low-flow groundwater sampling were conducted at SEAD-16, including one round in April 1994 as part of the ESI investigation activities, and two rounds in August and December 1996 as part of the RI activities. Compounds detected in the groundwater samples are presented in **Appendix A**. Refer to the RI Report for complete groundwater analyses. Metals were detected above either the applicable NYS Class GA standards or EPA MCLs. Concentrations exceeding applicable standards were less than or close to SEDA background concentrations, except for the exceedances of sodium. A summary of SEDA background groundwater data providing summary statistics (including maximum and average concentrations, the standard deviation for the collected data, and the frequency of detection) is provided in **Appendix B**. The Final Work Plan (Parsons, 2007) 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. This conclusion was based on a comparison of results to the background groundwater data collected from unaffected parts of SEDA.

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 concentrations of metals were highest in samples collected closest to the location of the former Active Deactivation Furnace and its support building, particularly near the southwestern corner of the building.

Pre-Remedial Action Groundwater Conditions

Prior to the completion of the RA, three rounds of groundwater sampling were conducted at SEAD-17, concurrent with the sampling conducted at SEAD-16 as identified above. Compounds detected in the groundwater samples collected during the low-flow sampling events in 1996 are presented in **Appendix A**. Metals were detected at concentrations above the applicable NYS Class GA standards or EPA MCLs; however, these concentrations were lower than SEDA background concentrations, except for sodium. (See SEDA background groundwater data summary in **Appendix B.**) 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. This conclusion is based on a comparison of results to groundwater data collected from non-impacted areas of SEDA.

2.5 Remedial Action Summary

The selected remedy for SEAD-16 and SEAD-17 required the following:

- Excavation of soil impacted with metals and PAHs at concentrations greater than the site-specific cleanup standards;
- Stabilization of excavated soil exceeding the toxicity characteristic leaching procedure;
- Disposal of the material in an off-site landfill;
- Backfilling the excavated areas with clean backfill;
- Performing groundwater monitoring for select metals until groundwater concentrations do not exceed the applicable NYS Class GA or EPA MCL standards;
- Establishing and maintaining LUCs to prevent access to or use of groundwater and to prevent residential use of the land until cleanup standards are met; and
- Performing a review of the selected remedy every five years to evaluate if the remedy remains protective of the public health and the environment in accordance with Section 121(c) of the Comprehensive Environmental Remediation and Cleanup Liability Act (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. Approximately 1,862 cy of impacted soil was removed from SEAD-16 and approximately 2,565 cy of impacted soil was removed from SEAD-17. The limit of the excavations performed at 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), the excavation floor, and the perimeter yielded analytical results below 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 was disposed as non-hazardous material at the Ontario County Landfill in Flint, New York.

Deeper excavations at SEAD-16 and SEAD-17, including 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 RA 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 LTM Event

The first post-RA groundwater LTM event (Year 1) was performed at SEAD16 and SEAD-17 between December 19, 2007 and December 21, 2007. The results of the Year 1 event are reported in the *Final Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)* (Parsons, 2008). Only unfiltered groundwater samples were collected and analyzed during this sampling event. Well MW16-3 was removed during the RA and was not sampled.

In summary, at SEAD-16 five metals (antimony, iron, lead, manganese, and sodium) were detected at concentrations above the respective NYS Class GA or EPA MCL standards in one or more of the wells, including antimony in wells MW16-2, MW16-4, and MW16-7; iron in wells MW16-5 and MW16-6; lead in well MW16-7; manganese in well MW16-7; and sodium in wells MW16-1, MW16-2, MW16-4, and MW16-7). At SEAD-17, two metals (antimony and sodium) were each detected once in different wells (MW17-2 and MW17-4, respectively) at concentrations above the respective NYS Class GA groundwater standards. Concentrations of other metals detected at SEAD-16 and SEAD-17 were below the applicable NYS Class GA groundwater and EPA MCL standards. With the noted exception of sodium concentrations detected at SEAD-16, concentrations detected at both SEAD-16 and SEAD-17 were below SEDA background concentrations. The *Final Construction Completion Report for the Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)* (Parsons, 2008) concluded that the groundwater did not appear to be impacted by historic site activities.

3.2 Summary of Year 2 LTM Event

The second post-RA LTM event (Year 2) was performed at SEAD-16 and SEAD-17 between December 9, 2008 and December 11, 2008. The results of the Year 2 event were reported in *Final Annual Report – Year 2* (Parsons, 2009). Only unfiltered groundwater samples were collected and analyzed during the Year 2 sampling event.

Four metals (antimony, iron, lead, and sodium) were detected in wells at SEAD-16 at concentrations above the respective NYS Class GA or EPA MCL standards, including antimony in wells MW16-2, MW16-5, and MW16-7; iron in wells MW16-5 and MW16-7; lead in well MW16-7; and sodium in wells MW16-1, MW16-2, MW16-4, and MW16-7. At SEAD-17, two metals (iron and manganese) were detected at concentrations above the applicable NYS Class GA standards in wells MW17-3 (iron and manganese) and MW17-4 (iron). Concentrations of other metals detected at SEAD-16 and SEAD-17 were below the applicable NYS Class GA or EPA MCL standards. *The Final Annual Report – Year 2* (Parsons, 2009) concluded that the groundwater does not appear to be impacted by historic site activities and there does not appear to be an indicator of deteriorating conditions at SEAD-16 and SEAD-17.

3.3 Summary of Year 3 LTM Event

The third post-RA LTM event (Year 3) was performed at SEAD-16 and SEAD-17 between November 12, 2009 and November 18, 2009. The results of the Year 3 event were reported in *Draft Final Annual*

Report – Year 3 (Parsons, 2010). Both filtered (i.e., dissolved) and unfiltered (i.e., total) samples were collected and characterized during this sampling event.

Three metals (antimony, iron, and sodium) were detected in unfiltered groundwater samples from SEAD-16 at concentrations above the applicable NYS Class GA standards in wells MW16-2 and MW16-7 (antimony); in wells MW16-4, MW-16-5, and MW16-6 (iron); and in wells MW16-1, MW16-2, MW16-4, and MW16-7 (sodium). At SEAD-17, antimony, iron, manganese, lead, and sodium were detected in the unfiltered sample collected from well MW17-2 at concentrations above the applicable NYS Class GA or EPA MCL standards; iron was detected above its NYS Class GA standard in the filtered and unfiltered samples collected from MW17-3; and sodium was detected above its NYS Class GA standard in the filtered and unfiltered samples at MW17-5.

Filtered and unfiltered sample results for SEAD-16 were similar for antimony and sodium in the wells as indicated above; however, unfiltered results for iron were somewhat higher than the filtered samples in wells MW16-4 and MW-16-5. Filtered and unfiltered sodium concentrations were similar in the SEAD-17 wells, but filtered and unfiltered iron concentrations in wells MW17-2 and MW17-3 were significantly different, with the unfiltered concentrations the highest in both cases.

Concentrations of the other metals detected at SEAD-16 and SEAD-17 were below the applicable NYS Class GA or EPA MCL standards. Similar to the results of the Year 2 LTM event, the *Draft Final Annual Report – Year 3* (Parsons, 2010) concluded that the groundwater does not appear to be impacted by historic site activities and there does not appear to be an indication that conditions are deteriorating at SEAD-16 and SEAD-17.

3.4 Summary of Year 4 LTM Event

The Year 4 LTM groundwater sampling event was conducted at SEAD-16 and SEAD-17 between December 13, 2010 and December 17, 2010. Filtered and unfiltered groundwater samples were collected from the six monitoring wells located at SEAD-16, and from the five monitoring wells located at SEAD-17. Concentrations of metals (including antimony, sodium, and iron) exceeding the applicable NYS Class GA standards were detected in the filtered and unfiltered samples collected from five of the six wells (MW16-1, MW16-2, MW16-4, MW16-5, and MW16-7) sampled at SEAD-16. Antimony and sodium were detected above the applicable NYS Class GA standard in MW16-2 and MW16-7; sodium was detected above the applicable NYS Class GA standard in MW16-1 and MW16-4; and iron was detected above the applicable NYS Class GA standard in MW16-5. Concentrations of antimony and sodium were similar for unfiltered and filtered samples, with the highest concentrations of antimony and sodium detected in MW16-7 and MW16-4, respectively. Iron exceedances were found in the unfiltered and filtered samples collected from MW16-5.

At SEAD-17, inorganic constituents were detected at concentrations below the applicable NYS Class GA and EPA MCL standards in both the filtered and unfiltered samples collected from the five monitoring wells with the exception of MW17-3. Similar to the results of the Year 3 LTM event, iron was the only metal detected above the applicable NYS Class GA standard in both unfiltered and filtered samples collected from MW17-3.

Similar to the results of previous LTM events, the *Draft Final Annual Report 2010 – Year 4* (Parsons, 2011) concluded that although there were exceedances of select metals found at both SEAD-16 and SEAD-17, the groundwater does not appear to be impacted by historic site activities and therefore does not appear to indicate that groundwater conditions are deteriorating at either SEAD-16 and SEAD-17.

3.5 Year 5 LTM Event

The Year 5 post-RA LTM event was conducted at SEAD-16 and SEAD-17 from December 11, 2012 through December 15, 2012. Filtered and unfiltered groundwater samples were collected from six monitoring wells located at SEAD-16 and from five monitoring wells located at SEAD-17. This is the third sampling event that includes the collection of filtered and unfiltered samples.

Field forms completed for the Year 5 sampling event are included in **Appendix C**. Prior to the collection of groundwater samples from each of the monitoring wells, groundwater elevation measurements were collected at each of the wells to be sampled. Groundwater elevation data for the Year 5 LTM event, as well as historic data, are presented in **Table 1** and **Table 2** for SEAD-16 and SEAD-17, respectively.

3.5.1 Year 5 LTM Sample Collection

Samples for the Year 5 LTM event were collected using low flow sampling techniques. A peristaltic pump was used in place of a bladder pump to collect the groundwater samples due to anticipated winter weather conditions, including possible standing air temperatures below 32 degrees Fahrenheit (0 degrees Celsius). A peristaltic pump is recommended for freezing conditions since the bladder pump recharge cycle sequence allows water to freeze in the exposed portion of the sample tubing, which may inhibit sample collection efforts if ice plugs form in the tubing.

Sample collection, handling and custody, holding times, and field parameter collection procedures were conducted in accordance with the *Revised Final Sampling and Analysis Plan for Seneca Army Depot Activity* (SAP) (Parsons, 2006c). Samples collected from the six SEAD-16 wells and the five SEAD-17 wells were submitted to TestAmerica (Savannah, GA) for the following analyses:

- Total Analyte List (TAL) metals, exclusive of mercury, by USEPA SW846 Method 6020; and
- Mercury by USEPA SW846 7470A.

TestAmerica's Savannah, GA laboratory is certified by the Department of Defense's (DoD's) Environmental Laboratory Accreditation Program (ELAP) and the NELAC National Environmental Laboratory Accreditation Program (NELAP) for the above analyses/analytical methods for both potable and non-potable water.

Quality control (QC) samples, including one duplicate and one matrix spike/matrix spike duplicate (MS/MSD) pair, were collected at MW16-7. In the field, pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), conductivity, temperature, and turbidity data were collected from each well during the purging cycle; filtered turbidity data was collected for each location after the filtered sample was collected; and pH, ORP, DO, conductivity, temperature, and turbidity data were also collected from each well after samples had been collected to assess overall sample sequence stability. A summary of the

pre- and post-sampling field parameters is provided in **Table 3** and **Table 4** for SEAD-16 and SEAD-17, respectively.

3.5.2 Year 5 LTM Sample Filtering

As documented in *Final Annual Report – Year 2* (Parsons, 2009), *Draft Final Annual Report – Year 3* (Parsons, 2010), and *Draft Final Annual Report 2010 – Year 4* (Parsons, 2011) some of the metal concentrations that exceed NYS Class GA or EPA MCL standards in SEAD-16 and SEAD-17 wells may be associated with the groundwater turbidity fluctuations encountered in the wells at the time of sampling. For example, several of the samples (e.g., MW16-1, MW16-4, MW16-7, MW17-1, and MW17-4) collected during the Year 3 monitoring event had very low levels of turbidity [i.e., less than 1 Nephelometric Turbidity Unit (NTU)] which resulted in similar metal concentrations reported for both the filtered and unfiltered samples. Conversely, certain metals (most notably aluminum, iron, and manganese in many wells) and specific metals such as lead (as detected in MW16-7, MW17-2 and MW17-3) appear to be affected by filtering, which suggests that the reported metal results may be due to the presence of soil in the samples analyzed. Concentrations measured for several metals (antimony, calcium, magnesium, potassium and sodium) are unaffected either by variations in turbidity level or by sample filtering, suggesting that these metals may be present as dissolved species in the groundwater. With this in mind, both unfiltered and filtered samples were collected for the Year 5 LTM event: samples were collected directly from the well as unfiltered samples, and then another sample was collected and filtered through a 0.45-micron membrane filter was used to collect the filtered sample.

Both the filtered and unfiltered samples from SEAD-16 and SEAD-17 wells were analyzed for TAL metals by the methods listed in **Section 3.5.1.** The unfiltered and filtered concentrations of metals detected in samples collected from SEAD-16 and SEAD-17 wells is shown in **Table 5A** and **Table 5B**, respectively.

Turbidity levels recorded immediately prior to sample collection ranged from 0.48 NTU (MW16-4) to 3.6 NTUs (MW17-1). Turbidity levels recorded after the collection of both unfiltered and filtered samples ranged from 0.87 NTU (MW16-1) to 3.28 NTU (MW17-1). Filtered water turbidity levels ranged from 0 NTU to 0.4 NTU, as would be expected after passing through a 0.45-micron membrane filter.

Review of the Year 5 data supports the conclusions drawn from interpretation of Year 3 and 4 data, and show that in cases where groundwater turbidity level is low, the difference between the metals concentrations for both filtered and unfiltered samples is minimal. Samples collected from MW16-1, MW16-4, MW16-7, MW17-1, and MW17-4 during the Year 5 monitoring event had very low turbidity levels (i.e., less than 1.7 NTU) which resulted in similar metal concentrations reported for both the filtered and unfiltered samples from these wells. Concentrations of some metals, such as iron, detected in six wells (M16-4, MW16-5, MW16-6, MW17-1, MW17-4 and MW17-5) showed decreases in concentration that may be attributed to filtering. Concentrations measured for several metals (i.e., antimony, calcium, magnesium, potassium and sodium) appear to be unaffected by either variation in turbidity levels or by sample filtering, suggesting that these metals are dissolved in the groundwater.

3.6 Year 5 Groundwater Elevations for SEAD-16 and SEAD-17

Groundwater elevations were measured on December 11, 2012 at SEAD-16, and on December 15, 2012 at SEAD-17. Groundwater elevation data, including historic groundwater elevation data, for SEAD-16 and SEAD-17 is presented as **Table 1** and **Table 2**, respectively.

Groundwater elevation data collected during previous investigations indicate that groundwater generally flows to the southwest at SEAD-16; however, historical groundwater elevation data also indicate that localized variation in groundwater flow direction may be due to higher groundwater elevations observed to the northeast and southwest of Building 311. During the most recent (Year 5) LTM event, and similar to the Year 4 LTM groundwater flow observations at SEAD-16, groundwater elevation data suggest that there is a groundwater low in the vicinity of the former Building 311 location. The higher groundwater elevations to the northeast and southwest of the apparent groundwater low in the vicinity of Building 311 result in two apparent local groundwater flow directions (to the southeast and northwest, respectively) as shown on **Figure 5**.

Based on the most recent elevation data (December 2012), groundwater at SEAD-17 appears to flow generally to the west-southwest as shown on **Figure 5**, which is consistent with historical groundwater flow observations at SEAD-17.

3.7 Summary of Year 5 Groundwater Data Analysis for SEAD-16

A summary of metals detected in groundwater during the Year 5 LTM event for SEAD-16 is presented in **Table 5A**. Complete groundwater data results are presented in **Appendix D**. A discussion of data validation results is presented in **Appendix F**; there were no non-compliance issues reported. Concentrations of metals including antimony, iron, and sodium were detected above applicable NYS Class GA standards in both filtered and unfiltered samples, including metals exceedances for filtered samples from five of the six wells, and unfiltered sample exceedances from the six wells.

Antimony exceeded the NYS Class GA standard of 3 µg/L for both the filtered and unfiltered samples collected from three wells (MW16-2, MW16-4, and MW16-7). The highest concentrations of antimony were found at well MW16-7, where concentrations of 13.5 µg/L and 13 µg/L, were found in the unfiltered and filtered samples, respectively. Antimony concentrations measured in the unfiltered versus filtered samples collected from MW16-2 were also comparable, with the unfiltered sample yielding a concentration of 7.1 µg/L, and the filtered sample's concentration was 7.8 µg/L. Unfiltered and filtered samples from MW16-4 yielded the lowest concentrations of 3.9 µg/L and 4 µg/L, respectively.

Iron exceeded the NYS Class GA standard (300 µg/L) in the unfiltered and filtered samples analyzed from well MW16-5, with unfiltered and filtered sample concentrations of 1,300 µg/L and 1,100 µg/L, respectively. Iron additionally exceeded the NYS GA standard at a concentration of 790 µg/L in the unfiltered sample collected from MW16-6.

Concentrations of the sum of iron and manganese compounds detected in unfiltered and filtered samples collected from well MW16-5 also exceeded the combined NYS Class GA standard of 500 µg/L with the primary contributing metal being iron. Although manganese was detected in the unfiltered and filtered

groundwater samples collected from the six SEAD-16 wells, it was not detected at concentrations above its NYS Class GA standard (300 µg/L) during the Year 5 LTM event.

Sodium was detected at concentrations above the NYS Class GA standard (20,000 µg/L) in unfiltered and filtered samples collected from SEAD-16 wells MW16-1, MW16-4, and MW16-7. The highest concentrations were detected in the unfiltered and filtered samples collected from well MW16-4 at concentrations of 310,000 µg/L and 340,000 µg/L, respectively. Sodium exceedances were also found in the MW16-1 unfiltered and filtered samples at concentrations of 62,000 µg/L and 63,000 µg/L, respectively; and in the MW16-7 filtered and unfiltered samples at concentrations of 35,000 µg/L and 32,000 µg/L, respectively. The duplicate of MW16-7 had similar sodium concentrations.

In summary, select metals including antimony, iron, and sodium continue to be detected in the groundwater at SEAD-16 at levels that exceed NYS Class GA standards. In general, however, there does not appear to be evidence of an area-wide or expanding plume at SEAD-16, as illustrated by the generally stable occurrence of metals concentrations identified across the groundwater monitoring well network during the LTM sampling events. 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 non-groundwater sourced municipal water supply is available for SEDA and currently includes the PID area. The groundwater access/use restriction will remain in effect at SEAD-16 until the select metal concentrations in groundwater have been reduced to levels below applicable NYS Class GA and EPA MCL standards, and until data demonstrating acceptable groundwater quality in the AOC is provided to and approved by the applicable regulatory agencies.

3.8 Summary of Year 5 Groundwater Data Analysis for SEAD-17

A summary of metals detected in the Year 5 groundwater samples event for SEAD-17 is presented in **Table 5B**. Complete groundwater analytical results are presented in **Appendix D**. Concentrations of metals in MW17-1, MW17-3, MW17-4, and MW17-5 were detected below the applicable NYS Class GA and EPA MCL standards in both the filtered and unfiltered samples. Antimony was detected at concentrations exceeding the NYS Class GA standard of 3µg/L in the filtered and unfiltered samples collected from MW17-2 at concentrations of 4 (J) µg/L and 4.4 (J) µg/L, respectively (note that the concentrations reported are followed by the "J" qualifier, which indicates that the reported value is estimated).

The SEAD-17 Year 5 data continues to demonstrate that the groundwater at SEAD-17 has not been impacted by metals released from the former Active Deactivation Furnace site. Although the concentrations of antimony were identified at concentrations above the applicable NYS Class GA standards, the results are similar to what has been observed historically at the site, and indicate that there has not been a significant change in groundwater conditions. Access to and use of the groundwater is restricted at the AOC under the terms of the ROD, and is not being used as a potable water source. A non-groundwater sourced municipal water supply is available for the Depot, and currently includes the PID area. The groundwater access/use restriction will remain in effect at SEAD-17 until select metal concentrations in groundwater have been reduced to levels below applicable NYS Class GA and EPA

MCL standards, and until data demonstrating acceptable groundwater quality in the AOC is provided to and approved by the applicable regulatory agencies.

3.9 Groundwater Data Trends

A comparison of data collected during the Years 1 to 5 LTM events to groundwater conditions noted prior to the RA is provided for SEAD-16 and SEAD-17 in the following discussions. Summaries of metal exceedances detected during the Year 5 groundwater monitoring event for SEAD-16 and SEAD-17 is provided in **Table 5A** and **Table 5B**, respectively. The complete data set for Year 1 through Year 5 LTM events is included as **Appendix D**.

3.9.1 Review of Groundwater Trends for SEAD-16

ESI and RI Data

Review of SEAD-16 data presented in the RI Report indicated that one or more concentrations measured for 14 metals (including arsenic, antimony, barium, beryllium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, sodium, and thallium) in 19 unfiltered groundwater samples collected during the ESI (performed in 1993/1994) and/or the RI (performed in 1999) exceeded NYS Class GA or EPA MCL standards in effect at the time of analysis. Of the 39 total instances where groundwater concentrations exceeded NYS Class GA or EPA MCL standards, 22 exceedances were associated with samples collected with peristaltic pumps (e.g., for the ESI sampling event) while the remaining 17 exceedances were found in samples collected using low-flow bladder pumps. Sample turbidities recorded during the RI sampling events were significantly lower than those recorded during the ESI sampling event, and thus are believed to be more representative of the water quality located at the site prior to the RA. Examination of the RI groundwater data shows that six metals were detected at concentrations in excess of NYS Class GA or EPA MCL standards in effect at the time of analysis:

- antimony (detected 2 times);
- iron (detected 5 times);
- lead (detected 1 time);
- manganese (detected 2 times);
- sodium (detected 3 times); and
- thallium (detected 4 times).EPA MCL

Of these detections, antimony was detected at concentrations above the applicable NYS Class GA standard only in well MW16-3, with a maximum concentration of 12.3 µg/L. Iron was found at elevated concentrations in three wells: MW16-1 (at a maximum concentration of 2,400 J[1] µg/L), MW16-2, and MW16-3. Lead was detected only in MW16-3 at a maximum concentration of 24.1 J µg/L; manganese was detected at elevated concentrations only in MW16-6 with a maximum level of 1,380 µg/L; sodium was detected in two wells (MW16-5 and MW16-6) with a maximum concentration of 409,000 µg/L

[1] The "J" data qualifier is used to indicate that the reported concentration is estimated.

detected at MW16-6; and thallium was detected in three wells including (MW16-2, MW16-5, and MW16-6), with a maximum concentration of 11 µg/L detected at MW16-6.

Post-Remedial Action Data

Over the six years since the completion of the RA at SEAD-16, a total of 56 groundwater samples, including 38 unfiltered and 18 filtered groundwater samples have been collected from the six wells located on SEAD-16. Amongst the 56 characterized groundwater samples, there have been eighty-one exceedances of individual applicable NYS Class GA or EPA MCL standards. These exceedances were primarily distributed across five metals consisting of antimony (28 exceedances), iron (14 exceedances), lead (two exceedances), manganese (one exceedance), and sodium (36 exceedances). Of the 81 exceedances, 22 were detected in the filtered samples and 46 were detected in unfiltered samples.

