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December 9, 2004

Mr. Scott Bradley
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
Attn: CEHNC-FS-IS
4820 University Square
Huntsville, AL 35816-1822

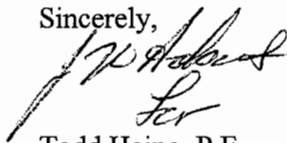
SUBJECT: Seneca Army Depot Activity – Final Record of Decision and Final, Revised Proposed Plan for No Further Action SWMUs (SEAD-50/54)

Dear Mr. Bradley:

Parsons Engineering Science, Inc. (Parsons) is pleased to submit the Final Record of Decision (ROD) and the Final, Revised Proposed Plan for No Further Action SWMUs (SEAD-50/54) at the Seneca Army Depot Activity located in Romulus, New York for your review. The work was performed in accordance with the Scope of Work (SOW) for Delivery Order 22 to the Parsons Contract DACA87-02-D-0005.

Parsons appreciates the opportunity to provide the Army with this document. Should you have any questions about the material presented and summarized in this document, please do not hesitate to call me at (617) 457-7905 to discuss them.

Sincerely,



Todd Heino, P.E.
Program Manager

Enclosures

cc: Mr. S. Absolom, SEDA
Mr. R. Battaglia, CENAN
Mr. K. Hoddinott, USACHPPM (PROV)
Mr. C. Boes, USAEC



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December 9, 2004

Mr. Julio Vazquez
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Mr. Joseph White
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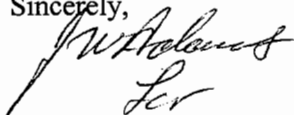
Subject: Seneca Army Depot Activity – Final Record of Decision and Final, Revised Proposed Plan for No Further Action SWMUs (SEAD-50/54); EPA Site ID: NY0213820830 - NY Site ID: 8-50-006; File No. 1022A/1023A

Dear Mr. Vazquez/Mr. White:

Parsons Engineering Science, Inc. (Parsons) is pleased to submit the Final Record of Decision (ROD) and the Final, Revised Proposed Plan for No Further Action SWMUs (SEAD-50/54) at the Seneca Army Depot Activity located in Romulus, New York for your review.

Should you have any questions, please do not hesitate to call me at (617) 457-7905 to discuss them.

Sincerely,



Todd Heino, P.E.
Program Manager

Enclosures

cc: S. Absolom, SEDA
R. Battaglia, USACE
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C. Bethoney, NYSDOH

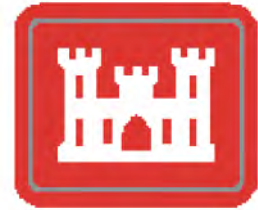
C. Boes, AEC
K. Hoddinott, USACHPPM
S. Bradley, USACE