Antimony concentrations exceeding the NYS Class GA standard of 3 µg/L have been detected 28 times and most frequently have been detected in two wells, MW16-2 and MW16-7. Antimony detections above the NYS Class GA standards have inconsistently been found in well MW16-4 (five times, including two filtered from LTM events 4 and 5 and three unfiltered from LTM events1, 3, and 5); and in MW16-5 (one unfiltered sample). Filtered and unfiltered sample results for antimony from wells MW16-2 and MW16-7 are generally comparable, suggesting that the metal is present as a dissolved species. The highest concentrations are found consistently in well MW16-7 where the overall maximum concentration (16.3µg/L) was detected in the sample/duplicate collected during the Year 3 sampling event in 2009. This maximum concentration is approximately equivalent to what was detected in the groundwater at the former MW16-3 prior to the RA.

Exceedances of the NYS Class GA standard for iron were noted 14 times, distributed across wells MW16-4 through MW 16-7 over the five LTM sampling events. Iron concentrations noted in filtered samples are generally lower than concentrations found in unfiltered samples indicating that the iron concentrations are somewhat dependant of turbidity levels present in the groundwater at the time of sampling. The highest post RA concentration of iron detected in the groundwater at SEAD-16 is 1,300 µg/L (MW16-5, Year 5 LTM sampling event), which is roughly half of what was detected in the groundwater at the site prior to the RA.

Lead has been detected less frequently (22 of 56 LTM samples) and at lower concentrations (two exceedances post RA) in groundwater during the five years of post-RA monitoring. The two noted post-RA exceedances of the lead EPA MCL both occurred in well MW16-7 during the first and second LTM sampling events. Both of these samples were unfiltered, and since the last exceedance at MW16-7, lead levels in both the filtered and the unfiltered samples collected from this well have trended downward.

Sodium is a persistent contaminant identified in SEAD-16 wells, as it has been detected in every sample collected from the site, and at levels in excess of its NYS Class GA standard in 36 of the 54 samples. Sodium concentrations detected in the groundwater are currently higher than what was found prior to the RA, with concentrations possibly affected by the known county highway salt pile operation that is operated by the Seneca County Highway Department (located approximately 1,000 feet upgradient to the east-northeast of SEAD-16).

Although enough data points are available to perform a limited statistical analysis [e.g., using the combined SEAD-16 pre-RA (1 to 3 samples per well) and post-RA (5 samples per well) datasets], the overall limited availability of data points and the high percentage of non-detects in the metal constituents results would not be conducive to providing a comprehensive evaluation. A review of the EPA's *Groundwater – Unified Guidance* (EPA 2009) document provides numerous statistical methodologies; however, although the present number of data points could be used to perform a statistical analysis. The guidelines recommend 10 to15 distinct data points for accurate and meaningful results. Based on the limited data available the results would be inconclusive since there are at most five distinct data points for antimony in two of the wells (MW16-2 and MW16-7). Following the additional annual LTM events it is anticipated that a sufficient number of data points will be available to conduct a statistical analysis of the post-RA sampling data.

3.9.2 Review of Groundwater Trends at SEAD-17

ESI and RI Data

Review of SEAD-17 data presented in the RI Report indicated that one or more concentrations measured for five metals (i.e., iron, lead, sodium, and thallium) in 12 unfiltered groundwater samples exceeded NYS Class GA or EPA MCL standards in effect at the time of analysis. Of the 16 instances where groundwater concentrations exceeded the NYS Class GA or EPA MCL standards, 10 were associated with samples collected with a peristaltic pump (ESI sampling event) while the remaining six were found in samples collected using low-flow sampling with a bladder pump. As was indicated above for SEAD-16, sample water turbidities recorded during the RI sampling events were lower than those recorded during the ESI sampling event, and thus the analytical results from the RI samples are believed to be more representative of the water quality present at SEAD-17. Examination of the RI groundwater data indicates that only three metals (iron, sodium, and thallium) were detected at concentrations above NYS Class GA or EPA MCL standards in effect at the time of analysis. Of these detections, iron was detected at an elevated concentration in one well (MW17-1 at a concentration of 572 J µg/L); sodium was detected in two wells (MW17-3, at a maximum concentration of 30,100 µg/L, and at MW17-4); and thallium was detected in two wells (MW17-1 at a maximum concentration of 7.1 µg/L, and at MW17-5).

Post-Remedial Action Data

Since the completion of the RA at SEAD-17, a total of 40 groundwater samples including 25 unfiltered and 15 filtered groundwater samples have been collected from the five wells located on SEAD-17. Eighteen exceedances of NYS Class GA or EPA MCL standards primarily distributed across five metals have been detected, including antimony (four exceedances), iron (seven exceedances), lead (one exceedance), manganese (two exceedances), and sodium (four exceedances). Of the 20 NYS Class GA or EPA MCL standard exceedances, five exceedances were detected in the filtered samples and 15 were detected in unfiltered samples. No exceedances of NYS Class GA or EPA MCL standards have been detected in well MW17-1 since the start of the post-RA LTM activities. Eight exceedances have been found in MW17-2; five exceedances have been found in well MW17-3 (with each of these exceedances of the NYS Class GA standard for iron); three exceedances in MW17-4; and two sodium exceedances found in MW17-5.

Exceedances of the 3 µg/L NYS Class GA standard for antimony were detected at MW17-2 in the unfiltered samples during the first and third sampling events; and during the most recent (2012) sampling event in both the filtered and unfiltered samples. The unfiltered sample from MW17-2 collected during the Year 3 event (2009) did not contain antimony concentrations in excess of the 3 µg/L EPA MCL standard. The maximum concentration reported for antimony was 3.7 µg/L detected in the MW17-2 Year 3 unfiltered sample. Exceedances of the NYS Class GA standard for iron were noted seven times in samples collected from three wells (MW17-2 with one exceedance; MW17-3 with five exceedances; and one exceedance at MW17-4). The maximum iron concentration was detected in the unfiltered sample collected from MW17-2 during the third sampling event (2009). Iron was not detected in the filtered sample collected during this event. This result therefore is presumed attributable to the elevated turbidity of the sample at the time of collection, which may also have impacted the other metal detections also reported (antimony, lead, and manganese) in this sample. Iron concentrations detected in five samples collected from MW17-3 (including three unfiltered and two filtered samples) were all above the applicable 300 µg/L NYS Class GA standard. Iron results from the filtered and unfiltered samples collected during the third (2009) LTM sampling event suggest that turbidity may have impacted the results for these analyses; however, iron in the filtered samples collected during this LTM event still exceeded the NYS Class GA standard.

Lead has been detected above the EPA MCL standard only once on the site since the completion of the RA in MW17-2 (unfiltered sample collected during the third LTM sampling event in 2009). Lead was not detected in the filtered sample, as the lead concentration in this sample was not above 2.9 µg/L U2.

Manganese concentrations reported for samples collected from MW17-2 (in the unfiltered sample collected during the Year 3 LTM sampling event in 2009) and MW17-4 (in the unfiltered sample collected during the Year 2 LTM sampling event in 2008) exceeded the NYS Class GA standard of 300 µg/L. The sample collected from MW17-4 yielded the highest manganese concentration of 911 µg/L.

Sodium was detected at levels in excess of the 20,000 µg/L NYS Class GA standard four times in samples collected from MW17-2, MW17-4 and MW17-5. Of these detections, the sample results from MW17-5 are the most notable as the filtered/unfiltered samples collected during the Year 3 LTM sampling event (2009) both were in excess of 360,000 µg/L. Sodium results for the Year 2 (2008) and Year 4 (2010) LTM events for this well were all below 10,000 µg/L, suggesting the Year 3 (2009) results are possibly a seasonal anomaly.

In general, post-RA LTM results indicate that groundwater quality at SEAD-17 is not impacted by historic operations conducted in this area. Many of the identified groundwater quality exceedances appear to be affected by turbidity issues (e.g., samples collected from MW17-2), while other exceedances of iron, manganese, and sodium appeared either as random occurrences (e.g., sodium at MW17-5) or may be attributable to iron and manganese groundwater concentrations that are identified regionally in Seneca County. Similar to SEAD-16, based on the limited data for SEAD-17 including pre-RA (1 to 3 samples per well) and post-RA (5 samples per well) datasets, the generally limited available data points and the

[2] A "U" data qualifier was used to indicate that the analytical results for lead in the unfiltered sample were not detected at a concentration above 2.9 µg/L.

high percentage of non-detects in the metal constituents results would yield inconclusive results. A review of the EPA's Groundwater – Unified Guidance (EPA, 2009) document provides numerous statistical methodologies which recommend more data points than are presently available. Once a sufficient number of data points has been obtained, a statistical analysis of the post-RA sampling data can be conducted.

3.10 Routine Inspections of SEAD-16 and SEAD-17 Monitoring Wells

Observation of the wells at SEAD-16 and SEAD-17 during the Year 5 LTM event indicates that the wells located on the site are in acceptable condition. No root material or other obstructions were observed in the wells at SEAD-16 and SEAD-17 during the Year 5 sampling event.

4.0 REMEDY EVALUATION

As discussed above in **Section 2.5**, approximately 4,427 cy of metal and PAH impacted soil were removed from SEAD-16 and SEAD-17 during the RA conducted in the summer of 2007. The impacted soil was removed to minimize or eliminate the migration of hazardous contaminants from soil to groundwater. Soil that exceeded the site-specific cleanup standards, as based on the confirmatory soil data, was removed from SEAD-16 and SEAD-17.

The long-term groundwater monitoring performed over five years following the completion of the 2007 RA shows that the soil removal remedy has been effective in minimizing the migration of select metals from soil to groundwater. Pre-RA groundwater quality concerns associated with arsenic, barium, beryllium, chromium, copper, iron, lead, mercury, nickel and thallium have been eliminated, as each of these metals, with the exception of lead, have not been detected in the groundwater at SEAD-16 in excess of the applicable NYS Class GA or EPA MCL standards since the RA was completed. Lead was found twice at levels in excess of the applicable EPA MCL, but these exceedances were confined to a single well (MW16-7) during the Year 1 and Year 2 post-RA LTM sampling events; lead exceedances in MW16-7 have not been detected during subsequent sampling events. While iron and manganese concentrations in excess of NYS Class GA groundwater quality standards are still present, these results appear to be partially affected by turbidity issues or are attributable to the regional groundwater quality, and are not attributable to site activities. Noted sodium exceedances found in the groundwater at SEAD-16 appear to originate from the salt storage area located upgradient of SEAD-16 which is operated by the Seneca County Highway Department. Antimony continues to be detected at concentrations above the applicable NYS Class GA standard, but these exceedances appear to be limited to two wells where concentrations have remained generally consistent since the RA was completed.

The groundwater quality at SEAD-17 appears to have improved since the completion of the RA. The few noted groundwater quality exceedances for metals other than iron and manganese appear to be limited to the initial Year 1 or Year 2 post-RA sampling events or to a sample where a turbidity impact is suspected (e.g., the sample collected from MW17-2 during the Year 3 LTM event), and where groundwater quality has improved since the exceedances were reported. The noted iron exceedances reported for SEAD-17 are isolated and are most likely attributable to regional groundwater quality.

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 NYS Class GA Groundwater or EPA MCL standards.

As part of the LTM program, SEAD-16 and SEAD-17 were inspected to determine if the LUCs are being maintained. During the Year 5 event, it was confirmed that no residential housing, elementary and/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 existing 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 controlling, and in some cases eliminating, the migration of select metals from soil to groundwater based on evaluation of the results of the five post-RA LTM sampling events.
- The results of the Year 5 LTM event continue to demonstrate that field filtering may be an effective tool for identifying and evaluating an association between turbidity impacts and groundwater analytical data.
- Post-remediation groundwater monitoring results indicate that the groundwater has not been impacted by site activities, although concentrations were detected above the NYS Class GA or EPA MCL standards.
- The land use and groundwater use restrictions imposed at SEAD-16 and SEAD-17 are maintained and there are no signs of unauthorized use or access to the AOCs.

5.2 Recommendations

Based on evaluation of the pre-RA groundwater data and the data collected during Years 1 through 5 of the post-RA LTM program at SEAD-16 and SEAD-17, the Army recommends that groundwater monitoring continue on an annual basis at SEAD-16 and SEAD-17.

6.0 REFERENCES

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TABLES

Table 1	Groundwater Table Elevation Summary - SEAD-16
Table 2	Groundwater Table Elevation Summary - SEAD-17
Table 3	SEAD-16 – Comparison of Year 5 Geochemical Parameters
Table 4	SEAD-17 – Comparison of Year 5 Geochemical Parameters
Table 5A	Year 5 Filtered and Unfiltered Groundwater Analyses at SEAD-16
Table 5B	Year 5 Filtered and Unfiltered Groundwater Analyses at SEAD-17

Table 1
SEAD-16 - Groundwater Table Elevations Summary
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Pre-Remedial Action Groundwater Elevation Data

Monitoring Well	Top of PVC Elevation [1] (feet)	April 4, 1994		August 27, 1996		December 6, 1996	
		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
MW 16-2	734.56	3.65	730.91	4.50	730.06	3.71	730.85
MW 16-3	735.48	4.60	730.88	5.43	730.05	4.64	730.84
MW 16-4	733.93	NA	NA	4.83	729.10	2.93	731.00
MW 16-5	733.40	NA	NA	4.76	728.64	2.20	731.20
MW 16-6	733.56	NA	NA	4.54	729.02	2.90	730.66
MW 16-7	734.42	NA	NA	5.06	729.36	4.23	730.19

Post-Remedial Action Groundwater Elevation Data

Monitoring Well	Top of PVC Elevation [1] (feet)	December 20, 2007		December 9, 2008		November 13, 2009		December 13, 2010		December 10, 2012		
		Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation [4,5] (feet)	Depth to Water (feet)	Water Table Elevation [5] (feet)	Depth to Water (feet)	Water Table Elevation [5] (feet)	Top of PVC Elevation [6] (feet)	Depth to Water (feet)	Water Table Elevation [6] (feet)
MW 16-1	735.54	4.25	731.29	4.28	731.26	5.76	729.78	3.16	732.38	735.53	3.15	732.38
MW 16-2	734.56	4.20	730.36	4.20	729.28	4.35	729.13	4.08	729.40	734.86	4.08	730.78
MW 16-3	735.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW 16-4	733.93	3.00	730.93	3.42	730.51	3.91	730.02	2.78	731.15	734.51	2.71	731.80
MW 16-5	733.40	1.90	731.50	3.32	732.50	3.10	732.72	1.68	734.14	735.36	1.63	733.73
MW 16-6	733.56	2.66	730.90	3.47	730.09	3.68	729.88	2.53	731.03	734.25	2.37	731.88
MW 16-7	734.42	4.45	729.97	4.63	729.79	4.75	729.67	4.41	730.01	734.96	4.28	730.68

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 phase.
(3) Monitoring well MW16-3 was destroyed during the remedial action conducted at SEAD-16.
(4) PVC riser pipe for wells MW16-2 and MW16-5 was necessary to be cut during December 2008 sampling event due to the PVC preventing the metal casing lid from opening.
(5) MW16-2 and MW16-5 were re-surveyed in Dec 2008 and this data was used for water table elevation calculations. MW16-2 Top of PVC elevation is 733.48 ft. and MW16-5 Top of PVC elevation is 735.82 ft.
(6) Wells were re-surveyed with GPS RTK equipment in November 2012. New ground surface and top of the PVC elevations were used for the December 2012 water table elevation calculation.
NA = Not Available.

Table 2
SEAD-17 - Groundwater Table Elevations Summary
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Pre-Remedial Action Groundwater Elevation Data

Monitoring Well	Top of PVC Elevation [1] (feet)	April 4, 1994		August 29, 1996		December 6, 1996	
		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	733.50	7.64	728.66	3.01	733.29
MW 17-2	733.75	3.19	730.56	7.24	726.51	3.45	730.30
MW 17-3	732.15	2.38	729.77	7.14	725.01	2.47	729.68
MW 17-4	734.59	3.00	731.59	7.23	727.36	3.13	731.46
MW 17-5	733.58	NA	NA	6.92	726.66	2.65	730.93

Post Remedial Action Groundwater Elevation Data

Monitoring Well	Top of PVC Elevation [1] (feet)	December 19, 2007		December 9, 2008		November 11, 2009		December 13, 2010		December 10, 2012		
		Depth to Water (feet)	Water Table Elevation (feet)	Depth to Water (feet)	Water Table Elevation [3,4] (feet)	Depth to Water (feet)	Water Table Elevation [4] (feet)	Depth to Water (feet)	Water Table Elevation [4] (feet)	Top of PVC Elevation [5] (feet)	Depth to Water (feet)	Water Table Elevation [5] (feet)
MW 17-1	736.30	3.33	732.97	4.25	732.05	5.60	730.70	3.32	732.98	736.39	3.19	733.20
MW 17-2	733.75	3.31	730.44	4.07	729.68	5.27	728.48	2.2	731.55	733.65	2.79	730.86
MW 17-3	732.15	2.67	729.48	3.96	728.67	6.15	726.48	2.51	730.12	732.05	2.4	729.65
MW 17-4	734.59	3.40	731.19	4.05	730.54	5.75	728.84	3.4	731.19	734.62	3.18	731.44
MW 17-5	733.58	2.90	730.68	3.46	730.12	4.65	728.93	2.79	730.79	734.12	2.64	731.48

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 Phase.
(3) PVC riser pipe for MW17-3 was necessary to be cut during December 2008 sampling event due to the PVC preventing the metal casing lid from opening.
(4) MW17-3 was re-surveyed in December 2008 and this data was used for water table elevation calculations. MW17-3 Top of PVC elevation is 732.63 ft.
(5) Wells were re-surveyed with GPS RTK equipment in November 2012. New ground surface and top of the PVC elevations were used for December 2012 water table elevation calculation.
NA = Not Available.

Table 3
SEAD-16 - Year 5 Geochemical Parameters Before and After Sample Collection Comparison
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Well ID	Geo param collection Before/After Sampling	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (Std units)	Conductivity (S/m)
MW16-1	Before	0.47	175	8.7	1.04	6.99	0.805
	After	0.3	154	8.9	0.87	6.9	0.806
MW16-2	Before	4.23	59	7.4	1.2	7.26	0.52
	After	4.13	67	7.4	3.01	7.12	0.526
MW16-4	Before	0.2	-48	6.8	0.48	7.31	2.71
	After	0.21	-46	6.7	1.01	7.33	2.83
MW16-5	Before	0.3	-127	5.8	0.94	7.21	0.373
	After	0.3	-138	6	1.39	7.2	0.383
MW16-6	Before	1.03	-76	8.2	1.67	7.49	0.317
	After	1.27	-70	8.6	3.58	7.49	0.307
MW16-7	Before	0.86	55	8.8	1.14	7.34	0.639
	After	0.86	40	8.9	1.29	7.37	0.651

Table 4
SEAD-17 - Year 5 Geochemical Parameters Before and After Sample Collection Comparison
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Well ID	Geo param collection Before/After Sampling	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (Std units)	Conductivity (S/m)
MW17-1	Before	1.43	-21	8.8	3.6	7.6	0.265
	After	1.26	-20	8.9	3.28	7.62	0.273
MW17-2	Before	2.3	112	8.6	2.17	7.39	0.501
	After	1.9	109	8.7	2.16	7.39	0.499
MW17-3	Before	2.22	198	8.7	1.9	7.36	0.281
	After	2.25	200	8.8	2.02	7.35	0.291
MW17-4	Before	0.62	4	7.7	1.6	7.35	0.36
	After	0.58	4	7.7	1.85	7.32	0.341
MW17-5	Before	1.67	34	8	1.87	7	0.427
	After	0.94	34	8.2	2.01	7.11	0.429

Table 5A
Year 5 Filtered and Unfiltered Groundwater Results at SEAD-16
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Area								SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
Loc ID								MW16-1	MW16-1	MW16-2	MW16-2	MW16-4	MW16-4
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								16LM20028F	16LM20028U	16LM20029F	16LM20029U	16LM20030F	16LM20030U
Sample Date								12/15/2012	12/15/2012	12/15/2012	12/15/2012	12/15/2012	12/15/2012
QC Type								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sample Round								5	5	5	5	5	5
Filtered Status:								Dissolved	Total	Dissolved	Total	Dissolved	Total
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value Qual	Value Qual	Value Qual	Value Qual	Value Qual	Value Qual
Aluminum	UG/L	300	7%			1	14	23 U	50 U	23 U	50 U	23 U	50 U
Antimony	UG/L	14	57%	3	8	8	14	2.3 U	2 U	**7.8**	**7.1**	**4 J**	**3.9 J**
Arsenic	UG/L	2.7	43%	10	0	6	14	1.3 U	1.3 U	1.3 U	1.3 U	1.5 J	1.3 J
Barium	UG/L	240	100%	1000	0	14	14	78	78	65	62	240	230
Beryllium	UG/L	0	0%	4	0	0	14	0.25 U	0.15 U	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	0.23	7%	5	0	1	14	0.095 U	0.13 U	0.095 U	0.13 U	0.095 U	0.23 J
Calcium	UG/L	230000	100%			14	14	120,000	120,000	110,000	100,000	230,000	220,000
Chromium	UG/L	0	0%	50	0	0	14	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L	1.9	79%			11	14	0.15 U	0.16 J	0.15 U	0.12 U	1.9	1.9
Copper	UG/L	11	100%	200	0	14	14	5.2	3.3 J	4.5 J	5	4.1 J	11
Iron	UG/L	1300	43%	300	3	6	14	33 U	44 U	33 U	44 U	130	140
Iron and Manganese	UG/L	1430	71%	500	3	10	14	34 U	46 U	34 U	46 U	270	280
Lead	UG/L	3.4	50%	15	0	7	14	0.2 U	0.5 U	0.24 J	0.66 J	0.2 U	3.4
Magnesium	UG/L	34000	100%			14	14	18,000	18,000	13,000	11,000	34,000	32,000
Manganese	UG/L	140	71%	300	0	10	14	1 U	2 U	1 U	2 U	140	140
Mercury	UG/L	0.1	8%	0.7	0	1	13	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel	UG/L	3.2	57%	100	0	8	14	2.3 J	2 U	2.2 J	2 U	2.6 J	3.2 J
Potassium	UG/L	5400	100%			14	14	900	870 J	2,200	1,900	3,200	3,100
Selenium	UG/L	0	0%	10	0	0	14	1 U	1.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	0	0%	50	0	0	14	0.25 U	0.18 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	340000	100%	20000	8	14	14	**63,000**	**62,000**	20,000	17,000	**340,000**	**310,000**
Thallium	UG/L	0	0%	2	0	0	14	0.5 U	0.25 U	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L	0	0%			0	14	3.8 U	3.2 U	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L	12	29%			4	14	8.3 U	8.4 U	9.5 J	8.8 J	12 J	11 J
Turbidity (pre)	NTU	3.58	100%			14	14	0.87	0.87	3.01	3.01	1.01	1.01
Turbidity (post)	NTU	1.67	100%			7	7		1.04		1.2		0.48

Notes:

1. The criteria values (where available) are NYS 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 the GA or MCL groundwater standard.
3. Dissolved samples were field filtered using a 0.45 micro filter.
4. A blank in the Criteria Level column indicates no standard established for that compound.

U = compound was not detected
J = the reported value is an estimated cocentration
SA = Sample
DU = Duplicate Sample

Table 5A
Year 5 Filtered and Unfiltered Groundwater Results at SEAD-16
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Area								SEAD-16		SEAD-16		SEAD-16		SEAD-16	
Loc ID								MW16-5		MW16-5		MW16-6		MW16-6	
Matrix								GW		GW		GW		GW	
Sample ID								16LM20031F		16LM20031U		16LM20032F		16LM20032U	
Sample Date								12/15/2012		12/15/2012		12/15/2012		12/15/2012	
QC Type								SA		SA		SA		SA	
Study ID								LTM		LTM		LTM		LTM	
Sample Round								5		5		5		5	
Filtered Status:								Dissolved		Total		Dissolved		Total	
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Aluminum	UG/L	300	7%			1	14	23	U	50	U	23	U	300	
Antimony	UG/L	14	57%	3	8	8	14	2.3	U	2	U	2.3	U	2	U
Arsenic	UG/L	2.7	43%	10	0	6	14	2.6		2.7		1.3	U	1.3	J
Barium	UG/L	240	100%	1000	0	14	14	34		39		41		45	
Beryllium	UG/L	0	0%	4	0	0	14	0.25	U	0.15	U	0.25	U	0.15	U
Cadmium	UG/L	0.23	7%	5	0	1	14	0.095	U	0.13	U	0.095	U	0.13	U
Calcium	UG/L	230000	100%			14	14	97,000		96,000		70,000		74,000	
Chromium	UG/L	0	0%	50	0	0	14	2.5	U	2.5	U	2.5	U	2.5	U
Cobalt	UG/L	1.9	79%			11	14	0.22	J	0.23	J	0.18	J	0.43	J
Copper	UG/L	11	100%	200	0	14	14	1.1	J	3	J	4.5	J	4.1	J
Iron	UG/L	1300	43%	300	3	6	14	**1,100**		**1,300**		33	J	**790**	
Iron and Manganese	UG/L	1430	71%	500	3	10	14	**1,230**		**1,430**		43	J	**816**	
Lead	UG/L	3.4	50%	15	0	7	14	0.2	U	0.5	U	0.2	U	0.5	U
Magnesium	UG/L	34000	100%			14	14	9,900		9,800		7,200		7,600	
Manganese	UG/L	140	71%	300	0	10	14	130		130		10		26	
Mercury	UG/L	0.1	8%	0.7	0	1	13	0.1	J	0.091	U	0.091	U	0.091	U
Nickel	UG/L	3.2	57%	100	0	8	14	2.1	J	2	U	2	U	2	J
Potassium	UG/L	5400	100%			14	14	2,100		2,100		2,400		2,400	
Selenium	UG/L	0	0%	10	0	0	14	1	U	1.1	U	1	U	1.1	U
Silver	UG/L	0	0%	50	0	0	14	0.25	U	0.18	U	0.25	U	0.18	U
Sodium	UG/L	340000	100%	20000	8	14	14	1,600		1,500		8,700		8,000	
Thallium	UG/L	0	0%	2	0	0	14	0.5	U	0.25	U	0.5	U	0.25	U
Vanadium	UG/L	0	0%			0	14	3.8	U	3.2	U	3.8	U	3.2	U
Zinc	UG/L	12	29%			4	14	8.3	U	8.4	U	8.3	U	8.4	U
Turbidity (pre)	NTU	3.58	100%			14	14	1.39		1.39		3.58		3.58	
Turbidity (post)	NTU	1.67	100%			7	7			0.94				1.67	

Notes:

1. The criteria values (where available) are NYS 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 the GA or MCL groundwater standard.
3. Dissolved samples were field filtered using a 0.45 micro filter.
4. A blank in the Criteria Level column indicates no standard established for that compound.

U = compound was not detected
J = the reported value is an estimated cocentration
SA = Sample
DU = Duplicate Sample

Table 5A
Year 5 Filtered and Unfiltered Groundwater Results at SEAD-16
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Area								SEAD-16		SEAD-16	
Loc ID								MW16-7		MW16-7	
Matrix								GW		GW	
Sample ID								16LM20033F		16LM20033U	
Sample Date								12/15/2012		12/15/2012	
QC Type								SA		SA	
Study ID								LTM		LTM	
Sample Round								5		5	
Filtered Status:								Dissolved		Total	
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value	Qual	Value	Qual
Aluminum	UG/L	300	7%			1	14	23	U	50	U
Antimony	UG/L	14	57%	3	8	8	14	13		13	
Arsenic	UG/L	2.7	43%	10	0	6	14	1.3	J	1.3	U
Barium	UG/L	240	100%	1000	0	14	14	100		100	
Beryllium	UG/L	0	0%	4	0	0	14	0.25	U	0.15	U
Cadmium	UG/L	0.23	7%	5	0	1	14	0.095	U	0.13	U
Calcium	UG/L	230000	100%			14	14	110,000	J	100,000	J
Chromium	UG/L	0	0%	50	0	0	14	2.5	U	2.5	U
Cobalt	UG/L	1.9	79%			11	14	0.23	J	0.22	J
Copper	UG/L	11	100%	200	0	14	14	4.1	J	8.3	
Iron	UG/L	1300	43%	300	3	6	14	33	U	44	U
Iron and Manganese	UG/L	1430	71%	500	3	10	14	92		90	
Lead	UG/L	3.4	50%	15	0	7	14	1.3	J	2.5	
Magnesium	UG/L	34000	100%			14	14	21,000		21,000	J
Manganese	UG/L	140	71%	300	0	10	14	92		90	
Mercury	UG/L	0.1	8%	0.7	0	1	13	0.091	U J	0.091	U
Nickel	UG/L	3.2	57%	100	0	8	14	2	U	2.2	J
Potassium	UG/L	5400	100%			14	14	5,300		5,200	
Selenium	UG/L	0	0%	10	0	0	14	1	U	1.1	U
Silver	UG/L	0	0%	50	0	0	14	0.25	U	0.18	U
Sodium	UG/L	340000	100%	20000	8	14	14	35,000		32,000	
Thallium	UG/L	0	0%	2	0	0	14	0.5	U	0.25	U
Vanadium	UG/L	0	0%			0	14	3.8	U	3.2	U
Zinc	UG/L	12	29%			4	14	8.3	U	8.4	U
Turbidity (pre)	NTU	3.58	100%			14	14	1.29		1.29	
Turbidity (post)	NTU	1.67	100%			7	7			1.14	

Area								SEAD-16		SEAD-16	
Loc ID								MW16-7		MW16-7	
Matrix								GW		GW	
Sample ID								16LM20034F		16LM20034U	
Sample Date								12/15/2012		12/15/2012	
QC Type								DU		DU	
Study ID								LTM		LTM	
Sample Round								5		5	
Filtered Status:								Dissolved		Total	
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value	Qual	Value	Qual
Aluminum	UG/L	300	7%			1	14	23	U	50	U
Antimony	UG/L	14	57%	3	8	8	14	13		13	
Arsenic	UG/L	2.7	43%	10	0	6	14	1.3	U	1.3	U
Barium	UG/L	240	100%	1000	0	14	14	99		100	
Beryllium	UG/L	0	0%	4	0	0	14	0.25	U	0.15	U
Cadmium	UG/L	0.23	7%	5	0	1	14	0.095	U	0.13	U
Calcium	UG/L	230000	100%			14	14	100,000		100,000	
Chromium	UG/L	0	0%	50	0	0	14	2.5	U	2.5	U
Cobalt	UG/L	1.9	79%			11	14	0.24	J	0.24	J
Copper	UG/L	11	100%	200	0	14	14	1.7	J	5.6	
Iron	UG/L	1300	43%	300	3	6	14	33	U	44	U
Iron and Manganese	UG/L	1430	71%	500	3	10	14	98		91	
Lead	UG/L	3.4	50%	15	0	7	14	2.3		2.6	
Magnesium	UG/L	34000	100%			14	14	20,000		22,000	
Manganese	UG/L	140	71%	300	0	10	14	98		91	
Mercury	UG/L	0.1	8%	0.7	0	1	13	0.091	U	0.091	U
Nickel	UG/L	3.2	57%	100	0	8	14	2	U	2.4	J
Potassium	UG/L	5400	100%			14	14	5,100		5,400	
Selenium	UG/L	0	0%	10	0	0	14	1	U	1.1	U
Silver	UG/L	0	0%	50	0	0	14	0.25	U	0.18	U
Sodium	UG/L	340000	100%	20000	8	14	14	33,000		32,000	
Thallium	UG/L	0	0%	2	0	0	14	0.5	U	0.25	U
Vanadium	UG/L	0	0%			0	14	3.8	U	3.2	U
Zinc	UG/L	12	29%			4	14	8.3	U	8.4	U
Turbidity (pre)	NTU	3.58	100%			14	14	1.29		1.29	
Turbidity (post)	NTU	1.67	100%			7	7			1.14	

Notes:

1. The criteria values (where available) are NYS 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 the GA or MCL groundwater standard.
3. Dissolved samples were field filtered using a 0.45 micro filter.
4. A blank in the Criteria Level column indicates no standard established for that compound.

U = compound was not detected
J = the reported value is an estimated cocentration
SA = Sample
DU = Duplicate Sample

Table 5B
Year 5 Filtered and Unfiltered Groundwater Results at SEAD-17
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Area								SEAD-17		SEAD-17		SEAD-17	
Loc ID								MW17-1		MW17-1		MW17-2	
Matrix								GW		GW		GW	
Sample ID								17LM20020F		17LM20020U		17LM20021F	
Sample Date								12/11/2012		12/11/2012		12/11/2012	
QC Type								SA		SA		SA	
Study ID								LTM		LTM		LTM	
Sample Round								5		5		5	
Filtered Status								Dissolved		Total		Dissolved	
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value	Qual	Value	Qual	Value	Qual
Aluminum	UG/L	0	0%			0	10	23	U	50	U	23	U
Antimony	UG/L	4.4	30%	3	2	3	10	2.3	U	2.7	J	4	J
Arsenic	UG/L	0	0%	10	0	0	10	1.3	U	1.3	U	1.3	U
Barium	UG/L	69	100%	1000	0	10	10	28		28		69	
Beryllium	UG/L	0	0%	4	0	0	10	0.25	U	0.15	U	0.25	U
Cadmium	UG/L	0.44	10%	5	0	1	10	0.095	U	0.44	J	0.095	U
Calcium	UG/L	120000	100%			10	10	53,000		55,000		120,000	
Chromium	UG/L	0	0%	50	0	0	10	2.5	U	2.5	U	2.5	U
Cobalt	UG/L	0.42	80%			8	10	0.32	J	0.37	J	0.39	J
Copper	UG/L	7.8	100%	200	0	10	10	4.7	J	5.4		7.7	
Iron	UG/L	160	50%	300	0	5	10	47	J	90	J	33	U
Iron and Manganese	UG/L	219	80%	500	0	8	10	54.2	J	98.1	J	12	
Lead	UG/L	1.1	40%	15	0	4	10	0.2	U	1.1	J	0.2	U
Magnesium	UG/L	15000	100%			10	10	7,200		7,700		12,000	
Manganese	UG/L	59	80%	300	0	8	10	7.2		8.1		12	
Mercury	UG/L	0.14	20%	0.7	0	2	10	0.14	J	0.091	U	0.091	U
Nickel	UG/L	2.1	10%	100	0	1	10	2	U	2	U	2	U
Potassium	UG/L	2500	100%			10	10	380	J	410	J	2,500	
Selenium	UG/L	0	0%	10	0	0	10	1	U	1.1	U	1	U
Silver	UG/L	0	0%	50	0	0	10	0.25	U	0.18	U	0.25	U
Sodium	UG/L	9400	100%	20000	0	10	10	2,400		2,500		8,400	
Thallium	UG/L	0	0%	2	0	0	10	0.5	U	0.25	U	0.5	U
Vanadium	UG/L	0	0%			0	10	3.8	U	3.2	U	3.8	U
Zinc	UG/L	29	40%			4	10	8.3	U	8.4	U	24	
Turbidity (pre)	NTU	3.28	100%			10	10	3.28		3.28		2.16	
Turbidity (post)	NTU	3.6	100%			5	5			3.6			

Area								SEAD-17		SEAD-17	
Loc ID								MW17-2		MW17-3	
Matrix								GW		GW	
Sample ID								17LM20021U		17LM20022F	
Sample Date								12/11/2012		12/11/2012	
QC Type								SA		SA	
Study ID								LTM		LTM	
Sample Round								5		5	
Filtered Status								Total		Dissolved	
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value	Qual	Value	Qual
Aluminum	UG/L	0	0%			0	10	50	U	23	U
Antimony	UG/L	4.4	30%	3	2	3	10	4.4	J	2.3	U
Arsenic	UG/L	0	0%	10	0	0	10	1.3	U	1.3	U
Barium	UG/L	69	100%	1000	0	10	10	68		37	
Beryllium	UG/L	0	0%	4	0	0	10	0.15	U	0.25	U
Cadmium	UG/L	0.44	10%	5	0	1	10	0.13	U	0.095	U
Calcium	UG/L	120000	100%			10	10	120,000		74,000	
Chromium	UG/L	0	0%	50	0	0	10	2.5	U	2.5	U
Cobalt	UG/L	0.42	80%			8	10	0.42	J	0.15	U
Copper	UG/L	7.8	100%	200	0	10	10	7.8		3.3	J
Iron	UG/L	160	50%	300	0	5	10	44	U	33	U
Iron and Manganese	UG/L	219	80%	500	0	8	10	14		34	U
Lead	UG/L	1.1	40%	15	0	4	10	0.99	J	0.24	J
Magnesium	UG/L	15000	100%			10	10	12,000		6,100	
Manganese	UG/L	59	80%	300	0	8	10	14		1	U
Mercury	UG/L	0.14	20%	0.7	0	2	10	0.091	U	0.091	U
Nickel	UG/L	2.1	10%	100	0	1	10	2	U	2	U
Potassium	UG/L	2500	100%			10	10	2,500		1,800	
Selenium	UG/L	0	0%	10	0	0	10	1.1	U	1	U
Silver	UG/L	0	0%	50	0	0	10	0.18	U	0.25	U
Sodium	UG/L	9400	100%	20000	0	10	10	8,400		3,300	
Thallium	UG/L	0	0%	2	0	0	10	0.25	U	0.5	U
Vanadium	UG/L	0	0%			0	10	3.2	U	3.8	U
Zinc	UG/L	29	40%			4	10	26		29	
Turbidity (pre)	NTU	3.28	100%			10	10	2.16		2.02	
Turbidity (post)	NTU	3.6	100%			5	5	2.17		1.9	

1. The criteria values (where available) are NYS 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 the GA or MCL groundwater standard.
3. Dissolved samples were field filtered using a 0.45 micro filter.
4. A blank in the Criteria Level column indicates no standard established for that compound.

U = compound was not detected
J = the reported value is an estimated cocentration
SA = Sample
DU = Duplicate Sample

Table 5B
Year 5 Filtered and Unfiltered Groundwater Results at SEAD-17
SEAD-16 & SEAD-17 Year 5 Annual Groundwater Monitoring Report
Seneca Army Depot Activity

Area								SEAD-17		SEAD-17		SEAD-17		SEAD-17	
Loc ID								MW17-4		MW17-4		MW17-5		MW17-5	
Matrix								GW		GW		GW		GW	
Sample ID								17LM20023F		17LM20023U		17LM20024F		17LM20024U	
Sample Date								12/11/2012		12/11/2012		12/11/2012		12/11/2012	
QC Type								SA		SA		SA		SA	
Study ID								LTM		LTM		LTM		LTM	
Sample Round								5		5		5		5	
Filtered Status								Dissolved		Total		Dissolved		Total	
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Criteria Level**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Aluminum	UG/L	0	0%			0	10	23	U	50	U	23	U	50	U
Antimony	UG/L	4.4	30%	3	2	3	10	2.3	U	2	U	2.3	U	2	U
Arsenic	UG/L	0	0%	10	0	0	10	1.3	U	1.3	U	1.3	U	1.3	U
Barium	UG/L	69	100%	1000	0	10	10	65		67		24		26	
Beryllium	UG/L	0	0%	4	0	0	10	0.25	U	0.15	U	0.25	U	0.15	U
Cadmium	UG/L	0.44	10%	5	0	1	10	0.095	U	0.13	U	0.095	U	0.13	U
Calcium	UG/L	120000	100%			10	10	83,000		87,000		68,000		75,000	
Chromium	UG/L	0	0%	50	0	0	10	2.5	U	2.5	U	2.5	U	2.5	U
Cobalt	UG/L	0.42	80%			8	10	0.21	J	0.25	J	0.31	J	0.31	J
Copper	UG/L	7.8	100%	200	0	10	10	1.1	J	4.7	J	3.7	J	2.1	J
Iron	UG/L	160	50%	300	0	5	10	33	U	72	J	44	J	160	
Iron and Manganese	UG/L	219	80%	500	0	8	10	9.5		83		82	J	219	
Lead	UG/L	1.1	40%	15	0	4	10	0.2	U	0.5	U	0.2	U	0.5	U
Magnesium	UG/L	15000	100%			10	10	15,000		15,000		9,900		11,000	
Manganese	UG/L	59	80%	300	0	8	10	9.5		11		38		59	
Mercury	UG/L	0.14	20%	0.7	0	2	10	0.091	U	0.091	U	0.12	J	0.091	U
Nickel	UG/L	2.1	10%	100	0	1	10	2	U	2.1	J	2	U	2	U
Potassium	UG/L	2500	100%			10	10	750		780	J	460	J	460	J
Selenium	UG/L	0	0%	10	0	0	10	1	U	1.1	U	1	U	1.1	U
Silver	UG/L	0	0%	50	0	0	10	0.25	U	0.18	U	0.25	U	0.18	U
Sodium	UG/L	9400	100%	20000	0	10	10	8,900		8,600		9,400		9,100	
Thallium	UG/L	0	0%	2	0	0	10	0.5	U	0.25	U	0.5	U	0.25	U
Vanadium	UG/L	0	0%			0	10	3.8	U	3.2	U	3.8	U	3.2	U
Zinc	UG/L	29	40%			4	10	8.3	U	8.4	U	8.3	U	8.4	U
Turbidity (pre)	NTU	3.28	100%			10	10	1.85		1.85		2.01		2.01	
Turbidity (post)	NTU	3.6	100%			5	5			1.6				1.87	

1. The criteria values (where available) are NYS 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 the GA or MCL groundwater standard.
3. Dissolved samples were field filtered using a 0.45 micro filter.
4. A blank in the Criteria Level column indicates no standard established for that compound.

U = compound was not detected
J = the reported value is an estimated concentration
SA = Sample
DU = Duplicate Sample

FIGURES

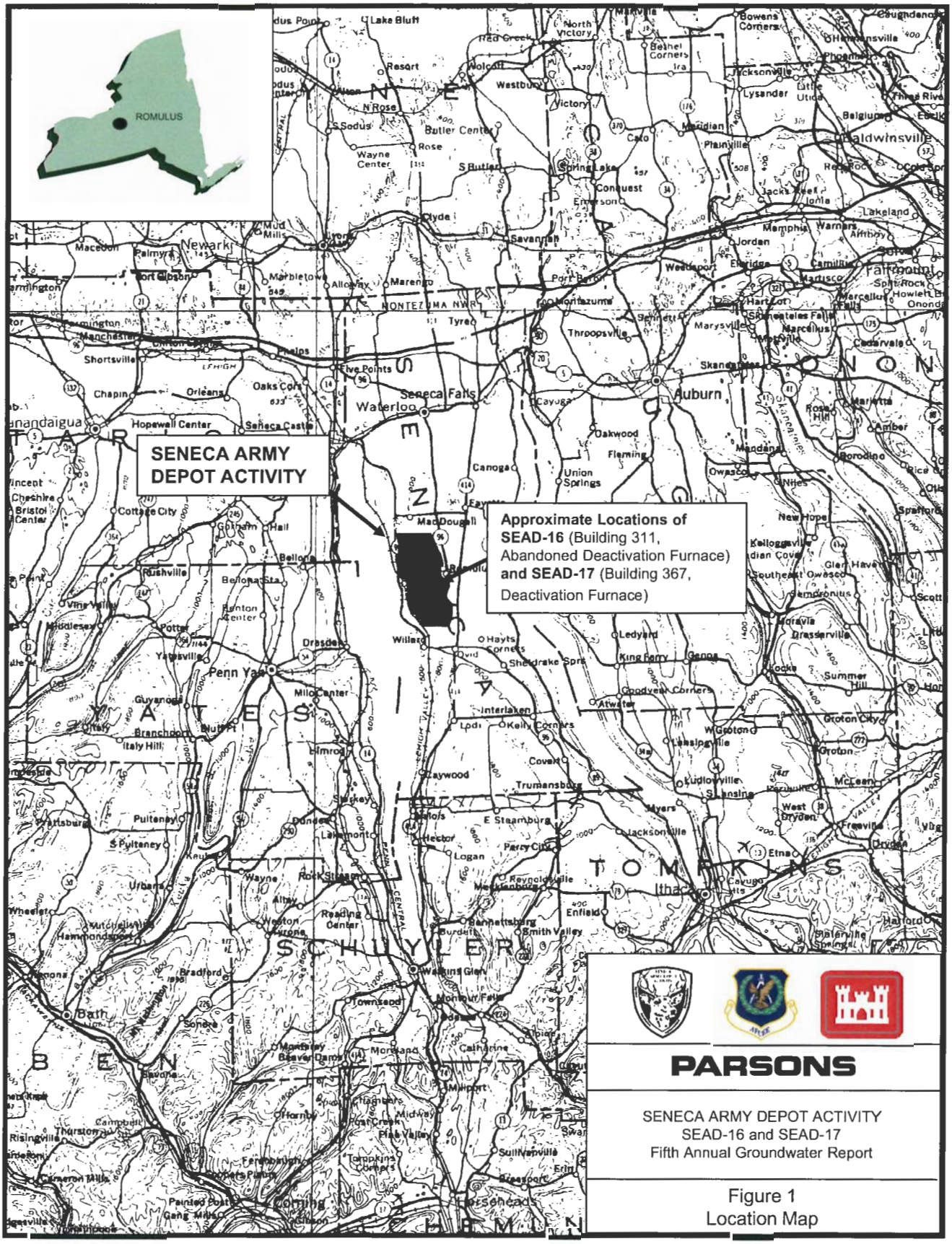
Figure 1 Seneca Army Depot Activity Location Map