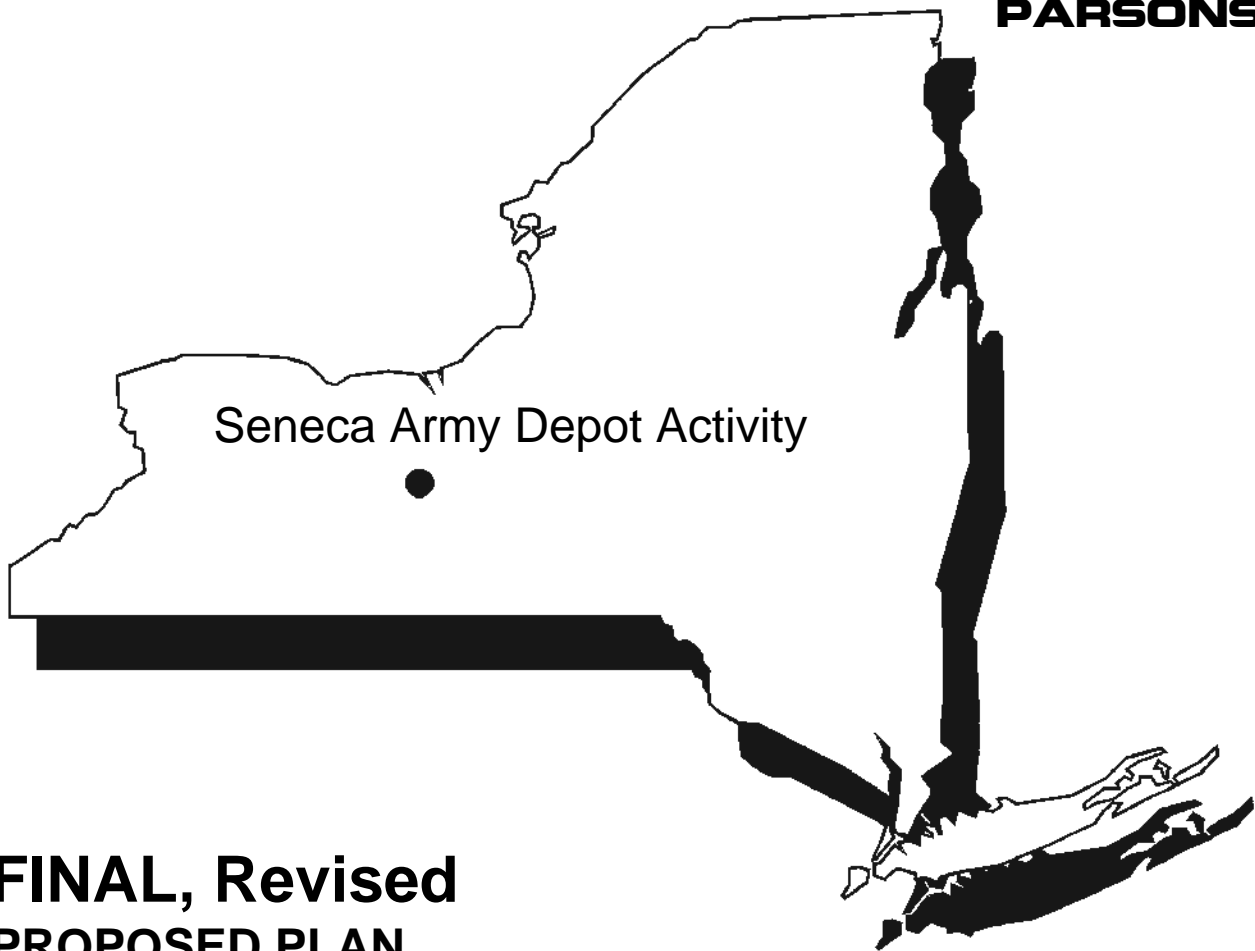


US Army, Engineering & Support Center
Huntsville, AL

Seneca Army Depot Activity
Romulus, NY



PARSONS



**FINAL, Revised
PROPOSED PLAN
NO FURTHER ACTION SWMUs (SEAD-50/54)
SENECA ARMY DEPOT ACTIVITY**

EPA Site ID# NY0213820830
NY Site ID# 8-50-006
CONTRACT NO. DACA87-02-D-0005
DELIVERY ORDER NO. 0022

December 2004

**FINAL, REVISED
PROPOSED PLAN
FOR
NO FURTHER ACTION FOR SWMUs SEAD-50/54
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK**

Prepared for:

**SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK**

and

**UNITED STATES ARMY CORPS OF ENGINEERS
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Prepared By:

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**CERCLIS Site ID No.: NY0213820830
NY State Site ID No.: 8-50-006
Contract Number: DACA87-02-D-0005
Delivery Order 0022 December 2004**

**FINAL, Revised Proposed Plan
No Further Action for SWMUs SEAD-50/54 at the
SENECA ARMY DEPOT ACTIVITY (SEDA)
Romulus, New York**

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Proposed Plan – Final, Revised



No Further Action for SWMUs SEAD-50/54 at the SENECA ARMY DEPOT ACTIVITY (SEDA) Romulus, New York



December 2004

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1 PURPOSE OF PROPOSED PLAN

This Proposed Plan presents and summarizes data and information that the United States Army (Army) has assembled in support of its assertion that two solid waste management units (SWMUs), designated as SEAD-50/54, within the Seneca Army Depot Activity (SEDA or the Depot) require No Further Action (NFA) because threats to human health or the environment resulting from petroleum products and hazardous materials do not exist. The Proposed Plan identifies the Army's and the U.S. Environmental Protection Agency's (EPA's) preferred and recommended remedial option (i.e., No Further Action) for SEAD-50/54, and provides the justification and rationale for its recommended alternative at the site. Representatives of the Army developed the Proposed Plan in cooperation with the EPA, Region II and the New York State Department of Environmental Conservation (NYSDEC).