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

Figure 3 Site Plan - SEAD-16

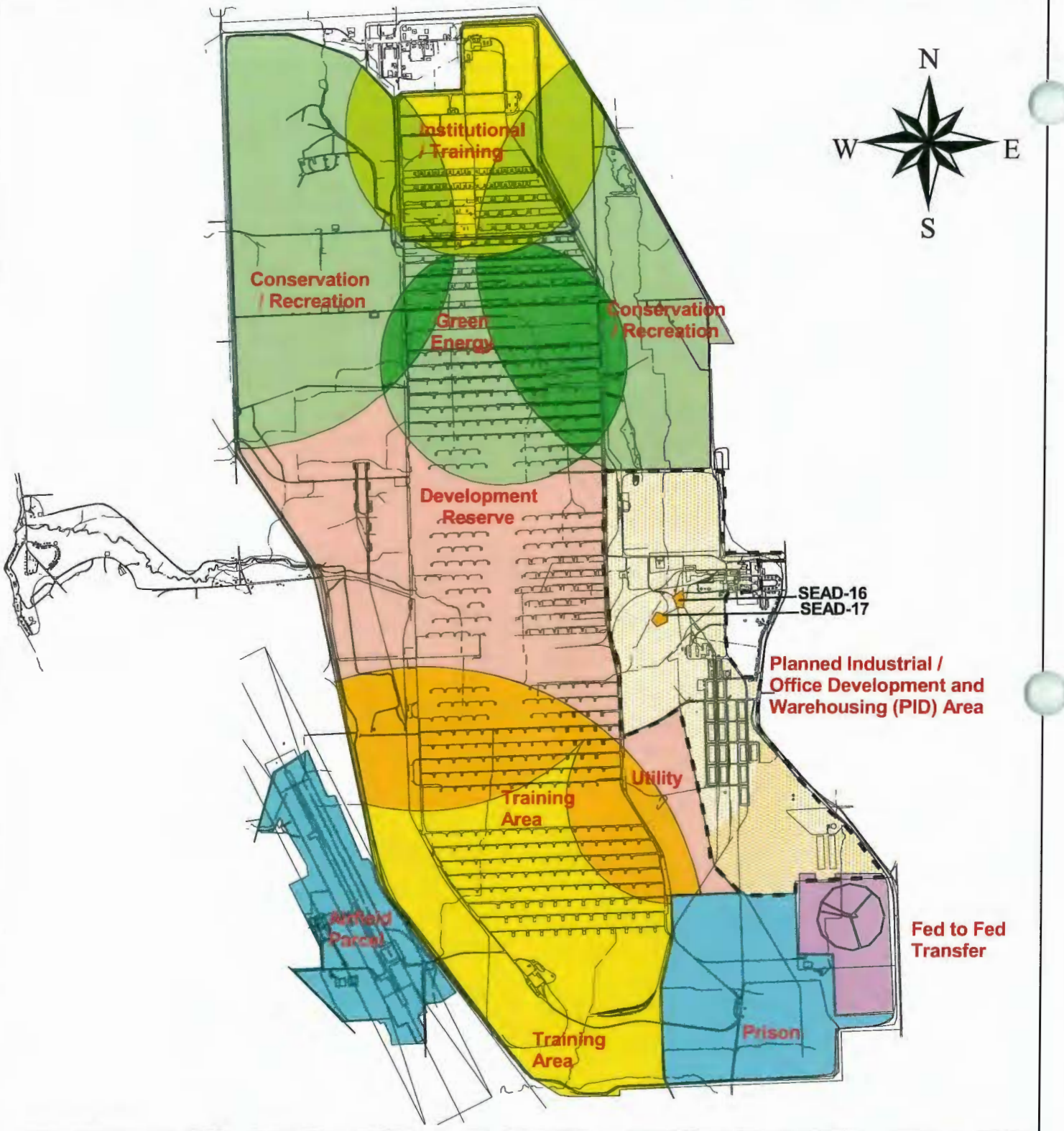
Figure 4 Site Plan - SEAD-17

Figure 5 SEAD-16 and SEAD-17 Groundwater Flow Trend



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

Figure 1
Location Map



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

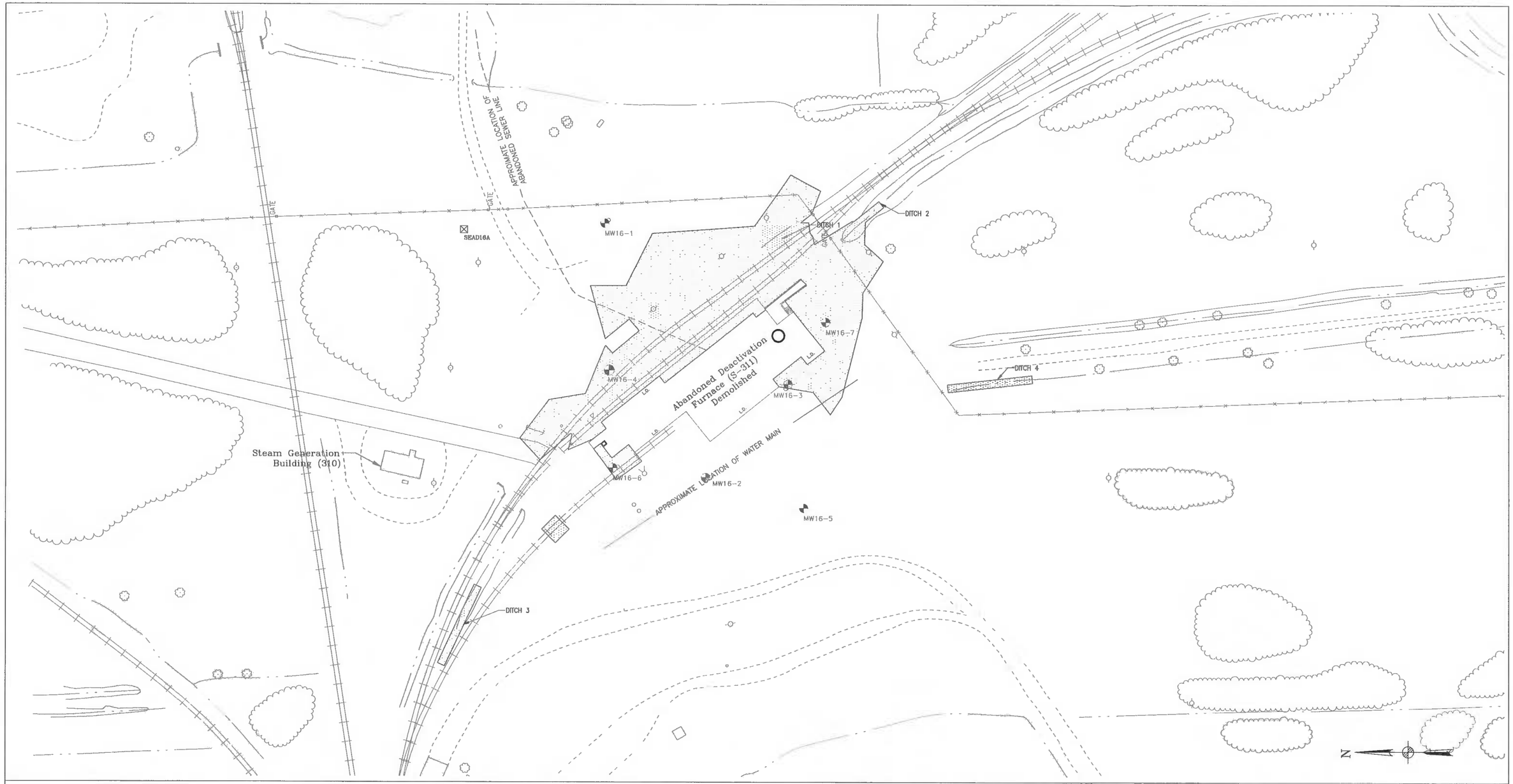
Area Covered by PID-wide Land Use Restrictions
- Prohibit the development and use of property for residential housing, elementary and secondary schools, childcare facilities and playgrounds.
- Prevent access to or use of the groundwater until the Class GA Groundwater Standards are met.

PARSONS

SENECA ARMY DEPOT ACTIVITY
Fifth 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 LOCATION

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

SEAD-16 AND SEAD-17

FIFTH ANNUAL GROUNDWATER REPORT

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 745172-01200

FIGURE 3
SEAD-16
SITE PLAN

SCALE 1" = 100'

DATE MARCH 2013

REV -

FILE: P:\PIT\PROJECTS\HUNTSVILLE CONT W912DY-08-D-0003\TO#15 - LTM AND LUC\SEAD 16 AND 17 LTM\ANNUAL REPORT - YR 5\DRAFT\FIGURES\FIGURE 3, DATE: 03/25/2013 08:59:39AM, p008529A

APPENDICES

Appendix A Historic Groundwater Data

Appendix B SEDA Background Groundwater Data Summary

Appendix C Field Forms - Year 5 LTM Groundwater Sampling Activities

Appendix D Complete Groundwater Data Results (Years 1 through 5)

Appendix E Laboratory Analytical Report

Appendix F Data Validation

APPENDIX A

HISTORIC GROUNDWATER DATA

			LOC_ID:	MW16-6		MW16-7		MW16-7		MW16-7	
			SAMP ID:	16155		16104		16158		16159	
			QC CODE:	SA		SA		SA		DU	
			STUDY ID:	I ROUND2		RI ROUND1		RI ROUND2		RI ROUND2	
			MATRIX:	WATER		WATER		WATER		WATER	
			SAMPLE DATE:	12/8/1996		8/28/1996		12/8/1996		12/8/1996	
PARAMETER	ACTION LEVEL	SOURCE [1]	UNI	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS											
3-Nitroaniline	5	GA	UG/I	25	U	25	J	25	U	25	U
4-Chloroaniline	5	GA	UG/I	10	U	10	J	10	U	10	U
Benzo[ghi]perylene			UG/I	10	U	10	U	10	U	10	U
Dibenz[a,h]anthracene			UG/I	10	U	10	U	10	U	10	U
Diethyl phthalate			UG/I	10	U	10	U	10	U	10	U
Indeno[1,2,3-cd]pyrene			UG/I	10	U	10	U	10	U	10	U
OTHER ANALYSES											
Nitrate/Nitrite Nitrogen	10	GA	MG/	0.01	U	0.83		0.24		0.23	
Percent Solids (Metals)				0		0		0		0	
Total Petroleum Hydrocarbons			MG/	0.73		0.41	U	0.46	U	1.3	
NITROAROMATICS											
1,3-Dinitrobenzene	5	GA	UG/I	0.26	U	0.26		0.26	U	0.26	U
2,4-Dinitrotoluene	5	GA	UG/I	0.26	U	0.26	U	0.26	U	0.26	U
METALS											
Aluminum			UG/I	170	U	12.4		67.4	U	52.9	U
Antimony	3	GA	UG/I	3	U	15.7	U	8.9	U	10	U
Arsenic	10	MCL	UG/I	4.4	U	4	U	4.4	U	4.4	U
Barium	1,000	GA	UG/I	80.2	U	89.2		59.1	U	60.2	U
Beryllium	4	MCL	UG/I	0.2	U	0.21		0.2	U	0.2	U
Cadmium	5	GA	UG/I	0.6	U	0.3	U	0.6	U	0.6	U
Calcium			UG/I	84,900		109,000		114,000		117,000	
Chromium	50	GA	UG/I	1	U	1		1	U	1	U
Cobalt			UG/I	1.3	U	1.2		1.3	U	1.3	U
Copper	200	GA	UG/I	1.1	U	5.1		1.4	U	2.1	U
Iron	300	GA	UG/I	290		23.4		174		160	
Lead	15	MCL	UG/I	1.5	U	8.4		9.9		9.2	
Magnesium			UG/I	12,800		16,900		22,600		23,200	
Manganese	300	GA	UG/I	1,380		85.7		43.2		44.3	
Mercury	0.7	GA	UG/I	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	100	GA	UG/I	2.5	U	2.2		2.5	U	2.5	U
Potassium			UG/I	2230	U	3220		2090	U	2160	U
Selenium	10	GA	UG/I	4.7	UJ	2.4	U	4.7	UJ	4.7	UJ
Sodium	20,000	GA	UG/I	409,000		12,000		9,940		10,200	
Thallium	2	MCL	UG/I	4.1	U	4.2				4.1	U
Vanadium			UG/I	1.6	U	1.2		1.6	U	1.6	U
Zinc			UG/I	10.5	U	2.9	R	2.2	U	7.3	U

Notes:
1. The criteria values are NYSDEC Class GA Groundwater Standards (T
   Maximum Contamination Limit (MCL), Source http://www.epa.gov/s
2. Shading indicates a concentration above groundwater standard.
3. A blank in the action level column indicates no Class GA and/or MCL

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

	MW17-5
	16170
	SA
	RI ROUND2
	Groundwater
	12/11/1996
PARAMETER	VALUE Q
SEMIVOLATILE	
Benzo[a]pyrene	10 U
Benzo[ghi]perylene	10 U
Dibenz[a,h]anthrace	10 U
Indeno[1,2,3-cd]pyr	10 U
OTHER ANALYS	
Nitrate/Nitrite Nitro	0.02
Percent Solids (Met	0
NITROAROMAT	
Tetryl	0.26 U
METALS	
Aluminum	59 U
Antimony	3 U
Arsenic	4.4 U
Barium	62.6 U
Beryllium	0.2 U
Cadmium	0.6 U
Calcium	81100
Chromium	1 U
Cobalt	1.3 U
Copper	1.3 U
Iron	134
Lead	1.5 U
Magnesium	13600
Manganese	62
Mercury	0.1 U
Nickel	2.5 U
Potassium	1070 U
Selenium	4.7 UJ
Silver	1.5 U
Sodium	8,970
Thallium	8.6 U
Vanadium	1.6 U
Zinc	4.4 U

Notes:
1. The criteria value
   Maximum Conta
2. Shading indicates
3. A blank in the act
4. Wells MW17-2,

U = compound was
J = the reported valu
R = the compound v

APPENDIX B

SEDA BACKGROUND GROUNDWATER DATA SUMMARY

Appendix B
SEDA Background Groundwater Concentrations
SEAD-16 & SEAD-17 Fifth Annual Groundwater Monitoring Report
Seneca Army Depot Activity

PARAMETER	UNIT	MAXIMUM	AVERAGE CONCENTRATION	STANDARD DEVIATION	FREQUENCY OF DETECTION	CRITERIA VALUE	TYPE OF CRITERIA	NUMBER OF EXCEEDENCES	NUMBER OF DETECTS	NUMBER OF ANALYSES
Aluminum	UG/L	42,400	2,732	8,207	87%	50	MCL	25	27	31
Antimony	UG/L	52.7	8.2	13.9	13%	3	GA	3	4	31
Arsenic	UG/L	10	1.7	2.2	13%	5	MCL	2	4	31
Barium	UG/L	337	78.2	62.6	94%	1000	GA	0	29	31
Beryllium	UG/L	2.2	0.2	0.4	13%	4	MCL	0	4	31
Cadmium	UG/L	0	0.5	0.5	0%	5	GA	0	0	31
Calcium	UG/L	181,000	115,619	25,274	100%			0	31	31
Chromium	UG/L	69.4	4.7	13.4	48%	50	GA	1	15	31
Cobalt	UG/L	34.6	3.7	7.4	45%			0	14	31
Copper	UG/L	32.5	3.3	6.9	48%	200	GA	0	15	31
Cyanide	UG/L	2.8	NA	NA	3%	200	GA	0	1	31
Iron	UG/L	69,400	4,476	13,429	100%	300	GA	22	31	31
Lead	UG/L	34.8	2.5	6.3	32%	15	MCL	1	10	31
Magnesium	UG/L	58,200	28,568	13,848	100%			0	31	31
Manganese	UG/L	1120	224	254	97%	50	SEC	22	30	31
Mercury	UG/L	0.06	0.04	0.02	23%	0.7	GA	0	7	31
Nickel	UG/L	99.8	7.3	18.7	61%	100	GA	0	19	31
Potassium	UG/L	10,200	3,833	3,010	94%			0	29	31
Selenium	UG/L	3.6	1.5	0.7	19%	10	GA	0	6	31
Silver	UG/L	0.98	1.0	1.0	6%	50	GA	0	2	31
Sodium	UG/L	59,400	14,601	13,877	97%	20000	GA	7	30	31
Thallium	UG/L	4.7	1.5	1.2	13%	2	MCL	4	4	31
Vanadium	UG/L	70.8	5.2	13.5	52%			0	16	31
Zinc	UG/L	143	23.1	34.5	84%	5000	MCL	0	26	31

GA = NYSDEC Ambient Water Quality Standards for a source of Drinking Water from Groundwater (TOGS 1.1.1)
MCL = Maximum Contaminant Level - Drinking Water Standards and Health Advisory (EPA 822-B-00-001)
SEC = Secondary Drinking Water Regulations - Drinking Water Standards and Health Advisory (EPA 822-B-00-001)

APPENDIX C

FIELD FORMS - YEAR 5 LTM GROUNDWATER SAMPLING ACTIVITIES

GROUNDWATER ELEVATION REPORT

PARSONS | CLIENT: | DATE: 12/10/12

PROJECT: SEAD-16/17 LTM Round 5 | PROJECT NO:

LOCATION: | INSPECTOR: BBo/SD

MONITORING EQUIPMENT:

INSTRUMENT	DECTECTOR	BGD	TIME	REMARKS

WATER LEVEL INDICATOR:

INSTRUMENT	CORRECTION FACTOR

COMMENTS: Temps 40's, winds 5-15 mph W→E Scattered rain showers. Wet ground surface, overnight rain

WELL	TIME	DEPTH TO WATER	DEPTH TO ~~PRODUCT~~ Bell	CORRECTED WATER LEVEL	MEASURED POW	INSTALLED POW	PRODUCT SPEC. GRAV.	WELL STATUS / COMMENTS (Lock?, Well ID, Surface Disturbance?, Riser marked?, Condition of riser, concrete, protective casing, etc.)
16-2	924	4.08	5.85					Locked w/ cap
16-6	926	2.37	6.83					Locked w/ cap
16-4	928	2.71	7.00					Locked, cap off, stuck inside Metal case
16-1	931	3.15	7.98					Locked w/ cap
16-7	934	4.28	6.76					Locked w/ cap
16-5	937	1.63	5.05					Locked w/ cap
17-2	943	2.79	6.85					Locked w/ cap
17-3	945	2.40	7.47					Locked w/ cap
17-4	947	3.18	8.44					Locked, need replacement well cap
17-5	950	2.64	10.13					Locked w/ cap
17-1	953	3.19	10.20					Locked needs well cap

(ALL DEPTH MEASUREMENTS FROM MARKED LOCATION ON RISER)

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-1

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/15/12
INSPECTORS: BBO
PUMP #: Peristaltic Parsons
SAMPLE ID #: 16LM20028 U/F

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS
805	38	overcast		0-5	S→N	

MONITORING

INSTRUMENT	DETECTOR
OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]
7.98-3.61 = 4.37 x .163 = 0.71 x 3 = 2.14 gals

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	7.98'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		3.61'			

RADIATION SCREENING DATA	~~PUMP PRIOR TO SAMPLING (cps)~~	TOR 10" below Radial Case Vent	~~PUMP AFTER SAMPLING (cps)~~	Bo 3'1" Metal Box Height above pad -5" for top start

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
823	3.60	YSI &	tubing in well, replaced water line						
823		Pump	Started	YSI	YSI	Horiba	Horiba	Horiba	Hach
832	3.73	140		0.18	8.5	0.820	7.18	227	13.1
837	3.75	150		0.40	8.5	0.812	7.08	223	8.27
842	3.73			0.26	8.5	0.810	6.99	222	4.99
847	3.76	142	~0.75 gal	0.81	8.5	0.807	7.04	218	4.85
852	3.77	142	~1 gal	0.38	8.6	0.804	7.03	216	3.08
857	3.77	150		0.40	8.7	0.804	7.02	212	2.66
902	3.76	124	~1.6 gals	0.70	8.7	0.804	6.95	208	2.14
907									
913	3.75	158	~1.9 gals	0.59	8.8	0.804	7.03	202	1.67
918	3.77	150	~2.1 gals	0.49	8.8	0.801	7.02	198	1.21
923	3.76	146		0.49	8.8	0.803	7.04	193	1.34
928	3.76	140	~2.6 gal	0.56	8.9	0.804	7.02	190	0.82
933	3.76	148		0.33	8.9	0.804	7.01	185	1.03
938	3.76	140	~3.0 gals	0.30	8.8	0.804	7.04	181	0.94
943	3.76	142		0.45	8.8	0.804	7.03	177	0.71
948	3.77	134	~3.25 gals	0.50	8.7	0.804	7.01	177	1.21
953	3.77	140	~3.5 gals	0.47	8.7	0.805	6.99	175	1.04
1000		Sample	Collected	16LM20028 U			1000	unfiltered	
				16LM20028 F			1003	filtered	
1004		Pump restarted, Post-Collection Groupings, flow cell reconnected							
1009	3.77		~3.9 gals	0.30	8.9	0.806	6.90	154	0.87

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-2

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY
DATE: 12/15/12
INSPECTORS:
PUMP #:
SAMPLE ID #: 16LM20029 U/F

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
1352	37	overcast		5-10	E→W		OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]
5.85-4.34 = 1.51 × .163 = 0.25 × 3 = 0.75 gals

2.19' height

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	5.85'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		4.34'			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1401	4.35	YSI & tubing in	well						
1401		Pump	started	YSI	YSI	Horiba	Horiba	Horiba	Hach
1411	4.38	162		6.31	7.0	0.255	7.66	43	540
1416	4.40	160		5.76	7.1	0.290	7.40	53	202
1421	4.39	156	~0.9 gal	5.48	7.1	0.323	7.41	52	83.7
1426	4.40	154		5.25	7.1	0.344	7.38	53	18.9
1431	4.39	144	~1.1 gal	5.12	7.1	0.383	7.28	58	8.11
1436	4.38	148		5.04	7.2	0.425	7.34	54	3.72
1441	4.38	150		4.93	7.2	0.447	7.29	58	3.61
1446	4.38	150	~2.0 gals	4.85	7.2	0.460	7.27	61	3.34
1451	4.38	154		4.77	7.3	0.468	7.28	57	1.87
1456	4.37	148		4.71	7.3	0.478	7.29	57	1.24
1501	4.38	156	~2.5 gals	4.66	7.3	0.489	7.30	56	1.26
1506	4.37	148		4.59	7.3	0.499	7.27	58	1.36
1511	4.37			4.38	7.4	0.507	7.26	60	0.97
1516	4.37	148	~3.0 gals	4.32	7.4	0.512	7.23	62	1.42
1521	4.37			4.17	7.4	0.516	7.27	59	1.06
1526	4.37			4.18	7.4	0.518	7.27	59	1.47
1531	4.37		~3.75	4.23	7.4	0.520	7.26	59	1.20
1533	Samples	Collected		16LM20029 U		1533		16LM20029F	1535
1539	Post-Sample Collection Geo params, Flow cell re-connected								
1544	4.37		~4.0 gals	4.13	7.4	0.526	7.12	67	3.01

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-4

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/15/12
INSPECTORS: SD
PUMP #: Peristaltic #
SAMPLE ID #: 16LM20030 4/F

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS

MONITORING INSTRUMENT	MONITORING DETECTOR
OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	7.00'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
	1.32 stickup	2.86			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1132	2.86	START PUMP		FOR PURGE					
1140	2.98	200		~~0.10~~ 0.13	7.6	1.17	7.33	-82	
1145	2.93	110		0.15	7.1	1.26	7.32	-85	5.42
1150	2.93	116		0.24	7.2	1.29	7.33	-81	3.36
1155	2.93	118		0.33	7.2	1.36	7.30	-70	2.41
1200	2.93	116		0.33	7.1	1.46	7.29	-62	1.69
1205	2.93	118		0.30	7.1	2.05	7.27	-55	1.38
1210	2.93	120		0.28	7.0	2.19	7.27	-52	1.14
1215	2.93	118		0.24	7.0	2.40	7.29	-48	0.86
1220	2.94	120		0.15	6.9	2.50	7.29	-47	1.21
1225	2.94	124		0.18	6.9	2.54	7.30	-47	1.74
1230	2.94	125		0.20	6.9	2.62	7.30	-47	0.59
1235	2.94	128		0.20	6.8	2.67	7.30	-47	0.77
1240	2.94	128		0.19	6.8	2.69	7.32	-48	0.58
1245	2.94	128	2.5 gal	0.20	6.8	2.71	7.31	-48	0.48
1250		COLLECT SAMPLE FOR		TOTAL & Dissolved metals					
1300	2.94	128	POST SAMPLE	0.21	6.7	2.83	7.33	-46	1.01

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-5

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY
DATE: 12/15/12
INSPECTORS:
PUMP #:
SAMPLE ID #: 16LM20031U /F

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
							OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	5.05'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
	1.43 feet stickup	1.86'			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
8:30	1.89	START PUMP FOR PURGE							
8:35	2.14	112		2.5	6.2	0.344	6.94	-25	
8:40	2.14	100		2.5	6.2	0.339	6.94	-38	
8:45	2.18	102		4.3	5.6	0.302	7.01	-62	5.79
8:50	2.23	102		4.9	5.6	0.298	7.08	-64	3.78
8:55	2.29	105		4.5	5.6	0.299	7.11	-66	3.15
9:00	2.35	110		3.4	5.6	0.302	7.16	-69	2.52
9:05	2.46	108		2.8	5.5	0.303	7.17	-71	1.62
9:10	2.55	100		2.6	5.4	0.303	7.18	-71	1.70
9:15	2.68	100		2.6	5.4	0.304	7.19	-72	1.85
9:20	2.80	100		3.2	5.4	0.304	7.19	-73	2.41
9:25	2.98	104	1.50 gal	4.1	5.3	0.306	7.21	-75	1.57
9:30	3.08	102		3.4	5.4	0.308	7.22	-77	1.50
9:35	3.16	102		2.6	5.3	0.313	7.21	-80	1.65
9:40	3.21	104		2.0	5.3	0.321	7.21	-85	1.06
9:45	3.23	104	2.1 gal	1.4	5.3	0.328	7.22	-88	1.49
9:50	3.29	108		0.9	5.3	0.331	7.22	-87	0.95
9:55	3.33	108		0.7	5.4	0.334	7.22	-88	0.74
1000	3.36	108		0.7	5.4	0.339	7.21	-92	1.62
10:05	3.42	108		0.6	5.5	0.345	7.21	-97	1.07
10:10	3.45	108		0.6	5.5	0.349	7.21	-100	1.12

SAMPLING RECORD - GROUNDWATER pg. 2

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-5

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/5/12
INSPECTORS: S. Dillon
PUMP #:
SAMPLE ID #: 16LM 20831 4/5

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	(FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
							OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1015	3.50	112	3 gal	~~0.06~~ 0.6	5.5	0.355	7.21	-105	1.12
1020	3.56	112		~~0.05~~ 0.5	5.5	0.357	7.21	-109	1.03
1025	3.63	112		~~0.05~~ 05	5.6	0.362	7.21	-115	1.13
1030	3.70	112		0.5	5.6	0.367	7.21	-120	1.26
1035	3.75	116	3.5 gal	0.4	5.7	0.369	7.21	-123	1.92
1040	3.82	116		0.3	5.8	0.373	7.21	-127	0.94
1045	3.90	COLLECT SAMPLE FOR Dissolved & Total Metals							
1055	4.05	118	POST SAMPLE	0.3	6.0	0.383	7.20	-138	1.39

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-6

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/15/12
INSPECTORS: S Dillman
PUMP #:
SAMPLE ID #: 16LM20032 U/F

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	(FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS

MONITORING INSTRUMENT	MONITORING DETECTOR
OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = ((POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	6.83'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
	1.51' stickup PVC	2.88'			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1410	2.88	START PUMP FOR PURGE							
1415	3.23	124							
1420	3.72	92		2.20	7.6	0.319	7.94	11	
1425	3.90	100		1.63	7.6	0.312	7.79	20	
1430	4.06	100		1.62	7.6	0.307	7.71	19	66.7
1435	4.14	100		1.55	7.8	0.305	7.68	11	31.9
1440	4.33	98		1.44	7.8	0.306	7.62	-19	11.2
1445	4.43	88		1.38	7.8	0.306	7.60	-31	6.37
1450	4.50	96		1.12	7.8	0.305	7.60	-37	6.24
1455	4.58	96		1.14	7.8	0.306	7.58	-40	4.83
1500	4.65	96		0.94	7.8	0.307	7.57	-40	3.42
1505	4.76	98	1.25 gal	0.78	7.8	0.307	7.57	-42	2.02
1510	4.86	100		0.80	7.8	0.309	7.57	-44	2.05
1515	4.98	100		0.85	7.9	0.312	7.56	-48	1.95
1520	5.07	106		0.85	7.9	0.315	7.56	-56	2.11
1525	5.19	108		0.84	8.0	0.318	7.53	-67	2.32
1530	5.29	106		0.87	8.1	0.317	7.52	-72	1.78
1535	5.40	108	2 gal	0.94	8.2	0.317	7.50	-76	1.92
1540	5.50	108		1.03	8.2	0.317	7.49	-76	1.67
1545		Collect Sample for TOTAL & Dissolved metals							
1598	6.06	108	POST SAMPLE	1.27	8.6	0.307	7.49	-70	3.58

End vol. 2.75 gal

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-7

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/15/12
INSPECTORS: BBO
PUMP #: Peristaltic Parsons
SAMPLE ID #: 16LM20033U 7E Dup #34

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
1038	37	Partly Sunny		~~Light~~ E-SW	0-5	~~W-E~~	OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]
6.76 - 4.56 = 2.2 x .163 = 0.36 x 3 = 1.08 gals

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	6.76'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
- old Groundwater New Groundwater		4.56'		~6.7'	1052

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1051	4.54	YSI &	tubing, in well, replaced waterline						
1052		Pump started		YSI	YSI	Horiba	Horiba	Horiba	Horiba
1058	4.71	86		3.20	8.0	0.515	7.54	193	43.6
1103	4.75	100		3.04	8.0	0.516	7.38	190	37.7
1108	4.81	107		2.91	8.1	0.516	7.29	181	17.7
1113	4.84			2.81	8.1	0.516	7.31	171	9.64
1118	4.86	105	~0.5 gal	2.69	8.2	0.518	7.24	164	7.02
1123	4.88			2.63	8.2	0.522	7.34	151	5.74
1128	4.89	112	~0.9 gal	2.50	8.3	0.538	7.32	141	5.31
1133	4.90	103		2.50	8.4	0.545	7.32	131	4.99
1138	4.91	103		2.51	8.5	0.562	7.32	122	5.76
1143	4.91	110	~1.3 gals	1.99	8.5	0.577	7.30	119	5.44
1148	4.92	105		1.60	8.6	0.589	7.33	108	4.04
1153	4.92	110		1.39	8.6	0.595	7.31	101	3.06
1158	4.93	110	~1.9 gals	1.26	8.7	0.602	7.35	90	2.87
1203	4.93	110		1.36	8.7	0.608	7.36	90	2.45
1208	4.93		~2.1 gals	1.40	8.7	0.614	7.35	84	2.06
1213	4.93			1.29	8.7	0.618	7.32	82	1.53
1218	4.94			1.18	8.8	0.622	7.34	77	0.99
1223	4.94		2.6 gals	1.04	8.8	0.624	7.37	71	0.54
1228	4.94			0.97	8.8	0.627	7.33	71	0.93

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW16-7

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/15/12
INSPECTORS: TBO
PUMP #: Peristaltic
SAMPLE ID #: 16LM20033/34

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
1229	37	Partly sunny		0-5	E-W		OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1233	4.93	107	~2.9 gals	0.94	8.8	0.628	7.32	68	1.15
1238	4.94			0.96	8.8	0.631	7.34	64	0.56
1243	4.93			1.08	8.8	0.634	7.36	61	0.75
1248	4.94		~3.3 gals	1.01	8.8	0.636	7.36	58	0.55
1253	4.93			0.90	8.8	0.637	7.36	56	0.94
1258	4.93		~3.5 gals	0.86	8.8	0.639	7.34	55	1.14
1303		Samples	Collected						
			16LM20033U		1305				
			16LM20033F		1305	1313			
			16LM20033UMS		1305				
			16LM20033FMS		1305	1313			
			16LM20033UMSD		1305				
			16LM20033FMSD		1305	1313			
			16LM20034U		1311				
			16LM20034F		1314	1316			
1331		Post-Sample Collection Geo Param, flow cell reconnected							
1336	4.90		~4.0 gals	0.86	8.9	0.651	7.37	40	1.29

→ Small clumps of wet roots came up w/ DO probe when removed from the well.

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: AW17-1

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/11/12
INSPECTORS: BBO/SD
PUMP #: Peristaltic Pump Parsons
SAMPLE ID #: 17LM20020

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
1437	33	overcast		5-10	NW→SE		OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]
10.2 - 3.3 = 6.9 x .163 = 1.12 gals x 3 = 3.37 gals

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	10.20'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		3.30'			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1500	3.28	YSI 85	& Tubing in Well						
1500		Pump Started							
1507	3.49	~120		1.15	8.8	0.259	7.46	-58	23.5
1512	3.52			1.03	8.7	0.258	7.50	-64	18.6
1517	3.57	~104		1.05	8.7	0.258	7.52	-62	13.4
1522	3.55			1.44	8.7	0.258	7.53	-57	10.6
1527	3.56		~1 gal	1.68	8.7	0.257	7.54	-54	8.85
1532	3.56	~110		1.78	8.7	0.257	7.55	-51	7.47
1537	3.58			1.78	8.8	0.257	7.52	-46	6.86
1542	3.60			1.79	8.8	0.258	7.54	-43	6.43
1547	3.60		~1.5 gals	1.82	8.8	0.258	7.54	-40	5.51
1552	3.61			1.76	8.8	0.259	7.58	-37	4.40
1557	3.61			1.66	8.8	0.259	7.58	-34	6.40
1602	3.61		~2.0 gals	1.59	8.8	0.260	7.59	-31	7.13
1607	3.61			1.43	8.8	0.261	7.59	-28	3.51
1612	3.62			1.48	8.8	0.262	7.60	-26	4.70
1617	3.63			1.46	8.8	0.263	7.60	-24	3.51
1623	3.63		~2.5 gals	1.49	8.8	0.263	7.60	-23	3.83
1627	3.63			1.26	8.9	0.264	7.60	-22	3.77
1632	3.63		~2.8 gals	1.43	8.8	0.265	7.60	-21	3.60
1640	1440	Collected	Samples	17LM20020 U	1640	1440		17LM20020 F	1440
1646	1446	Post-Sample Collection Geo Parson, Pump re-started							
1651	1451	3.65	~3.0 gal	1.26	8.9	0.273	7.62	-20	3.28

1640 DBC 12/16/12

BBO 12/12/12

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW17-2

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/11/12
INSPECTORS: BBO
PUMP #: ~~Peristaltic Pump Person~~ BBO 12/11/12
SAMPLE ID #: ~~Peristaltic Pump #~~ 019002
17LM20021

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
840	34	overcast light snow flurries		0-5	SE-SW		OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
Horiba U52 # YSI 85 # Water Level Meter #01895	6.85'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		2.86'			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	~~YSI~~ DISSOLVED OXYGEN (mg/L)	TEMP (C)	~~mS/cm~~ SPEC. COND (mmhos)	pH	ORP (mV)	TURBIDITY (NTU)
713	2.82	YSI & tubing in well							
1025	3.95	Pump Started		YSI	YSI	Horiba	Horiba	Horiba	Hach
~~1025~~	4030	220 → 110		7.5	8.1	0.559	7.46	223	
1035	4.01	160		7.8	8.2	0.556	7.43	221	5.25
1040	4.06	100		6.8	8.3	0.553	7.39	201	
1045	4.13	100		6.8	8.4	0.552	7.36	138	3.63
1050	4.22	100	.75 gal	6.5	8.4	0.551	7.36	98	3.31
1055	4.28	100		5.9	8.4	0.549	7.35	99	2.84
1100	4.30	100		6.0	8.4	0.549	7.28	82	2.86
1105	4.36	100		6.2	8.4	0.547	7.35	41	2.76
1109	4.40	100		5.5	8.1	0.546	7.34	35	2.71
1114	4.44	100	1.7 gal	5.2	7.8	0.546	7.35	64	2.80
1119	4.45	100		4.8	8.0	0.531	7.35	34	2.56
1124	4.45	100		3.5	8.2	0.527	7.36	60	2.85
1130	4.54	100		3.6	8.3	0.517	7.36	95	2.63
1135	4.59	102		3.4	8.4	0.514	7.37	106	2.50
1140	4.63	100		3.3	8.5	0.510	7.37	107	2.36
1145	4.69	100		2.1	8.5	0.507	7.38	106	2.59
1150	4.75	102		1.1	8.5	0.504	7.39	118	1.88
1155	4.80	102		1.9	8.5	~~0.505~~ 0.502	7.40	114	2.08
1200	4.83	100	3.5 gal	2.3	8.6	0.501	7.39	112	2.17
1205	collect sample for Total & Dissolved metals								
1230	4.96	100		1.9	8.7	0.499	7.39	109	2.16

POST SAMPLE Reading

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW17-3

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/11/12
INSPECTORS: S. Dillman
PUMP #: 019002 Peristaltic
SAMPLE ID #: 17LM20022

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS

MONITORING

INSTRUMENT	DETECTOR
OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	7.47'					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		2.43			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1300	2.43	START PUMP FOR PURGE							
1306	3.20	104		~~3~~4.31	8.1	0.261	7.64	160	
1311	3.37	130		4.36	8.1	0.257	7.59	166	~~4.06~~
1315	3.49	120		4.11	8.2	0.256	7.50	171	4.06
1320	3.60	120		4.29	8.3	0.257	7.49	172	
1325	3.66	110		4.43	8.3	0.258	7.46	175	5.34
1330	3.73	106		4.09	8.2	0.257	7.44	177	3.98
1335	3.80	106	1 gal	3.71	8.1	0.258	7.42	180	3.32
1340	3.89	106		3.76	8.2	0.260	7.41	185	2.61
1345	3.94	106		3.29	8.3	0.262	7.38	187	2.79
1350	3.99	106		2.89	8.4	0.263	7.39	188	1.68
1355	4.05	106		3.01	8.4	0.265	7.39	189	1.77
1400	4.11	106		3.49	8.3	0.265	7.38	189	1.61
1405	4.13	106		2.86	8.4	0.269	7.38	191	1.87
1410	4.15	106		2.59	8.5	0.271	7.38	191	1.92
1415	4.18	106	2 gal	2.39	8.5	0.274	7.36	193	1.96
1420	4.20	106		2.25	8.6	0.276	7.36	195	1.76
1425	4.23	106		2.15	8.6	0.280	7.36	197	1.66
1430	4.33	106		2.22	8.7	0.281	7.36	198	1.90
1435		COLLECT SAMPLE FOR		Metals (Filtered & Unfiltered)					
1447	4.59	106	2.7 gal	2.25	8.8	0.291	7.35	200	2.02

POST SAMPLE READINGS

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW 17-4

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/11/12
INSPECTORS: BBO
PUMP #: Peristaltic Pump Rental
SAMPLE ID #: 17LM20023

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND (FROM) DIRECTION (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
1220	33	Light snow showers		5-10	NW-SE		OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) X WELL DIAMETER FACTOR (GAL/FT)]
8.44-3.23 = 5.21 x .163 = 0.85 x 3 = 2.55 gals

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	8.44					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		3.23			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND ~~mS/cm~~ umhos	pH	ORP (mV)	TURBIDITY (NTU)
1227	3.19	YSI & Tubing in well							
1227		Pump Started		YSI	YSI	Horiba	Horiba	Horiba	Hach
1232	3.44	~110		0.95	7.7	0.481	7.17	48	11.8
1242	3.43			0.92	7.9	0.470	7.19	32	6.94
1247	3.43	~110		0.95	8.0	0.470	7.16	30	8.13
1252	3.43			0.99	8.0	0.463	7.18	22	4.18
1257	3.44		~0.5 gals	0.84	8.0	0.445	7.18	18	3.27
1302	3.44	~110		0.75	8.0	0.443	7.17	17	2.01
1307	3.43			0.94	7.9	0.435	7.23	14	1.51
1312	3.45		~1.1 gals	0.72	7.9	0.429	7.25	11	1.40
1317	3.45	~110	~1.5 gals	0.80	7.8	0.424	7.26	10	1.07
1322	3.46			0.78	7.8	0.414	7.29	9	1.98
1327	3.46			0.64	7.7	0.407	7.30	8	1.92
1332	3.47			0.61	7.7	0.400	7.30	8	1.36
1337	3.46	~104	~2.0 gals	0.62	7.7	0.392	7.31	8	1.50
1342	3.46			0.64	7.8	0.384	7.33	7	1.19
1347	3.46		~2.5 gals	0.63	7.8	0.376	7.34	6	3.18
1352	3.46			0.57	7.7	0.369	7.34	5	1.19
1357	3.47		~2.75 gals	0.62	7.7	0.360	7.35	4	1.60
1405	Sample	Collected		17LM20023 @ 1405			17LM20023F		1409
1411	Post-Sample Collection Geo Param, Pump Re-Started								
1416	3.48		~3 gals	0.58	7.7	0.341	7.32	4	1.85

SAMPLING RECORD - GROUNDWATER

SENECA ARMY DEPOT ACTIVITY	PARSONS	WELL #: MW17-5

PROJECT: SEAD-16/17 LTM Groundwater Sampling - Round 5
LOCATION: ROMULUS, NY

DATE: 12/11/12
INSPECTORS: TBO
PUMP #: Peristaltic Pump Parts
SAMPLE ID #: 17LM20024

WEATHER / FIELD CONDITIONS CHECKLIST (RECORD MAJOR CHANGES)

TIME (24 HR)	TEMP (APPRX)	WEATHER (APPRX)	REL. HUMIDITY (GEN)	WIND VELOCITY (APPRX)	WIND DIRECTION (FROM) (0 - 360)	GROUND / SITE SURFACE CONDITIONS	MONITORING INSTRUMENT	MONITORING DETECTOR
922	33	1.5ft Snow shoe overcast		5-10	NW→SE		OVM-580	PID

WELL VOLUME CALCULATION FACTORS

DIAMETER (INCHES):	0.25	1	2	3	4	6
GALLONS / FOOT:	0.0026	0.041	0.163	0.367	0.654	1.47
LITERS/FOOT	0.010	0.151	0.617	1.389	2.475	5.564

ONE WELL VOLUME (GAL) = [(POW - STABILIZED WATER LEVEL) WELL DIAMETER FACTOR (GAL/FT)]
10.13 - 2.58 = 7.55 x .163 = 1.23 x 3 = 3.69 gals

HISTORIC DATA	DEPTH TO POINT OF WELL (TOC)	DEPTH TO TOP OF SCREEN (TOC)	SCREEN LENGTH (FT)	WELL DEVELOPMENT TURBIDITY	WELL DEVELOPMENT pH	WELL DEVELOPMENT SPEC. COND
	10.13					

DATA COLLECTED AT WELL SITE	PID READING (OPENING WELL)	DEPTH TO STATIC WATER LEVEL (TOC)	DEPTH TO STABILIZED WATER LEVEL (TOC)	DEPTH TO PUMP INTAKE (TOC)	PUMPING START TIME
		2.58'			

RADIATION SCREENING DATA	PUMP PRIOR TO SAMPLING (cps)		PUMP AFTER SAMPLING (cps)	

MONITORING DATA COLLECTED DURING PURGING OPERATIONS

TIME (min)	WATER LEVEL	PUMPING RATE (ml/min)	CUMULATIVE VOL (GALLONS)	DISSOLVED OXYGEN (mg/L)	TEMP (C)	SPEC. COND mS/cm (umhos)	pH	ORP (mV)	TURBIDITY (NTU)
1021	2.59	YSI & Hobay in well							
1022		Pump Started		YSI	YSI	Horiba	Horiba	Horiba	Hach
1029	2.65	100 ml/min		0.88	8.2	0.423	6.97	207	41.2
1035	2.65			0.87	8.2	0.419	6.78	199	30.0
1040	2.66	114		0.86	8.1	0.421	6.62	189	18.5
1045	2.65			0.82	8.1	0.422	6.93	155	13.0
1050	2.66	109		0.85	8.2	0.422	7.22	120	10.5
1055	2.66			0.89	8.2	0.423	7.20	108	8.92
1100	2.66			1.14	8.0	0.425	7.23	85	8.54
1105	2.67	120	~1.25 gal	2.05	8.0	0.427	7.27	65	6.64
1110	2.67			0.71	8.1	0.426	7.22	50	5.42
1115	2.67		~1.5 gals	1.55	8.2	0.425	7.11	46	4.47
1120	2.67	116	~2.0 gals	0.97	8.1	0.426	7.00	47	4.90
1130	2.67			0.50	8.1	0.429	7.02	42	3.21
1140	2.68		~2.5 gals	1.64	8.0	0.427	7.07	32	2.25
1145	2.68			1.56	8.0	0.427	7.03	33	2.07
1150	2.68		~3.0 gals	1.67	8.0	0.427	7.00	34	1.87
1200	Collected Samples			17LM20024U		1200			
				17LM20024F		1205			
1206	2.68 Pgal - Sample Collection, Geo Probe, Pump Started								
1211	2.68		~3.1 gals	0.94	8.2	0.429	7.11	34	2.01