The Army is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Contingency Plan (NCP). This Proposed Plan is being provided to inform the public of the Army's preferred and recommended

remedial alternative. The Army's preferred remedy for SEAD-50/54 is No Further Action. Information, provided herein, was presented to and discussed with representatives of EPA and NYSDEC and serves as the basis of the Army identifying SEAD-50/54 as No Further Action SWMUs. The Army recommended NFA as the preferred remedial alternative since interim measures performed by the Army resulted in the removal of soil that previously was shown to represent a potential threat to the environment and human health. Confirmation sampling and analysis results indicate that soil cleanup goals have been met, and these results have been reviewed and approved by the EPA and NYSDEC.

This Proposed Plan identifies the preferred remedy and discusses the reasons for this preference. The Army will select a final remedy for the site only after careful consideration of all comments received during the public comment period, and subsequent to final consultation with the EPA and NYSDEC.

2 COMMUNITY ROLE IN THE SELECTION PROCESS

The Army, the EPA, and the NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for

each Superfund site. A public comment period for SEAD-50/54 took place from December 15, 2003 through January 13, 2004. A public meeting was held at the Seneca County Office Building (Waterloo, NY) on December 16, 2003 at 7 p.m. At the public meeting, the results of the investigations and the remedial action (RA) at the sites were presented along with a summary of the preferred remedy. A question-and-answer period was held, during which the public could ask questions or submit written comments on the Proposed Plan.

Information and data summarized within this Proposed Plan for SEAD-50/54 is presented and described in greater detail within the "Final Completion Report for SEAD-50/54" (Weston Solutions, Inc., 2003); and the "Final Action Memorandum and Decision Document, Time-Critical Removal Actions, Four Metal Sites - SEADs 24, 50/54, & 67" Report (Parsons, 2002). To better understand the sites and the investigations and studies that have been conducted at the sites, the public was encouraged to review the project documents at the Seneca Army Depot Activity during the public comment period. The building location to view the documents was given during the public meeting. Written comments could be submitted to the SEDA Base Realignment and Closure (BRAC) Environmental Coordinator (address given during public meeting) at any time during the public comment period.

No formal public comments were received from the community during the comment period or during the public meeting, thus none were incorporated into the Proposed Plan or the final Record of Decision (ROD). Comments on the Draft and Draft Final ROD were provided to the Army by NYSDEC and EPA and changes required to address these comments have been incorporated in this final document.

3 SITE BACKGROUND

The SEDA previously occupied approximately 10,600 acres of land that is located near the Village of

Romulus in Seneca County, New York. The former military facility was owned by the U.S. Government and operated by the Army between 1941 and approximately 2000, when the SEDA military mission ceased.

The SEDA is located in an uplands area, which forms a divide separating two of the New York Finger Lakes, Cayuga Lake on the east and Seneca Lake on the west. The elevation of the facility is approximately 600 feet above Mean Sea Level (MSL).

On July 14, 1989, the EPA proposed SEDA for inclusion on the National Priorities List (NPL). Supporting its recommendation for listing, the EPA stated "the Army identified a number of potentially contaminated areas, including an unlined 13-acre landfill in the west-central portion of the depot, where solid waste and incinerator ash were disposed of intermittently for 30 years during 1941-79; two incinerator pits adjacent to the landfill, where refuse was burned at least once a week during 1941-74; a 90-acre open burning/detonation area in the northwest portion of the depot, where explosives and related wastes have been burned and detonated during the past 30 years; and the APE-1236 Deactivation Furnace in the east-central portion of the depot, where small arms are destroyed." The EPA recommendation was approved and finalized on August 30, 1990, when SEDA was listed in Group 14 of the Federal Facilities portion of the NPL.