APPENDIX D

COMPLETE GROUNDWATER DATA RESULTS FOR YEARS 1 THROUGH 5

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
Loc ID				MW16-1	MW16-1	MW16-1	MW16-1	MW16-1	MW16-1	MW16-1	MW16-1	MW16-1
Matrix				GW	GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				16LM20000	16LM20001	16LM20013	16LM20014FIL	16LM20014UNFIL	16LM20021FIL	16LM20021UNF	16LM20028F	
Sample Depth Interval (FT)				0-0	0-0	0-0.1	0-0	0-0	0-0.1	0-0.1	0-0.1	
Sample Date				12/20/2007	12/20/2007	12/9/2008	11/13/2009	11/13/2009	12/16/2010	12/16/2010	12/15/2012	
QC Type				SA	DU	SA	SA	SA	SA	SA	SA	
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM	
Sample Round				1	1	2	3	3	4	4	5	
Filtered				Total	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	
Inorganics												
Aluminum	UG/L			61.4 J	91.6 J	148 J	24 U	45 J	23 U	50 U	23 U	
Antimony	UG/L	GA	3	1 U	1.02	0.95 J	1 U	1 U	2.3 U	2 U	2.3 U	
Arsenic	UG/L	MCL	10	4.2 U	4.2 U	3.7 U	3.7 U	3.7 U	1.3 U	1.3 U	1.3 U	
Barium	UG/L	GA	1,000	60.4	59	125	105	104	110	97 J	78	
Beryllium	UG/L	MCL	4	0.27 U	0.27 U	0.33 U	0.3 U	0.3 U	0.25 U	0.15 U	0.25 U	
Cadmium	UG/L	GA	5	0.36 U	0.36 U	0.33 U	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U	
Calcium	UG/L			107,000 J	105,000 J	176,000	111,000 J	110,000 J	140,000	130,000	120,000	
Chromium	UG/L	GA	50	0.84 U	0.84 U	0.88 U	0.9 U	0.9 U	2.5 U	2.5 U	2.5 U	
Cobalt	UG/L			0.89 U	0.89 U	1.1 U	1.1 U	1.1 U	1.1	1.1	0.15 U	
Copper	UG/L	GA	200	1.3 U	1.3 U	1.3 U	1.6 J	1.6 J	1.1 U	1.1 U	5.2	
Iron	UG/L	GA	300	35.8 J	68.3	93.3	19 UJ	19 UJ	77 J	100	33 U	
Iron+Manganese	UG/L	GA	500	39 J	73	105	1 J	2.4 J	131 J	152	34 U	
Lead	UG/L	MCL	15	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	0.2 U	0.5 U	0.2 U	
Magnesium	UG/L			16,100 J	15,900 J	25,800	18,000	17,900	21,000	20,000 J	18,000	
Manganese	UG/L	GA	300	3.3	5	11.8	1 J	2.4 J	54	52	1 U	
Mercury	UG/L	GA	0.7	0.12 U	0.12 U	0.12 U	0.1 U	0.1 U	0.091 U	0.091 U	0.091 U	
Nickel	UG/L	GA	100	1.2 U	1.2 U	1 U	1.8 J	1.2 J	2.8 J	2.7 J	2.3 J	
Potassium	UG/L			886 R	907 R	1,340 J	1,110	1,100	1,200	1,100	900	
Selenium	UG/L	GA	10	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U	
Silver	UG/L	GA	50	1 U	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	
Sodium	UG/L	GA	20,000	24,200 J	25,300 J	182,000	8,000 J	8,000 J	170,000	160,000	63,000	
Thallium	UG/L	MCL	2	0.03 U	0.03 U	0.09 U	0.2 U	0.2 U	0.5 U	0.25 U	0.5 U	
Vanadium	UG/L			0.78 U	0.78 U	0.98 U	1 U	1 U	3.8 U	3.2 U	3.8 U	
Zinc	UG/L			4.4 J	7.8 J	5.8 J	3.6 U	3.6 U	8.3 U	8.8 J	8.3 U	
Turbidity (post)	NTU								0		0.87	
Turbidity (pre)	NTU			0.4	0.4	5		0.4		0.7		

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
Loc ID				MW16-1	MW16-2	MW16-2	MW16-2	MW16-2	MW16-2	MW16-2	MW16-2
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				16LM20028U	16LM20002	16LM20007	16LM20015FIL	16LM20015UNFIL	16LM20022FIL	16LM20022UNF	16LM20023FIL
Sample Depth Interval (FT)				0-0.1	0-0	0-0.1	0-0	0-0	0-0.1	0-0.1	0-0.1
Sample Date				12/15/2012	12/20/2007	12/9/2008	11/11/2009	11/11/2009	12/15/2010	12/15/2010	12/15/2010
QC Type				SA	SA	SA	SA	SA	SA	SA	DU
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				5	1	2	3	3	4	4	4
Filtered				Total	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			50 U	98.8 J	97.1 J	24 U	205	23 U	50 U	23 U
Antimony	UG/L	GA	3	2 U	3.36	5.53	3.6	3.6	6.1	6.6	6.1
Arsenic	UG/L	MCL	10	1.3 U	4.2 U	3.7 U	3.7 U	3.7 U	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	78	64.6	69.7	71.9	72.7	68	77 J	67
Beryllium	UG/L	MCL	4	0.15 U	0.27 U	0.33 U	0.3 U	0.3 U	0.25 U	0.15 U	0.25 U
Cadmium	UG/L	GA	5	0.13 U	0.36 U	0.33 U	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U
Calcium	UG/L			120,000	143,000 J	138,000	118,000 J	117,000 J	100,000 J	110,000 J	96,000
Chromium	UG/L	GA	50	2.5 U	0.84 U	0.88 U	0.9 U	0.9 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			0.16 J	0.89 U	1.1 U	1.1 U	1.1 U	0.15 U	0.12 U	0.15 U
Copper	UG/L	GA	200	3.3 J	4.5 J	4 J	3.4 J	5.1 J	4.4 J	5.9	4.5 J
Iron	UG/L	GA	300	44 U	49.5 J	26.1 J	19 UJ	197 J	33 U	89 J	33 U
Iron+Manganese	UG/L	GA	500	46 U	53 J	27	39.5	260.7 J	12	105 J	12
Lead	UG/L	MCL	15	0.5 U	2.9 U	2.9 U	2.9 U	2.9 U	0.21 J	1.3 J	0.2 U
Magnesium	UG/L			18,000	15,600 J	15,700	12,600	12,300	12,000	14,000 J	11,000
Manganese	UG/L	GA	300	2 U	3.4	0.84 J	39.5	63.7	12	16	12
Mercury	UG/L	GA	0.7	0.091 U	0.12 U	0.148 J	0.1 U	0.1 U	0.091 U	0.091 U	0.091 U
Nickel	UG/L	GA	100	2 U	1.2 U	1.6 J	2.2 J	2.6 J	2 U	2 J	2.2 J
Potassium	UG/L			870 J	2,050 R	2,410 J	3,170	3,140	2,300	2,500	2,200
Selenium	UG/L	GA	10	1.1 U	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U
Silver	UG/L	GA	50	0.18 U	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U
Sodium	UG/L	GA	20,000	32,000	30,000 J	34,500	19,500 J	18,800 J	33,000 J	34,000 J	31,000
Thallium	UG/L	MCL	2	0.25 U	0.03 U	0.09 U	0.2 U	0.2 U	0.5 U	0.25 U	0.5 U
Vanadium	UG/L			3.2 U	0.78 U	0.98 U	1 U	1 U	3.8 U	3.2 U	3.8 U
Zinc	UG/L			8.4 U	8.2 J	10.2	11.1	11.3	11 J	14 J	12 J
Turbidity (post)	NTU			0.87					0.25	4.9	0.25
Turbidity (pre)	NTU			1.04	7.3	1.4		17.9		2.1	

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
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3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
Loc ID				MW16-2	MW16-2	MW16-2	MW16-4	MW16-4	MW16-4	MW16-4	MW16-4
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				16LM20023UNF	16LM20029F	16LM20029U	16LM20003	16LM20008	16LM20009	16LM20016FIL	16LM20016UNFIL
Sample Depth Interval (FT)				0-0.1	0-0.1	0-0.1	0-0	0-0.1	0-0.1	0-0	0-0
Sample Date				12/15/2010	12/15/2012	12/15/2012	12/20/2007	12/9/2008	12/9/2008	11/17/2009	11/17/2009
QC Type				DU	SA	SA	SA	SA	DU	SA	SA
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				4	5	5	1	2	2	3	3
Filtered				Total	Dissolved	Total	Total	Total	Total	Dissolved	Total
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			50 U	23 U	50 U	167 J	104 J	101 J	24 U	68 J
Antimony	UG/L	GA	3	6	7.8	7.1	5.11	2.89	2.94	6	6.3
Arsenic	UG/L	MCL	10	1.3 U	1.3 U	1.3 U	4.2 U	3.7 U	3.7 U	3.7 U	3.7 U
Barium	UG/L	GA	1,000	69 J	65	62	44.5	290	279	129	123
Beryllium	UG/L	MCL	4	0.15 U	0.25 U	0.15 U	0.27 U	0.33 U	0.33 U	0.3 U	0.3 U
Cadmium	UG/L	GA	5	0.13 U	0.095 U	0.13 U	0.36 U	0.33 U	0.33 U	0.3 U	0.3 U
Calcium	UG/L			100,000	110,000	100,000	87,100 J	275,000	267,000	130,000 J	125,000 J
Chromium	UG/L	GA	50	2.5 U	2.5 U	2.5 U	1 J	0.88 U	0.88 U	0.9 U	0.9 U
Cobalt	UG/L			0.12 U	0.15 U	0.12 U	0.89 U	1.1 U	1.1 U	1.8 J	2 J
Copper	UG/L	GA	200	5.1	4.5 J	5	5.4 J	4.4 J	4.2 J	2.4 J	6.2 J
Iron	UG/L	GA	300	63 J	33 U	44 U	95.4	57 J	38.4 J	329 J	419 J
Iron+Manganese	UG/L	GA	500	76 J	34 U	46 U	127	65	46 J	417.7 J	[illegible]
Lead	UG/L	MCL	15	0.97 J	0.24 J	0.66 J	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U
Magnesium	UG/L			12,000 J	13,000	11,000	9,440 R	35,200	34,500	16,800	16,000
Manganese	UG/L	GA	300	13	1 U	2 U	31.2	7.7	8	88.7	94.5
Mercury	UG/L	GA	0.7	0.091 U	0.091 U	0.091 U	0.12 U	0.12 U	0.12 U	0.1 U	0.1 U
Nickel	UG/L	GA	100	2.2 J	2.2 J	2 U	1.2 U	2.2 J	1.9 J	1.7 J	1.4 J
Potassium	UG/L			2,200	2,200	1,900	1,300 R	3,830 J	3,690 J	3,270	3,270
Selenium	UG/L	GA	10	1.1 U	1 U	1.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U
Silver	UG/L	GA	50	0.18 U	0.25 U	0.18 U	1 U	1.3 U	1.3 U	1.3 U	1.3 U
Sodium	UG/L	GA	20,000	32,000	20,000	17,000	40,800 J	434,000	419,000	380,000 J	363,000 J
Thallium	UG/L	MCL	2	0.25 U	0.5 U	0.25 U	0.03 U	0.09 U	0.09 U	0.2 U	0.2 U
Vanadium	UG/L			3.2 U	3.8 U	3.2 U	0.78 U	0.98 U	0.98 U	1.1 J	1.1 J
Zinc	UG/L			12 J	9.5 J	8.8 J	5.3 J	14.6 J	9.8 J	3.6 U	3.6 U
Turbidity (post)	NTU			4.9	3.01	3.01					
Turbidity (pre)	NTU			2.1		1.2	4.5	0.4	0.4		0.03

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
Loc ID				MW16-4	MW16-4	MW16-4	MW16-4	MW16-5	MW16-5	MW16-5	MW16-5
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				16LM20024FIL	16LM20024UNF	16LM20030F	16LM20030U	16LM20004	16LM20010	16LM20017FIL	16LM20017UNFIL
Sample Depth Interval (FT)				0-0.1	0-0.1	0-0.1	0-0.1	0-0	0-0.1	0-0	0-0
Sample Date				12/16/2010	12/16/2010	12/15/2012	12/15/2012	12/20/2007	12/10/2008	11/16/2009	11/16/2009
QC Type				SA	SA	SA	SA	SA	SA	SA	SA
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				4	4	5	5	1	2	3	3
Filtered				Dissolved	Total	Dissolved	Total	Total	Total	Dissolved	Total
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			23 U	50 U	23 U	50 U	160 J	563	24 U	164 J
Antimony	UG/L	GA	3	2.3 U	2 U	4 J	3.9 J	1.82	4.23	1 U	1 U
Arsenic	UG/L	MCL	10	1.3 U	1.3 U	1.5 J	1.3 J	4.2 U	3.7 U	3.7 U	3.7 U
Barium	UG/L	GA	1,000	220	240 J	240	230	38.9	22	42.8	42
Beryllium	UG/L	MCL	4	0.25 U	0.15 U	0.25 U	0.15 U	0.27 U	0.33 U	0.3 U	0.3 U
Cadmium	UG/L	GA	5	0.095 U	0.13 U	0.095 U	0.23 J	0.36 U	0.33 U	0.3 U	0.3 U
Calcium	UG/L			210,000	210,000	230,000	220,000	89,000 J	53,100	115,000 J	110,000 J
Chromium	UG/L	GA	50	2.5 U	2.5 U	2.5 U	2.5 U	1.1 J	1.2 J	0.9 U	0.9 U
Cobalt	UG/L			0.7	0.71	1.9	1.9	0.89 U	1.1 U	1.1 U	1.1 U
Copper	UG/L	GA	200	1.4 J	2.8 J	4.1 J	11	3.1 J	10.6	1.3 U	1.3 U
Iron	UG/L	GA	300	130	150	130	140	1,200	699	868 J	1,110 J
Iron+Manganese	UG/L	GA	500	260	290	270	280	1,238	731	970 J	1,283 J
Lead	UG/L	MCL	15	0.7 J	3	0.2 U	3.4	2.9 U	10.1	2.9 U	2.9 U
Magnesium	UG/L			31,000	32,000 J	34,000	32,000	9,380 R	6,050	12,200	11,800
Manganese	UG/L	GA	300	130	140	140	140	37.6	32.4	170	173
Mercury	UG/L	GA	0.7	0.091 U	0.091 U	0.091 U	0.091 U	0.12 U	0.12 U	0.1 U	0.1 U
Nickel	UG/L	GA	100	2.2 J	2.3 J	2.6 J	3.2 J	1.2 U	2.6 J	1.8 J	2 J
Potassium	UG/L			2,600	2,600	3,200	3,100	4,420 R	2,610 J	2,370	2,380
Selenium	UG/L	GA	10	1 U	1.1 U	1 U	1.1 U	6.1 U	6.1 U	6.1 U	6.1 U
Silver	UG/L	GA	50	0.25 U	0.18 U	0.25 U	0.18 U	1 U	1.3 U	1.3 U	1.3 U
Sodium	UG/L	GA	20,000	540,000	550,000	340,000	310,000	8,410 R	2,180	2,700 J	2,800 J
Thallium	UG/L	MCL	2	0.5 U	0.25 U	0.5 U	0.25 U	0.03 U	0.09 U	0.2 U	0.2 U
Vanadium	UG/L			3.8 U	3.2 U	3.8 U	3.2 U	1.2 J	2.3 J	1 U	1.1 J
Zinc	UG/L			9.2 J	13 J	12 J	11 J	34.4	10.3	3.6 U	3.6 U
Turbidity (post)	NTU			0		1.01	1.01				
Turbidity (pre)	NTU				0.7		0.48	4.9	29		10

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
Loc ID				MW16-5	MW16-5	MW16-5	MW16-5	MW16-6	MW16-6	MW16-6	MW16-6
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				16LM20025FIL	16LM20025UNF	16LM20031F	16LM20031U	16LM20005	16LM20011	16LM20018FIL	16LM20018UNFIL
Sample Depth Interval (FT)				0-0.1	0-0.1	0-0.1	0-0.1	0-0	0-0.1	0-0	0-0
Sample Date				12/15/2010	12/15/2010	12/15/2012	12/15/2012	12/20/2007	12/9/2008	11/17/2009	11/17/2009
QC Type				SA	SA	SA	SA	SA	SA	SA	SA
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				4	4	5	5	1	2	3	3
Filtered				Dissolved	Total	Dissolved	Total	Total	Total	Dissolved	Total
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			23 U	160	23 U	50 U	168 J	189 J	107 J	442
Antimony	UG/L	GA	3	2.3 U	2 U	2.3 U	2 U	1 U	0.92 J	0.9 J	1 U
Arsenic	UG/L	MCL	10	1.3 U	1.3 U	2.6	2.7	4.2 U	3.7 U	3.7 U	3.7 U
Barium	UG/L	GA	1,000	34	33 J	34	39	31.8	39.1	78.5	80.2
Beryllium	UG/L	MCL	4	0.25 U	0.15 U	0.25 U	0.15 U	0.27 U	0.33 U	0.3 U	0.3 U
Cadmium	UG/L	GA	5	0.095 U	0.13 U	0.095 U	0.13 U	0.36 U	0.33 U	0.3 U	0.3 U
Calcium	UG/L			90,000	86,000	97,000	96,000	80,400 J	84,300	112,000 J	112,000 J
Chromium	UG/L	GA	50	2.5 U	2.5 U	2.5 U	2.5 U	0.84 U	0.88 U	0.9 U	0.9 U
Cobalt	UG/L			0.15 U	0.12 U	0.22 J	0.23 J	0.89 U	1.1 U	1.1 U	1.1 U
Copper	UG/L	GA	200	1.1 U	1.1 U	1.1 J	3 J	3.4 J	2.1 J	1.9 J	2.5 J
Iron	UG/L	GA	300	496	600	1,100	1,300	418	153	55 J	440 J
Iron+Manganese	UG/L	GA	500	696	760	1,230	1,430	441	158	153.4 J	515 J
Lead	UG/L	MCL	15	0.2 U	0.77 J	0.2 U	0.5 U	2.9 U	2.9 U	2.9 U	2.9 U
Magnesium	UG/L			10,000	9,700 J	9,900	9,800	7,100 R	7,380	9,970	9,950
Manganese	UG/L	GA	300	200	160	130	130	23.3	4.8	98.4	75
Mercury	UG/L	GA	0.7	0.091 U	0.091 U	0.1 J	0.091 U	0.12 U	0.12 U	0.1 U	0.1 U
Nickel	UG/L	GA	100	2 U	2 U	2.1 J	2 U	1.2 U	1 U	1.2 J	2.6 J
Potassium	UG/L			2,200	2,100	2,100	2,100	2,690 R	2,310 J	2,380	2,580
Selenium	UG/L	GA	10	1 U	1.1 U	1 U	1.1 U	6.1 U	6.1 U	6.1 U	6.1 U
Silver	UG/L	GA	50	0.25 U	0.18 U	0.25 U	0.18 U	1 U	1.3 U	1.3 U	1.3 U
Sodium	UG/L	GA	20,000	1,800	1,800	1,600	1,500	6,110 R	9,200	22,000 J	20,600 J
Thallium	UG/L	MCL	2	0.5 U	0.25 U	0.5 U	0.25 U	0.03 U	0.09 U	0.008 U	0.008 U
Vanadium	UG/L			3.8 U	3.2 U	3.8 U	3.2 U	0.86 J	0.98 U	1 U	1.3 J
Zinc	UG/L			8.3 U	8.4 U	8.3 U	8.4 U	5.5 J	3.7 J	3.6 U	3.6 U
Turbidity (post)	NTU			0	6.5	1.39	1.39				
Turbidity (pre)	NTU				1.4		0.94	7	1.5		7.3

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Parameter	Unit	Criteria [1] Source	Criteria [1] Level	SEAD-16 MW16-6 GW 16LM20026FIL 0-0.1 12/15/2010 SA LTM 4 Dissolved	SEAD-16 MW16-6 GW 16LM20026UNF 0-0.1 12/15/2010 SA LTM 4 Total	SEAD-16 MW16-6 GW 16LM20032F 0-0.1 12/15/2012 SA LTM 5 Dissolved	SEAD-16 MW16-6 GW 16LM20032U 0-0.1 12/15/2012 SA LTM 5 Total	SEAD-16 MW16-7 GW 16LM20006 0-0 12/20/2007 SA LTM 1 Total	SEAD-16 MW16-7 GW 16LM20012 0-0.1 12/10/2008 SA LTM 2 Total	SEAD-16 MW16-7 GW 16LM20019FIL 0-0 11/12/2009 SA LTM 3 Dissolved	SEAD-16 MW16-7 GW 16LM20019UNFIL 0-0 11/12/2009 SA LTM 3 Total
Inorganics											
Aluminum	UG/L			23 U	61 J	23 U	300	45.9 J	577	32 J	182 J
Antimony	UG/L	GA	3	2.3 U	2 U	2.3 U	2 U	9.58	13.6	15.2	15.7
Arsenic	UG/L	MCL	10	1.3 U	1.3 U	1.3 U	1.3 J	4.2 U	3.7 U	3.7 U	3.7 U
Barium	UG/L	GA	1,000	44	50 J	41	45	170	122	83.6	81.6
Beryllium	UG/L	MCL	4	0.25 U	0.15 U	0.25 U	0.15 U	0.27 U	0.33 U	0.3 U	0.3 U
Cadmium	UG/L	GA	5	0.095 U	0.13 U	0.095 U	0.13 U	0.46 J	0.33 U	0.3 U	0.3 U
Calcium	UG/L			68,000	78,000	70,000	74,000	194,000	133,000	85,000 J	84,600 J
Chromium	UG/L	GA	50	2.5 U	2.5 U	2.5 U	2.5 U	0.84 U	1.6 J	0.9 U	0.9 U
Cobalt	UG/L			0.15 U	0.12 U	0.18 J	0.43 J	1.6 J	1.1 J	1.1 U	1.1 U
Copper	UG/L	GA	200	1.5 J	2 J	4.5 J	4.1 J	34.7	20.2	3.1 J	5 J
Iron	UG/L	GA	300	33 U	110	33 J	790	29.2 J	770	19 UJ	135 J
Iron+Manganese	UG/L	GA	500	2.1 J	113.5 J	43 J	816	660 J	990	136	244 J
Lead	UG/L	MCL	15	0.2 U	0.5 U	0.2 U	0.5 U	26.5	88.6	4.4 J	12.1
Magnesium	UG/L			6,600	7,600 J	7,200	7,600	32,000 J	25,100	15,900	16,500
Manganese	UG/L	GA	300	2.1 J	3.5 J	10	26	631	220	136	109
Mercury	UG/L	GA	0.7	0.091 U	0.091 U	0.091 U	0.091 U	0.507	0.12 U	0.1 U	0.1 U
Nickel	UG/L	GA	100	2 U	2 U	2 U	2 J	5.5 J	2.6 J	1.9 J	1.7 J
Potassium	UG/L			1,500	1,800	2,400	2,400	5,480 J	5,670 J	6,520	5,780
Selenium	UG/L	GA	10	1 U	1.1 U	1 U	1.1 U	6.1 U	6.1 U	6.1 U	6.1 U
Silver	UG/L	GA	50	0.25 U	0.18 U	0.25 U	0.18 U	1 U	1.3 U	1.3 U	1.3 U
Sodium	UG/L	GA	20,000	7,600	8,400	8,700	8,000	[illegible]	[illegible]	52,100 J	47,400 J
Thallium	UG/L	MCL	2	0.5 U	0.25 U	0.5 U	0.25 U	0.03 J	0.09 U	0.2 U	0.2 U
Vanadium	UG/L			3.8 U	3.2 U	3.8 U	3.2 U	0.78 U	0.98 U	1 U	1 U
Zinc	UG/L			8.3 U	8.4 U	8.3 U	8.4 U	3.6 U	8.6 J	3.6 U	3.6 U
Turbidity (post)	NTU			0.25	3.3	3.58	3.58				
Turbidity (pre)	NTU				3.1		1.67	0.3	3.1		0.8