Once the Seneca Army Depot Activity was listed on the NPL, the Army, USEPA, and NYSDEC identified 57 solid waste management units (SWMUs) where historic data or information suggested, or evidence existed to support, that hazardous materials or hazardous wastes had been handled and may have possibly been released and migrated into the environment. Each of these sites was identified in the "Federal Facilities Agreement" (i.e., FFA, USEPA, NYSDEC, Army, 1993) signed by the three parties in 1993. This list was subsequently expanded to include 72 sites when the Army

completed the "SWMU Classification Report, *Final*" (Parsons, 1994), which was required under the terms of the FFA. The SEDA was a generator and Treatment, Storage and Disposal Facility (TSDF) and thus subject to regulation under the Resource Conservation and Recovery Act (RCRA). Under this permit system, corrective action is required at all SWMUs.

Remedial goals are the same for CERCLA and RCRA; thus when the 72 SWMUs were classified in the "SWMU Classification Report, *Final*" (Parsons, 1994), the Army recommended that they be listed either as No Action sites or Areas of Concern (AOCs). SWMUs listed as AOCs in the "SWMU Classification Report, *Final*" (Parsons, 1994) were then scheduled for further investigations based upon data and potential risks to the environment.

In 1995, the SEDA was designated for closure under the Department of Defense's (DoD's) BRAC process. With SEDA's inclusion on the BRAC list, the Army's emphasis expanded from expediting necessary investigations and remedial actions at prioritized sites to include the release of non-affected portions of the Depot to the surrounding community for their reuse for non-military purposes (i.e., industrial, municipal, and residential).

Since the inclusion of the SEDA in the BRAC program, approximately 8,000 acres have been released to the community. An additional 250 acres of land have undergone a federal-to-federal transfer for use by the U.S. Coast Guard.

4 SITE DESCRIPTION

SEAD-50/54 encompasses land where the Depot's historic Tank Farm was located. The Tank Farm (SEAD-50) was located in the southeastern portion of the SEDA in an area where the designated future land use is designated as Warehousing. The Tank Farm was sited in a triangular-shaped tract of land encompassing approximately 22 acres, immediately west of East Patrol Road between Building 350 and

Buildings 356 and 357 (**Figure 1**). At one time, approximately 160 aboveground storage tanks (silos) were located at the Tank Farm site, but all tanks have since been removed from the site. According to SEDA personnel, the tanks were always used to store dry materials such as antimony, rutile ore, and other ores and minerals, which were part of the country's strategic material stockpiles.

SEAD-54, which was assigned to historic Tank #88, is listed as a separate SWMU under the Depot's prior submissions because it previously contained asbestos material.

The topography of SEAD-50/54 is relatively flat, with a total relief of 2 to 3 feet. There is an east-west running access road that bisects the site and connects Avenue H with the East Patrol Road. Drainage ditches run along both sides of the access road, and water captured in these ditches flows east towards intersecting ditches bordering the East Patrol Road. North of the access road, SEAD-50/54 is generally overgrown with vegetation, exclusive of spots where the circular footprints of former tanks are located. The circular footprints of the former tanks are generally clear of vegetation and covered with gravel. The former asbestos storage tank (Tank #88) was located immediately north of the access road on the east side of the Tank Farm and the Depot's property line, designated as SEAD-54. The area south of the access road is flat and grassy. A ferro-chromate ore pile is located in the southern area of the historic Tank Farm at the border of the grassy area. There are no mapped wetlands located within the bounds of the former Tank Farm.

5 SITE INVESTIGATIONS AND STUDIES

5.1 1993 Expanded Site Investigation

An Expanded Site Investigation (ESI) was performed in the area of the Tank Farm in 1993 to determine whether a release of hazardous constituents had occurred (Parsons, 1995). The ESI included a geophysical survey, the drilling and installation of

three groundwater monitoring wells, and collection of soil, sediment, surface water and groundwater samples for subsequent chemical analyses. The geophysical survey conducted included a seismic refraction survey that was initially used to estimate the direction of groundwater flow, which was determined to flow approximately west to east.

Fifteen surface soil samples, three groundwater samples, three surface water samples, and three sediment samples were collected from the area of the Tank Farm. All samples were submitted to the laboratory for chemical analysis. Collected samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals and cyanide according to the NYSDEC Contract Laboratory Program Statement of Work. In addition, all of the surface soil samples were analyzed for bulk asbestos by polarized light microscopy.

Fifteen surface soil samples were collected at random locations within the Tank Farm to assess potential releases from the tanks. Seven samples were collected from the 0-2 inch depth horizon, while the remaining eight samples were collected from the 0-12 inch depth horizon.

Three groundwater monitoring wells were installed in the till/weathered shale aquifer that exists in the area of the Tank Farm. One monitoring well was installed upgradient (west) of SEAD-50/54 and was used to obtain background water quality data, while the other two wells were installed downgradient (east) of the Tank Farm, between East Patrol Road and the Depot's perimeter fence, to determine if hazardous constituents from the site were impacting the groundwater. Three samples, one sample from each well, were collected and submitted to the laboratory for chemical analysis.

Three surface water and three collocated sediment (shallow soil) samples were collected from drainage

culverts that run adjacent to roadway surfaces in the vicinity of the Tank Farm. One surface water and shallow soil sample pair was collected from a drainage ditch that runs parallel to the unnamed road that bisects the Tank Farm, while the remaining two surface water and shallow soil/sediment sample pairs were collected from a downgradient drainage ditch that runs between the East Patrol Road and Route 96. The drainage ditches that surround SEAD-50/54 are temporal, typically holding water only as a result of a storm or snowmelt event. As such, the "sediment" lining the base of the drainage ditches is considered to be, and was evaluated as, soil by the Army.

5.1.1 ESI Results Summary

A summary of the ESI results is presented below. For complete results, refer to the "Expanded Site Inspection, 8 Moderately Low Priority AOCs, SWMUs 5, 9, 123 (A and B), (43, 56, and 69), 44 (A and B), 50, 58 and 59, *Draft Final*" (Parsons, December 1995) or the "Final Action Memorandum and Decision Document (AM/DD), Time-Critical Removal Action, Four Metal Sites (SEADs 24, 50/54, & 67" Report (Parsons, 2002), which are available in the Administrative Record.

Soil

Soil sampling results are presented in **Tables 1 and 2**. Of 56 TCL/TAL analytes detected in one or more of the soil samples collected, one was a VOC, 20 were SVOCs, 13 were pesticides or PCBs, and the remaining 22 were metals. Asbestos was detected in one of the 15 soil samples, at location SS50-1, which is located in excavation Area 5.

Eight metals (antimony, arsenic, chromium, copper, lead, magnesium, mercury, and zinc) were found in soil samples at concentrations that exceeded their respective NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 recommended clean-up objective levels. Although lead was found at concentrations that exceeded

NYSDEC's recommended level (24.8 mg/Kg based on site background) in 13 of the 15 surface soil samples characterized, it was not found at a concentration that exceeds the EPA's recommended soil cleanup level for residential properties (400 mg/Kg).

The maximum concentrations measured within SEAD-50/54 for chromium, lead, mercury, and zinc were found at sample location SS50-5, Area 1. Arsenic concentrations exceeded its TAGM value in three of the 15 surface soil samples collected; the maximum concentration detected was 151 mg/Kg at location SS50-6, in excavation Area 1. Other concentrations measured for metals that exceeded TAGMs were generally evenly distributed amongst the soil sampling locations, and, typically, measured concentrations did not significantly exceed their respective cleanup levels.

Results for asbestos in soil are provided in **Table 2** at the end of this document. The surface soil sample collected from Area 5 contained 10 to 15 percent chrysotile asbestos. Area 5 is approximately 400 ft. south-east of Tank #88, which once stored dry asbestos (amosite). However, asbestos was not found in any of the other surface soil samples collected from the area of SEAD-50/54 or in subsequent confirmatory soil samples from Area 5 or SEAD-50/54.

Concentrations measured for seven SVOCs (including six PAHs and phenol) exceeded their respective NYSDEC cleanup objective levels in soils. A majority of the PAH concentrations found above cleanup levels were found in the three samples collected from locations SS50-11 (Area 4), SS50-14 (Area 2), and SS50-15 (Area 3). Each of these sampling locations is in the northern part of the historic Tank Farm, north of the unnamed road that bisects the area.