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 1
SEAD-16 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Parameter	Unit	Criteria [1] Source	Criteria [1] Level	SEAD-16 MW16-7 GW 16LM20020FIL 0-0 11/12/2009 DU LTM 3 Dissolved Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20020UNFIL 0-0 11/12/2009 DU LTM 3 Total Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20027FIL 0-0.1 12/15/2010 SA LTM 4 Dissolved Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20027UNF 0-0.1 12/15/2010 SA LTM 4 Total Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20033F 0-0.1 12/15/2012 SA LTM 5 Dissolved Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20033U 0-0.1 12/15/2012 SA LTM 5 Total Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20034F 0-0.1 12/15/2012 DU LTM 5 Dissolved Value (Q)[2]	SEAD-16 MW16-7 GW 16LM20034U 0-0.1 12/15/2012 DU LTM 5 Total Value (Q)[2]
Inorganics											
Aluminum	UG/L			25 J	116 J	23 U	50 U	23 U	50 U	23 U	50 U
Antimony	UG/L	GA	3	13.9	16.3	15	16	13	13	13	14
Arsenic	UG/L	MCL	10	3.7 U	3.7 U	1.3 U	1.3 U	1.3 J	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	83.9	80.3	69	71 J	100	100	99	100
Beryllium	UG/L	MCL	4	0.3 U	0.3 U	0.25 U	0.15 U	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	GA	5	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U	0.13 U	0.095 U	0.13 U
Calcium	UG/L			81,900 J	82,800 J	82,000	86,000	110,000 J	100,000 J	100,000	110,000
Chromium	UG/L	GA	50	0.9 U	0.9 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			1.1 U	1.1 U	0.15 U	0.12 U	0.23 J	0.22 J	0.24 J	0.24 J
Copper	UG/L	GA	200	3.5 J	4.1 J	1.8 J	2.7 J	4.1 J	8.3	1.7 J	5.6
Iron	UG/L	GA	300	19 UJ	61 J	33 U	45 J	33 U	44 U	33 U	44 U
Iron+Manganese	UG/L	GA	500	152	168 J	35	79 J	92	90	98	91
Lead	UG/L	MCL	15	4.9 J	9.4	1 J	6.3	1.3 J	2.5	2.3	2.6
Magnesium	UG/L			14,800	16,200	18,000	19,000 J	21,000	21,000 J	20,000	22,000
Manganese	UG/L	GA	300	152	107	35	34	92	90	98	91
Mercury	UG/L	GA	0.7	0.1 U	0.1 U	0.091 U	0.091 U	0.091 U J	0.091 U	0.091 U	0.091 U
Nickel	UG/L	GA	100	2 J	1.1 J	2 U	2 U	2 U	2.2 J	2 U	2.4 J
Potassium	UG/L			7,010	5,630	2,800	2,700	5,300	5,200	5,100	5,400
Selenium	UG/L	GA	10	6.1 U	6.1 U	1 U	1.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	GA	50	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	GA	20,000	55,900 J	46,100 J	29,000	28,000	35,000	32,000	33,000	32,000
Thallium	UG/L	MCL	2	0.2 U	0.2 U	0.5 U	0.25 U	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L			1 U	1 U	3.8 U	3.2 U	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L			3.6 U	3.6 U	8.3 U	8.4 U	8.3 U	8.4 U	8.3 U	8.4 U
Turbidity (post)	NTU					0	1	1.29	1.29	1.29	1.29
Turbidity (pre)	NTU				0.8		0.15		1.14		1.14

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 2
SEAD-17 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17
Loc ID				MW17-1	MW17-1	MW17-1	MW17-1	MW17-1	MW17-1	MW17-1	MW17-1
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				17LM20000	17LM20005	17LM20010FIL	17LM20010UNFIL	17LM20016FIL	17LM20016UNF	17LM20020F	17LM20020U
Sample Depth Interval (FT)				0-0	0-0.1	0-0	0-0	0-0.1	0-0.1	0-0.1	0-0.1
Sample Date				12/20/2007	12/11/2008	11/18/2009	11/18/2009	12/17/2010	12/17/2010	12/11/2012	12/11/2012
QC Type				SA	SA	SA	SA	SA	SA	SA	SA
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				1	2	3	3	4	4	5	5
Filtered				Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			204	219	37 J	59 J	23 U	50 U	23 U	50 U
Antimony	UG/L	GA	3	1 U	1 U	1 U	1 U	2.3 U	2 U	2.3 U	2.7 J
Arsenic	UG/L	MCL	10	4.2 U	3.7 U	3.7 U	3.7 U	1.3 U	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	70	79	99.1	99	61	63 J	28	28
Beryllium	UG/L	MCL	4	0.27 U	0.33 U	0.3 U	0.3 U	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	GA	5	0.36 U	0.33 U	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U	0.44 J
Calcium	UG/L			98,300 J	95,600	109,000 J	108,000 J	96,000	100,000	53,000	55,000
Chromium	UG/L	GA	50	0.84 U	0.88 U	0.9 U	0.9 U	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			0.89 U	1.1 U	1.1 U	1.1 U	0.15 U	0.3 J	0.32 J	0.37 J
Copper	UG/L	GA	200	1.3 U	1.3 U	1.3 U	1.3 U	1.1 U	1.1 J	4.7 J	5.4
Iron	UG/L	GA	300	106	126	19 UJ	42 J	33 U	270	47 J	90 J
Iron+Manganese	UG/L	GA	500	119	141	38.9	67.6 J	4.2 J	312	54.2 J	98.1 J
Lead	UG/L	MCL	15	2.9 U	2.9 U	2.9 U	2.9 U	0.2 U	0.5 U	0.2 U	1.1 J
Magnesium	UG/L			21,800 J	20,600	24,300	24,000	19,000	20,000 J	7,200	7,700
Manganese	UG/L	GA	300	13.2	14.9	38.9	25.6	4.2 J	42	7.2	8.1
Mercury	UG/L	GA	0.7	0.12 U	0.12 U	0.1 U	0.1 U	0.091 U	0.091 U	0.14 J	0.091 U
Nickel	UG/L	GA	100	1.2 U	1.3 J	1 U	1 U	2 U	2 U	2 U	2 U
Potassium	UG/L			614 R	462 J	260 J	254 J	690	690 J	380 J	410 J
Selenium	UG/L	GA	10	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	GA	50	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	GA	20,000	7,790 R	8,380	7,300 J	7,400 J	6,000	6,200	2,400	2,500
Thallium	UG/L	MCL	2	0.03 U	0.09 U	0.008 U	0.008 U	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L			0.78 U	0.98 U	1 U	1 U	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L			4.7 J	4 J	3.6 U	3.6 U	8.3 U	8.4 U	8.3 U	8.4 U
Turbidity (post)	NTU							0	1.2	3.28	3.28
Turbidity (pre)	NTU			4	3		0.4		1.6		3.6

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safawater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 2
SEAD-17 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17
Loc ID				MW17-2	MW17-2	MW17-2	MW17-2	MW17-2	MW17-2	MW17-2	MW17-2
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				17LM20001	17LM20006	17LM20011FIL	17LM20011UNFIL	17LM20015FIL	17LM20015UNF	17LM20021F	17LM20021U
Sample Depth Interval (FT)				0-0	0-0.1	0-0	0-0	0-0.1	0-0.1	0-0.1	0-0.1
Sample Date				12/20/2007	12/10/2008	11/17/2009	11/17/2009	12/16/2010	12/16/2010	12/11/2012	12/11/2012
QC Type				SA	SA	SA	SA	SA	SA	SA	SA
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				1	2	3	3	4	4	5	5
Filtered				Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			110 J	142 J	88 J	19,600	23 U	51 J	23 U	50 U
Antimony	UG/L	GA	3	3.44	2.76	2.2	3.7	2.3 U	2 U	4 J	4.4 J
Arsenic	UG/L	MCL	10	4.2 U	3.7 U	3.7 U	7.8 J	1.3 U	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	58.8	51.8	82.3	251	54	58 J	69	68
Beryllium	UG/L	MCL	4	0.27 U	0.33 U	0.3 U	1.2 J	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	GA	5	0.36 U	0.33 U	0.3 U	1.7	0.095 U	0.13 U	0.095 U	0.13 U
Calcium	UG/L			110,000 J	112,000	154,000 J	195,000 J	140,000	150,000	120,000	120,000
Chromium	UG/L	GA	50	0.84 U	2.9 J	0.9 U	37.2	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			0.89 U	1.1 U	1.1 U	10.5	0.32 J	0.46 J	0.39 J	0.42 J
Copper	UG/L	GA	200	6.2 J	4.4 J	2.9 J	46.7	1.5 J	1.9 J	7.7	7.8
Iron	UG/L	GA	300	140	115	19 UJ	25,500 J	33 U	130	33 U	44 U
Iron+Manganese	UG/L	GA	500	160	121	1.5 J	25,929 J	23	173	12	14
Lead	UG/L	MCL	15	2.9 U	2.9 U	2.9 U	103	0.2 U	0.6 J	0.2 U	0.99 J
Magnesium	UG/L			11,000 R	11,200	18,200	23,300	18,000	19,000 J	12,000	12,000
Manganese	UG/L	GA	300	20.5	6.1	1.5 J	429	23	43	12	14
Mercury	UG/L	GA	0.7	0.12 U	0.12 U	0.1 U	0.1 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel	UG/L	GA	100	1.2 U	2.8 J	1.2 J	34	2 U	2 U	2 U	2 U
Potassium	UG/L			1,690 R	1,260 J	2,390	7,810	1,300	1,300	2,500	2,500
Selenium	UG/L	GA	10	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	GA	50	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	GA	20,000	6,620 R	7,860	19,800 J	20,300 J	14,000	14,000	8,400	8,400
Thallium	UG/L	MCL	2	0.03 U	0.09 U	0.008 U	0.2 U	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L			0.78 U	0.98 U	1 U	32.8	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L			72 J	27.6	28.6	935	17 J	21	24	26
Turbidity (post)	NTU							0.4	1.4	2.16	2.16
Turbidity (pre)	NTU			3.3	6.6		24.4		0.96		2.17

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 2
SEAD-17 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Parameter	Unit	Criteria Source [1]	Criteria Level [1]	SEAD-17 MW17-3 GW 17LM20002 0-0 12/20/2007 SA LTM 1 Total Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20007 0-0.1 12/10/2008 SA LTM 2 Total Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20012FIL 0-0 11/18/2009 SA LTM 3 Dissolved Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20012UNFIL 0-0 11/18/2009 SA LTM 3 Total Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20017FIL 0-0.1 12/16/2010 SA LTM 4 Dissolved Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20017UNF 0-0.1 12/16/2010 SA LTM 4 Total Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20022F 0-0.1 12/11/2012 SA LTM 5 Dissolved Value (Q)[2]	SEAD-17 MW17-3 GW 17LM20022U 0-0.1 12/11/2012 SA LTM 5 Total Value (Q)[2]
Inorganics											
Aluminum	UG/L			106 J	386	141 J	1,550 J	23 U	50 U	23 U	50 U
Antimony	UG/L	GA	3	1 U	1 U	1 U	1.5	2.3 U	2 U	2.3 U	2 U
Arsenic	UG/L	MCL	10	4.2 U	3.7 U	3.7 U	3.7 U	1.3 U	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	39	29.3	49.4	54.5	37	38 J	37	36
Beryllium	UG/L	MCL	4	0.27 U	0.33 U	0.3 U	0.3 U	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	GA	5	0.36 U	0.33 U	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U	0.13 U
Calcium	UG/L			69,000 J	67,200	99,400 J	95,900 J	90,000	93,000	74,000	67,000
Chromium	UG/L	GA	50	0.84 U	0.88 U	0.9 U	5.2	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			0.89 U	1.1 U	1.5 J	1.7 J	0.63	0.7	0.15 U	0.12 U
Copper	UG/L	GA	200	2.6 J	2.8 J	2.5 J	7.9 J	1.1 U	1.1 U	3.3 J	3.2 J
Iron	UG/L	GA	300	133	1,300	827 J	2,690 J	730	770	33 U	44 U
Iron+Manganese	UG/L	GA	500	170	1,573	968 J	2,858 J	890	940	34 U	46 U
Lead	UG/L	MCL	15	2.9 U	2.9 U	2.9 U	8.6	0.2 U	0.5 U	0.24 J	0.78 J
Magnesium	UG/L			7,560 R	7,400	9,850	9,170	9,900	10,000 J	6,100	5,800
Manganese	UG/L	GA	300	36.7	273	141	168	160	170	1 U	2 U
Mercury	UG/L	GA	0.7	0.12 U	0.12 U	0.1 U	0.1 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel	UG/L	GA	100	1.2 U	1.8 J	3.1 J	4.5 J	2 U	2 U	2 U	2 U
Potassium	UG/L			2,620 R	1,840 J	1,290	1,590	1,200	1,200	1,800	1,700
Selenium	UG/L	GA	10	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	GA	50	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	GA	20,000	4,550 R	5,500	7,500 J	6,200 J	6,000	6,100	3,300	3,100
Thallium	UG/L	MCL	2	0.03 U	0.09 U	0.008 U	0.008 U	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L			0.78 U	0.98 U	1 U	1.7 J	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L			27 J	14.2	21.1	45.7	8.3 U	12 J	29	26
Turbidity (post)	NTU							0	1.2	2.02	2.02
Turbidity (pre)	NTU			1.2	20.8				1.3		1.9

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 2
SEAD-17 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Area				SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17
Loc ID				MW17-4	MW17-4	MW17-4	MW17-4	MW17-4	MW17-4	MW17-4	MW17-4
Matrix				GW	GW	GW	GW	GW	GW	GW	GW
Sample ID				17LM20003	17LM20008	17LM20013FIL	17LM20013UNFIL	17LM20018FIL	17LM20018UNF	17LM20023F	17LM20023U
Sample Depth Interval (FT)				0-0	0-0.1	0-0	0-0	0-0.1	0-0.1	0-0.1	0-0.1
Sample Date				12/20/2007	12/10/2008	11/17/2009	11/17/2009	12/16/2010	12/16/2010	12/11/2012	12/11/2012
QC Type				SA	SA	SA	SA	SA	SA	SA	SA
Study ID				LTM	LTM	LTM	LTM	LTM	LTM	LTM	LTM
Sample Round				1	2	3	3	4	4	5	5
Filtered				Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Parameter	Unit	Criteria [1] Source	Criteria [1] Level	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]	Value (Q)[2]
Inorganics											
Aluminum	UG/L			50.2 J	125 J	28 J	70 J	23 U	50 U	23 U	50 U
Antimony	UG/L	GA	3	1 U	0.62 J	1 U	1 U	2.3 U	2 U	2.3 U	2 U
Arsenic	UG/L	MCL	10	4.2 U	3.7 U	3.7 U	3.7 U	1.3 U	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	32.5	35.9	36.3	36.6	27	28 J	65	67
Beryllium	UG/L	MCL	4	0.27 U	0.33 U	0.3 U	0.3 U	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	GA	5	0.36 U	0.33 U	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U	0.13 U
Calcium	UG/L			74,900 J	74,700	96,600 J	97,600 J	90,000	88,000	83,000	87,000
Chromium	UG/L	GA	50	1 J	0.88 U	0.9 U	0.9 U	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			0.89 U	2.4 J	1.5 J	1.3 J	0.96	1.1	0.21 J	0.25 J
Copper	UG/L	GA	200	1.8 J	1.8 J	1.3 U	1.3 U	1.1 U	1.1 U	1.1 J	4.7 J
Iron	UG/L	GA	300	45.4 J	1,760	60 J	142 J	240	260	33 U	72 J
Iron+Manganese	UG/L	GA	500	59 J	2,071	258 J	355 J	370	400	9.5	83
Lead	UG/L	MCL	15	2.9 U	2.9 U	2.9 U	2.9 U	0.2 U	0.5 U	0.2 U	0.5 U
Magnesium	UG/L			10,400 R	10,200	12,900	13,000	13,000	13,000 J	15,000	15,000
Manganese	UG/L	GA	300	13.7	311	198	213	130	140	9.5	11
Mercury	UG/L	GA	0.7	0.12 U	0.12 U	0.1 U	0.1 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel	UG/L	GA	100	1.2 U	2.6 J	2.2 J	2.4 J	2 U	2 U	2 U	2.1 J
Potassium	UG/L			838 R	1,190 J	844	866	540	530 J	750	780 J
Selenium	UG/L	GA	10	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	GA	50	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	GA	20,000	28,500 J	15,500	10,400 J	10,500 J	12,000	12,000	8,900	8,600
Thallium	UG/L	MCL	2	0.03 U	0.09 U	0.008 U	0.008 U	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L			0.78 U	0.98 U	1 U	1 U	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L			5.1 J	6.7 J	3.6 U	3.6 U	8.7 J	8.4 U	8.3 U	8.4 U
Turbidity (post)	NTU							0	0.85	1.85	1.85
Turbidity (pre)	NTU			9.5	4.6		6.2		0.67		1.6

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
   [empty cell] = data is not qualified
   U = compound not detected at concentration listed
   J = the reported value is an estimated concentration
   R = the result was rejected due to QA/QC considerations
   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

Appendix D Table 2
SEAD-17 Post Remedial Action Groundwater Monitoring Results
SEAD-16 SEAD-17 Long-term Monitoring Report
Seneca Army Depot Activity

Parameter	Unit	Criteria Source [1]	Criteria Level [1]	SEAD-17 MW17-5 GW 17LM20004 0-0 12/20/2007 SA LTM 1 Total Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20009 0-0.1 12/11/2008 SA LTM 2 Total Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20014FIL 0-0 11/17/2009 SA LTM 3 Dissolved Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20014UNFIL 0-0 11/17/2009 SA LTM 3 Total Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20019FIL 0-0.1 12/16/2010 SA LTM 4 Dissolved Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20019UNF 0-0.1 12/16/2010 SA LTM 4 Total Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20024F 0-0.1 12/11/2012 SA LTM 5 Dissolved Value (Q)[2]	SEAD-17 MW17-5 GW 17LM20024U 0-0.1 12/11/2012 SA LTM 5 Total Value (Q)[2]
Inorganics											
Aluminum	UG/L			98.5 J	125 J	29 J	98 J	23 U	50 U	23 U	50 U
Antimony	UG/L	GA	3	1 U	0.56 J	1	1	2.3 U	2 U	2.3 U	2 U
Arsenic	UG/L	MCL	10	4.2 U	3.7 U	3.7 U	3.7 U	1.3 U	1.3 U	1.3 U	1.3 U
Barium	UG/L	GA	1,000	86.7	82.9	166	168	81	82 J	24	26
Beryllium	UG/L	MCL	4	0.27 U	0.33 U	2 U	2 U	0.25 U	0.15 U	0.25 U	0.15 U
Cadmium	UG/L	GA	5	0.36 U	0.33 U	0.3 U	0.3 U	0.095 U	0.13 U	0.095 U	0.13 U
Calcium	UG/L			97,100 J	97,300	184,000 J	185,000 J	100,000	110,000	68,000	75,000
Chromium	UG/L	GA	50	0.84 U	0.88 U	0.9 U	0.9 U	2.5 U	2.5 U	2.5 U	2.5 U
Cobalt	UG/L			0.89 U	1.1 U	1.1 U	1.1 U	0.17 J	0.19 J	0.31 J	0.31 J
Copper	UG/L	GA	200	1.3 U	1.5 J	1.3 U	1.3 U	1.1 U	1.1 U	3.7 J	2.1 J
Iron	UG/L	GA	300	91.7	76	19 UJ	34 J	83 J	110	44 J	160
Iron+Manganese	UG/L	GA	500	128	85	24.3	61.4 J	118 J	145	82 J	219
Lead	UG/L	MCL	15	2.9 U	2.9 U	2.9 U	2.9 U	0.2 U	0.5 U	0.2 U	0.5 U
Magnesium	UG/L			15,800 J	15,600	27,100	27,300	17,000	18,000 J	9,900	11,000
Manganese	UG/L	GA	300	36.5	8.9	24.3	27.4	35	35	38	59
Mercury	UG/L	GA	0.7	0.12 U	0.12 U	0.1 U	0.1 U	0.091 U	0.091 U	0.12 J	0.091 U
Nickel	UG/L	GA	100	1.2 U	1.2 J	1.7 J	1.8 J	2 U	2 U	2 U	2 U
Potassium	UG/L			972 R	824 J	1,920	1,960	1,600	1,600	460 J	460 J
Selenium	UG/L	GA	10	6.1 U	6.1 U	6.1 U	6.1 U	1 U	1.1 U	1 U	1.1 U
Silver	UG/L	GA	50	1 U	1.3 U	1.3 U	1.3 U	0.25 U	0.18 U	0.25 U	0.18 U
Sodium	UG/L	GA	20,000	7,950 R	7,360	364,000 J	366,000 J	8,200	8,300	9,400	9,100
Thallium	UG/L	MCL	2	0.03 U	0.09 U	0.08 J	0.08 J	0.5 U	0.25 U	0.5 U	0.25 U
Vanadium	UG/L			0.78 U	0.98 U	1 U	1 U	3.8 U	3.2 U	3.8 U	3.2 U
Zinc	UG/L			4.7 J	41.6	3.6 U	3.6 U	20	8.4 U	8.3 U	8.4 U
Turbidity (post)	NTU							0	0	2.01	2.01
Turbidity (pre)	NTU			2.4	0.8		0.04		0		1.87

Notes:

1. The lowest value for either the New York Class GA Groundwater Standards (TOGS 1.1.1, June 1998, et al.) or the EPA Maximum Contaminant Limit (MCL), source http://www.epa.gov/safewater/mcl.html#inorganic.html is used. A blank cell indicates no criteria value available.
2. Data validation qualifier.
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   UJ = detection limit is estimated.
3. Shading indicates a concentration above the identified criteria value.

APPENDIX E

LABORATORY REPORTS

Laboratory Reports have been provided on the CD version of this report.

APPENDIX F

DATA VALIDATION

PROJECT NAME/NO. USACE - Seneca Army Depot SEAD-16/17 LTM Round 5
LAB: TestAmerica
SDG: 680-85871-1 (aka J85871)
FRACTION: Metals (SW846 6020)
MEDIA: Groundwater
NUMBER OF SAMPLES: 12 Unfiltered and 12 Filtered

CRITERIA	Did Analyses Meet all criteria as specified in the SOPS?	Region 2 Acceptable limits / criteria	Comments/Qualifying Actions	Qualifiers Added?
Data Completeness, Holding Times & Preservation	Yes	Cooler temp < 10 C. Holding Time Hg < 28 days, all other metals < 180 days from collection.	Coolers were received at 2.4°C by the laboratory. All samples were received in good condition based on the laboratory login report. Samples were properly preserved and had pH < 2. Samples were analyzed within 10 days from collection.	No
Calibration	Yes	r^2 ≥ 0.995 CCV every 10 samps or 2 hours ICV/CCV %R btw 90-110%	Calibrations available, taken every ten samples, and within recovery limits (90-110%). Initial Calibration Verification for Total metals was conducted on 12/24/12 at 19:54. The ICV and subsequent CCVs for metals were all within accetance criteria. ICV for Total Be and Na was conducted on 12/24/12 at 19:54. The ICV and subsequent CCVs for metals were all within accetance criteria. ICV for Dissolved metals was conducted on 12/21/12 at 17:00. The ICV and subsequent CCVs for metals were all within accetance criteria. ICV for Dissolved metals (Sb, As, Ba, Cd, Ca, Co, Cu, Pb, and Mg) was conducted on 12/27/12 at 18:47. The ICV and subsequent CCVs for metals were all within accetance criteria.	No
Blanks (prep blank, ICB, CCB)	No	Method blanks: 1 per 20 project samples.	ICB analyzed on 12/24/12 at 20:02 for metals and all metals were non-detected. CCBs were analyzed from 12/24/12 at 20:24 to 12/25/12 at 14:58 for Total metals every ten samples; all CCBs were non-detect for Total metals except for Na (34.6 J ug/L at 11:00). No action was taken since no samples were analyzed before or after the 11:00 CCB. CCBs were analyzed from 12/24/12 at 20:02 to 12/26/12 at 15:51 for Total Be and Na every ten samples; all CCBs were non-detect for Be and Na. CCBs were analyzed from 12/21/12 at 17:06 to 12/22/12 at 01:27 for Dissolved metals every ten samples; all CCBs were non-detect for Dissolved metals. CCBs were analyzed from 12/27/12 at 18:54 to 12/27/12 at 21:52 for Dissolved metals (Sb, As, Ba, Cd, Ca, Co, Cu, Pb, and Mg) every ten samples; all CCBs were non-detect for Dissolved metals except for Cd (0.0222 J ug/L) and Mn (0.208 J ug/L) at 12/27/12 19:17. Project samples were not associated with this CCB. Three Preparation blank were analyzed for Dissolved metals and all results were non-detect. Two Preparation blank were analyzed for Total metals and all results were non-detect except for Cu (2.06 ug/L). Qualify project samples Total Cu detects < RL but > MDL as U and change to the RL for the following samples: 16LM20028U (5 U), 16LM20031U (5 U), 16LM20032U (5 U), 17LM20022U (5 U), 17LM20023U (5 U), and 17LM20024U (5 U).	Yes
CRDL Standard	No	CRDL results btw 70-130%	CRDL analyses for all remaining metals conducted at the beginning and end of the analysis. All met requirements except Total Ni (150%), Dissolved Be (53%), and Dissolved Cd (72%). However, all three were within the lab limits. Qualify Dissolved Be and Cd results < 2xRL as J; and qualify Total Ni detects < 2xRL as J.	Yes
Laboratory Control Sample	Yes	LCS/LCSD: 1 per 20 project samples or each preparation batch. LCS limits within 80-120%.	Two aqueous LCS results were within the limits for Total metals . Three aqueous LCS results were within the limits for Dissolved metals.	No
Duplicates	No	RPD < 20% or Absolute Diff < 2 RL when samp/dup value < 5x RL	Two field duplicate pairs were collected for this SDG; a unfiltered and filtered sample. Unfiltered sample 16LM20033U and its duplicate 16LM20034U, and filtered sample 16LM20033F and its duplicate 16LM20034F. All RPDs were within acceptance limits except for Dissolved Pb (56%) and Total Cu (39%). Qualify both samples Dissolved Pb and Total Cu results > CRDL as J. A lab duplicate was not analyzed for this SDG. Qualify all sample results as J since a lab duplicate was not performed.	Yes

PROJECT NAME/NO. USACE - Seneca Army Depot SEAD-16/17 LTM Round 5
LAB: TestAmerica
SDG: 680-85871-1 (aka J85871)
FRACTION: Metals (SW846 6020)
MEDIA: Groundwater
NUMBER OF SAMPLES: 12 Unfiltered and 12 Filtered

CRITERIA	Did Analyses Meet all criteria as specified in the SOPS?	Region 2 Acceptable limits / criteria	Comments/Qualifying Actions	Qualifiers Added?
Matrix Spike/Matrix Spike Duplicates	Yes	MS/MSD: 1 per 20 project samples or each preparation batch. Recoveries within lab limits. MS/MSD %RPDs <= 20%. Spike Recovery limits 75-	Two spike samples were associated with this SDG; samples 16LM20033U and 16LM20033F. All spike metal recoveries were within the limits and did not have a initial conc >4x spike conc. The post digestion spike was performed on 16LM20033U and 16LM20033F. Calcium recoveries were above the limits due to parent sample conc being >4x spike.	No
ICP Interference Check Sample (ICS)	Yes	ICS results within 80-120%.	All concentrations detected in all samples within the ICP Linear Range. No action was taken.	No
ICP Tune Analysis	Yes	RSD < 5%	Tune Analysis was conducted on 12/21/12, 12/24/12, and 12/27/12. All isotopes of each analyte had a RSD < 5%.	No
Internal Standard	No	Intensity within 60-125%	IS from 12/21/12 to 12/22/12 had %RI within acceptance limits. IS from 12/24/12 to 12/25/12 had %RI within acceptance limits except for 16LM20028U for Li-6 (59%) and 16LM20032U for Li-6 (58%). Qualifiy samples 16LM20028U and 16LM20032U results as J for metals with atomic masses between Li-6 and Sc-45 (Al, Be, Ca, Mg, Na, K). IS from 12/24/12 to 12/27/12 had %RI within acceptance limits. IS from 12/27/12 to 12/27/12 had %RI within acceptance limits.	Yes
Serial Dilution	Yes	Performed on samples of a similar matrix or 1 per 20 samples. %D ≤ 10% conc ≥ 25xDL (7470A/7471A) and 10x IDL (6010B) for 5-fold dilution.	Sample 16LM20033U serial dilution for all metal with %D < 10% and sample conc > 50xMDL met requirements. Sample 16LM20033F serial dilution for all metal with %D < 10% and sample conc > 50xMDL met requirements.	No
Total/Dissolved Comparison	No	%RPD less than 20%	Samples with Total and Dissolved results that have detected Dissolved concentrations greater than the Total and have a Dissolved concentration > 5xMDL. All sample results met this requiment except for in samples: 16LM20028U/16LM20028F for Cu (45%), and 17LM20024U/17LM20024F for Cu (55%). Qualify these samples results as J.	Yes
Field Duplicate Precision	No	%RPD less than 20%	Two field duplicate pairs were collected for this SDG; a unfiltered and filtered sample. Unfiltered sample 16LM20033U and its duplicate 16LM20034U, and filtered sample 16LM20033F and its duplicate 16LM20034F. All RPDs were within acceptance limits except for Dissolved Pb (56%) and Total Cu (39%). Qualify both samples Dissolved Pb and Total Cu results > CRDL as J.	Yes

RT = Retention Time; %D = Percent Deviation; %RPD = Relative Percent Difference; %RSD = Percent Relative Standard Deviation; RRF = Relative Response Factor; CCV = Continuing Calibration Ve
TCL = Target Compound List; MS = Matrix Spike; MSD = Matrix Spike Duplicate;

PROJECT NAME/NO. USACE - Seneca Army Depot SEAD-16/17 LTM Round 5
LAB: TestAmerica
SDG: 680-85871-1 (aka J85871)
FRACTION: Metals (SW846 7470A)
MEDIA: Groundwater
NUMBER OF SAMPLES: 12 Unfiltered and 12 Filtered

CRITERIA	Did Analyses Meet all criteria as specified in the SOPS?	Region 2 Acceptable limits / criteria	Comments/Qualifying Actions	Qualifiers Added?
Data Completeness, Holding Times & Preservation	Yes	Cooler temp < 10 C. Holding Time Hg < 28 days, all other metals < 180 days from collection.	Coolers were received at 2.4°C by the laboratory. All samples were received in good condition based on the laboratory login report. Samples were properly preserved and had pH < 2. Samples were analyzed within 15 days from collection.	No
Calibration	Yes	r^2 ≥ 0.995 CCV every 10 samps or 2 hours ICV/CCV %R btw 90-110%	Calibrations available, taken every ten samples, and within recovery limits (80-120%). Initial Calibration Verification (ICV) for Dissolved Hg associated was conducted on 12/24/12 at 10:18. The ICV and subsequent CCVs for Dissolved Hg were all within accetance criteria. ICV for Hg associated was conducted on 12/30/12 at 13:42. The ICV and subsequent CCVs for Hg were all within accetance criteria.	No
Blanks (prep blank, ICB, CCB)	Yes	Method blanks: 1 per 20 project samples.	ICB analyzed on 12/24/12 at 10:20 for Hg Method 7470. CCBs were analyzed from 12/24/12 at 16:11 to 12/24/12 at 17:07 for Dissolved Hg every ten samples; all CCBs were non-detec for Dissolved Hg (MDL = 0.1 and RL = 0.2 ug/L). CCBs were analyzed from 12/30/12 at 13:45 to 12/30/12 at 15:19 for Hg every ten samples; all CCBs were non-detect for Hg (MDL = 0.1 and RL = 0.2 ug/L). One Preparation blank analyzed for Total Hg, it was non-detect. One Preparation blank analyzed for Dissolved Hg, it was non-detect.	No
CRDL Standard	Yes	CRDL results btw 70-130%	CRDL analyses for Hg conducted at the beginning and end of the analysis. All met requirements.	No
Laboratory Control Sample	Yes	LCS/LCSD: 1 per 20 project samples or each preparation batch. LCS limits within 80-120%.	One aqueous LCS results were within the limits for Total Hg. Two aqueous LCS results were within the limits for Dissolved Hg.	No
Duplicates	No	RPD < 20% or Absolute Diff < 2 RL when samp/dup value < 5x RL	Two field duplicate pairs were collected for this SDG; a unfiltered and filtered sample. Unfiltered sample 16LM20033U and its duplicate 16LM20034U, and filtered sample 16LM20033F and its duplicate 16LM20034F. All results were non-detect. A lab duplicate was not analyzed for this SDG. Qualify all sample results as J since a lab duplicate was not performed.	Yes
Matrix Spike/Matrix Spike Duplicates	Yes	MS/MSD: 1 per 20 project samples or each preparation batch. Recoveries within lab limits. MS/MSD %RPDs <= 20%. Spike Recovery limits	Two spike samples were associated with this SDG; samples 16LM20033U and 16LM20033F. All spike metal recoveries were within the limits and did not have a initial conc >4x spike conc.	No
ICP Interference Check Sample (ICS)	Yes	ICS results within 80-120%.	ICP Interference Check was performed and all recoveries were within acceptance limits.	No
Serial Dilution	NA	Performed on samples of a similar matrix or 1 per 20 samples. %D ≤ 10% conc ≥ 25xDL (7470A/7471A) and 10x IDL (6010B) for 5-fold dilution.	A serial dilution was not performed on this analysis.	NA
Total/Dissolved Comparison	Yes	%RPD less than 20%	Samples with Total and Dissolved results that have detected Dissolved concentrations greater than the Total and have a Dissolved concentration > 5xMDL. All sample results met this requiment.	No

PROJECT NAME/NO. USACE - Seneca Army Depot SEAD-16/17 LTM Round 5
LAB: TestAmerica
SDG: 680-85871-1 (aka J85871)
FRACTION: Metals (SW846 7470A)
MEDIA: Groundwater
NUMBER OF SAMPLES: 12 Unfiltered and 12 Filtered

CRITERIA	Did Analyses Meet all criteria as specified in the SOPS?	Region 2 Acceptable limits / criteria	Comments/Qualifying Actions	Qualifiers Added?
Field Duplicate Precision	Yes	%RPD less than 20%	Two field duplicate pairs were collected for this SDG; a unfiltered and filtered sample. Unfiltered sample 16LM20033U and its duplicate 16LM20034U, and filtered sample 16LM20033F and its duplicate 16LM20034F. Both sample duplicate pairs Hg results were non-detect; therefore no action was taken.	No

RT = Retention Time; %D = Percent Deviation; %RPD = Relative Percent Difference; %RSD = Percent Relative Standard Deviation; RRF = Relative Response Factor; CCV = Continuing Calibratic
TCL = Target Compound List; MS = Matrix Spike; MSD = Matrix Spike Duplicate;

Table A
Comparison of Filtered and Unfiltered Groundwater at SEAD-16

Area		SEAD-16	SEAD-16		SEAD-16	SEAD-16		SEAD-16	SEAD-16		SEAD-16	SEAD-16	
Loc ID		MW16-1	MW16-1		MW16-2	MW16-2		MW16-4	MW16-4		MW16-5	MW16-5	
Matrix		GW	GW		GW	GW		GW	GW		GW	GW	
Sample ID		16LM20028U	16LM20028F		16LM20029U	16LM20029F		16LM20030U	16LM20030F		16LM20031U	16LM20031F	
Sample Date		12/15/2012	12/15/2012		12/15/2012	12/15/2012		12/15/2012	12/15/2012		12/15/2012	12/15/2012	
QC Type		SA	SA		SA	SA		SA	SA		SA	SA	
Study ID		LTM	LTM		LTM	LTM		LTM	LTM		LTM	LTM	
Sample Round		5	5		5	5		5	5		5	5	
Filtered Status:		Total	Dissolved		Total	Dissolved		Total	Dissolved		Total	Dissolved	
Parameter	**Units**	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD
Aluminum	UG/L	50 U	23 U		50 U	23 U		50 U	23 U		50 U	23 U	
Antimony	UG/L	2 U	2.3 U		7.1	7.8	9%	3.9 J	4 J	3%	2 U	2.3 U	
Arsenic	UG/L	1.3 U	1.3 U		1.3 U	1.3 U		1.3 J	1.5 J	14%	2.7	2.6	
Barium	UG/L	78	78		62	65	5%	230	240	4%	39	34	
Beryllium	UG/L	0.15 U	0.25 U		0.15 U	0.25 U		0.15 U	0.25 U		0.15 U	0.25 U	
Cadmium	UG/L	0.13 U	0.095 U		0.13 U	0.095 U		0.23 J	0.095 U		0.13 U	0.095 U	
Calcium	UG/L	120,000	120,000		100,000	110,000	10%	220,000	230,000	4%	96,000	97,000	1%
Chromium	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	
Cobalt	UG/L	0.16 J	0.15 U		0.12 U	0.15 U		1.9	1.9		0.23 J	0.22 J	
Copper	UG/L	3.3 J	5.2	45%	5	4.5 J	11%	11	4.1 J		3 J	1.1 J	
Iron	UG/L	44 U	33 U		44 U	33 U		140	130		1,300	1,100	
Iron+Manganese	UG/L	46 U	34 U		46 U	34 U		280	270		1,430	1,230	
Lead	UG/L	0.5 U	0.2 U		0.66 J	0.24 J		3.4	0.2 U		0.5 U	0.2 U	
Magnesium	UG/L	18,000	18,000		11,000	13,000	17%	32,000	34,000	6%	9,800	9,900	1%
Manganese	UG/L	2 U	1 U		2 U	1 U		140	140		130	130	
Mercury	UG/L	0.091 U	0.091 U		0.091 U	0.091 U		0.091 U	0.091 U		0.091 U	0.1 J	
Nickel	UG/L	2 U	2.3 J	14%	2 U	2.2 J	10%	3.2 J	2.6 J		2 U	2.1 J	5%
Potassium	UG/L	870 J	900		1,900	2,200	15%	3,100	3,200	3%	2,100	2,100	
Selenium	UG/L	1.1 U	1 U		1.1 U	1 U		1.1 U	1 U		1.1 U	1 U	
Silver	UG/L	0.18 U	0.25 U		0.18 U	0.25 U		0.18 U	0.25 U		0.18 U	0.25 U	
Sodium	UG/L	62,000	63,000	2%	17,000	20,000	16%	310,000	340,000	9%	1,500	1,600	6%
Thallium	UG/L	0.25 U	0.5 U		0.25 U	0.5 U		0.25 U	0.5 U		0.25 U	0.5 U	
Vanadium	UG/L	3.2 U	3.8 U		3.2 U	3.8 U		3.2 U	3.8 U		3.2 U	3.8 U	
Zinc	UG/L	8.4 U	8.3 U		8.8 J	9.5 J	8%	11 J	12 J	9%	8.4 U	8.3 U	
Turbidity (pre)	NTU	0.87	0.87		3.01	3.01		1.01	1.01		1.39	1.39	
Turbidity (post)	NTU	1.04			1.2			0.48			0.94		

U = compound was not detected
J = the reported value is
an estimated cocentration

Table A
Comparison of Filtered and Unfiltered Groundwater at SEAD-16

Area		SEAD-16	SEAD-16		SEAD-16	SEAD-16		SEAD-16	SEAD-16	
Loc ID		MW16-6	MW16-6		MW16-7	MW16-7		MW16-7	MW16-7	
Matrix		GW	GW		GW	GW		GW	GW	
Sample ID		16LM20032U	16LM20032F		16LM20033U	16LM20033F		16LM20034U	16LM20034F	
Sample Date		12/15/2012	12/15/2012		12/15/2012	12/15/2012		12/15/2012	12/15/2012	
QC Type		SA	SA		SA	SA		DU	DU	
Study ID		LTM	LTM		LTM	LTM		LTM	LTM	
Sample Round		5	5		5	5		5	5	
Filtered Status:		Total	Dissolved		Total	Dissolved		Total	Dissolved	
Parameter	**Units**	Value Qual	Value Qual	**RPD**	Value Qual	Value Qual	**RPD**	Value Qual	Value Qual	**RPD**
Aluminum	UG/L	300	23 U		50 U	23 U		50 U	23 U	
Antimony	UG/L	2 U	2.3 U		13	13		14	13	
Arsenic	UG/L	1.3 J	1.3 U		1.3 U	1.3 J		1.3 U	1.3 U	
Barium	UG/L	45	41		100	100		100	99	1%
Beryllium	UG/L	0.15 U	0.25 U		0.15 U	0.25 U		0.15 U	0.25 U	
Cadmium	UG/L	0.13 U	0.095 U		0.13 U	0.095 U		0.13 U	0.095 U	
Calcium	UG/L	74,000	70,000		100,000 J	110,000 J	10%	110,000	100,000	
Chromium	UG/L	2.5 U	2.5 U		2.5 U	2.5 U		2.5 U	2.5 U	
Cobalt	UG/L	0.43 J	0.18 J		0.22 J	0.23 J	4%	0.24 J	0.24 J	
Copper	UG/L	4.1 J	4.5 J	9%	8.3	4.1 J		5.6	1.7 J	
Iron	UG/L	790	33 J		44 U	33 U		44 U	33 U	
Iron+Manganese	UG/L	816	43 J		90	92	2%	91	98	7%
Lead	UG/L	0.5 U	0.2 U		2.5	1.3 J		2.6	2.3	
Magnesium	UG/L	7,600	7,200		21,000 J	21,000		22,000	20,000	
Manganese	UG/L	26	10		90	92	2%	91	98	7%
Mercury	UG/L	0.091 U	0.091 U		0.091 U	0.091 UJ		0.091 U	0.091 U	
Nickel	UG/L	2 J	2 U		2.2 J	2 U		2.4 J	2 U	
Potassium	UG/L	2,400	2,400		5,200	5,300	2%	5,400	5,100	
Selenium	UG/L	1.1 U	1 U		1.1 U	1 U		1.1 U	1 U	
Silver	UG/L	0.18 U	0.25 U		0.18 U	0.25 U		0.18 U	0.25 U	
Sodium	UG/L	8,000	8,700	8%	32,000	35,000	9%	32,000	33,000	3%
Thallium	UG/L	0.25 U	0.5 U		0.25 U	0.5 U		0.25 U	0.5 U	
Vanadium	UG/L	3.2 U	3.8 U		3.2 U	3.8 U		3.2 U	3.8 U	
Zinc	UG/L	8.4 U	8.3 U		8.4 U	8.3 U		8.4 U	8.3 U	
Turbidity (pre)	NTU	3.58	3.58		1.29	1.29		1.29	1.29	
Turbidity (post)	NTU	1.67			1.14			1.14		

U = compound was not detected
J = the reported value is
an estimated cocentration

Table B
Comparison of Filtered and Unfiltered Groundwater at SEAD-17

Area		SEAD-17	SEAD-17		SEAD-17	SEAD-17		SEAD-17	SEAD-17		SEAD-17	SEAD-17		SEAD-17	SEAD-17	
Loc 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		17LM20020U	17LM20020F		17LM20021U	17LM20021F		17LM20022U	17LM20022F		17LM20023U	17LM20023F		17LM20024U	17LM20024F	
Sample Date		12/11/2012	12/11/2012		12/11/2012	12/11/2012		12/11/2012	12/11/2012		12/11/2012	12/11/2012		12/11/2012	12/11/2012	
QC Type		SA	SA		SA	SA		SA	SA		SA	SA		SA	SA	
Study ID		LTM	LTM		LTM	LTM		LTM	LTM		LTM	LTM		LTM	LTM	
Sample Round		5	5		5	5		5	5		5	5		5	5	
Filtered Status:		Total	Dissolved		Total	Dissolved		Total	Dissolved		Total	Dissolved		Total	Dissolved	
Parameter	**Units**	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD	Value Qual	Value Qual	RPD
Antimony	UG/L	2.7 J	2.3 U		4.4 J	4 J		2 U	2.3 U		2 U	2.3 U		2 U	2.3 U	
Arsenic	UG/L	1.3 U	1.3 U		1.3 U	1.3 U		1.3 U	1.3 U		1.3 U	1.3 U		1.3 U	1.3 U	
Barium	UG/L	28	28		68	69	1%	36	37	3%	67	65		26	24	
Beryllium	UG/L	0.15 U	0.25 U		0.15 U	0.25 U		0.15 U	0.25 U		0.15 U	0.25 U		0.15 U	0.25 U	
Cadmium	UG/L	0.44 J	0.095 U		0.13 U	0.095 U		0.13 U	0.095 U		0.13 U	0.095 U		0.13 U	0.095 U	
Calcium	UG/L	55,000	53,000		120,000	120,000		67,000	74,000	10%	87,000	83,000		75,000	68,000	
Chromium	UG/L	2.5 U	2.5 U		2.5 U	2.5 U		2.5 U	2.5 U		2.5 U	2.5 U		2.5 U	2.5 U	
Cobalt	UG/L	0.37 J	0.32 J		0.42 J	0.39 J		0.12 U	0.15 U		0.25 J	0.21 J		0.31 J	0.31 J	
Copper	UG/L	5.4	4.7 J		7.8	7.7		3.2 J	3.3 J	3%	4.7 J	1.1 J		2.1 J	3.7 J	55%
Iron	UG/L	90 J	47 J		44 U	33 U		44 U	33 U		72 J	33 U		160	44 J	
Iron/Manganese	UG/L	98.1 J	54.2 J		14	12		46 U	34 U		83	9.5		219	82 J	
Lead	UG/L	1.1 J	0.2 U		0.99 J	0.2 U		0.78 J	0.24 J		0.5 U	0.2 U		0.5 U	0.2 U	
Magnesium	UG/L	7,700	7,200		12,000	12,000		5,800	6,100	5%	15,000	15,000		11,000	9,900	
Manganese	UG/L	8.1	7.2		14	12		2 U	1 U		11	9.5		59	38	
Mercury	UG/L	0.091 U	0.14 J		0.091 U	0.091 U		0.091 U	0.091 U		0.091 U	0.091 U		0.091 U	0.12 J	27%
Nickel	UG/L	2 U	2 U		2 U	2 U		2 U	2 U		2.1 J	2 U		2 U	2 U	
Potassium	UG/L	410 J	380 J		2,500	2,500		1,700	1,800	6%	780 J	750		460 J	460 J	
Selenium	UG/L	1.1 U	1 U		1.1 U	1 U		1.1 U	1 U		1.1 U	1 U		1.1 U	1 U	
Silver	UG/L	0.18 U	0.25 U		0.18 U	0.25 U		0.18 U	0.25 U		0.18 U	0.25 U		0.18 U	0.25 U	
Sodium	UG/L	2,500	2,400		8,400	8,400		3,100	3,300	6%	8,600	8,900	3%	9,100	9,400	3%
Thallium	UG/L	0.25 U	0.5 U		0.25 U	0.5 U		0.25 U	0.5 U		0.25 U	0.5 U		0.25 U	0.5 U	
Vanadium	UG/L	3.2 U	3.8 U		3.2 U	3.8 U		3.2 U	3.8 U		3.2 U	3.8 U		3.2 U	3.8 U	
Zinc	UG/L	8.4 U	8.3 U		26	24		26	29	11%	8.4 U	8.3 U		8.4 U	8.3 U	
Turbidity (pre)	NTU	3.28	3.28		2.16	2.16		2.02	2.02		1.85	1.85		2.01	2.01	
Turbidity (post)	NTU	3.6			2.17			1.9			1.6			1.87		

U compound was not detected
J the reported value is an estimated concentration