Groundwater

Generally, available chemical analysis data indicate

that groundwater at SEAD-50/54 has not been significantly impacted by the historic storage activities that were performed in this area. A summary of the groundwater sampling program is presented in **Table 3** at the end of this document. One SVOC and 18 metals were detected in one or more of the three groundwater samples collected. Concentrations measured for five of the metals (aluminum, iron, manganese, sodium and thallium) exceeded their respective GA groundwater criteria levels. In three out of five cases (not including sodium and thallium), the highest concentration measured for these metals were found in the upgradient well. Additionally, none of these five metals were found at concentrations exceeding NYSDEC recommended cleanup level objectives for soil at the Tank Farm. Thus, it is presumed that the presence of these metals in the groundwater results from other sources or activities unrelated to the historic Tank Farm operations.

Surface Water

Chemical analysis results indicate that surface water at the site has not been significantly impacted by the historic storage activities that were conducted at SEAD-50/54. A summary of the ESI surface water sampling program is presented in **Table 4** at the end of this document. Fifteen metals were detected in the surface water samples collected, and two of these metals (aluminum and iron) were found at a concentration that exceeded their NYS Class C surface water criteria at a single location, SW50-1.

Sediment

The available chemical analysis data suggest that several targeted chemicals have impacted the surface soil in drainage ditches at SEAD-50/54. A summary of the results from samples collected in drainage ditches that abut the Tank Farm are presented in **Table 5**. Forty-four TCL/TAL analytes, including one VOC, 17 SVOCs, six pesticides and PCBs, and 20 metals were detected in samples collected. Of the compounds detected, 11 were

detected at concentrations that exceeded their respective TAGM cleanup objective values. The 11 compounds found to exceed their respective TAGMs included 6 SVOCs and 5 metals.

The five metals (arsenic, lead, manganese, potassium and zinc) were detected at sampling location, SW50-1/SD50-1, closest to the former location of Tank #88 (SEAD-54). Arsenic, lead, manganese, and zinc were found due north of Tank #88 in the ditch adjacent to East Patrol Road. However, sample location SW50-3/SD50-3, which is at the furthest downstream location and within the same ditch network as SW50-1/SD50-1, showed metal concentrations well below the TAGM levels. SVOCs were found at concentrations exceeding their respective TAGM values in ditch soils located at SW50-1/SD50-1 (Area 6) and SW50-2/SD50-2 (Area 7).

5.2 2003 Time Critical Removal Action

The results of the ESI suggested that metal contaminants (namely arsenic, mercury, and zinc) were present at levels that potentially represented a threat to the environment and surrounding populations. Additionally, localized areas of elevated PAH concentrations were also identified in several of the areas where the primary metal contaminants were found. In order to alleviate or eliminate the potential threat posed by these chemicals, the Army recommended that a Time-Critical Removal Action (TCRA) be implemented. Details of the Army's proposed removal were presented in the "Final Action Memorandum and Decision Document, Time-Critical Removal Actions, Four Metal Sites (SEADs 24, 50/54, & 67)" (Parsons, 2002).

The TCRA was performed from late November 2002 through late February 2003, and consisted of the excavation of soil from seven areas where high metal concentrations (specifically arsenic, mercury, and zinc) had previously been found. The seven excavation areas within SEAD 50/54 are shown in **Figure 2**. Final decisions pertinent to the completion

of the excavation at each site were to be based on the results of confirmational sampling and analyses that were performed at each of the targeted areas.

Prior to the excavation of any soil from Area 5, asbestos and pre-characterization bulk soil samples were collected and analyzed at each planned grid cell location within the excavation area to verify if any asbestos containing material (ACM) was present. This work was included within the overall scope of the TCRA in response to the prior finding of ACM at sample location SS50-1 during the ESI. However, the results of sampling and analyses completed during the TCRA by Weston Solutions did not show that ACM was present at the site. Nonetheless, Weston Solutions prepared ACM notifications and submitted forms to the State of New York and to the EPA on November 13, 2002 to perform a removal action in the area of SS50-1. The New York Department of Labor Asbestos Control Bureau approved the ACM work in a letter dated November 26, 2002. A term of the approval letter was that work was not to begin earlier than November 27, 2002.

Soil excavation was performed at grid cell (quadrant) FX-015 within Area 5, which is the area within which the ESI sample (i.e., SS50-1) found to contain asbestos was located, on December 4, 2002. The asbestos removal effort was conducted in compliance with: EPA 340/1-90/019 Asbestos/National Emission Standards for Hazardous Air Pollutants (NESHAP) Adequately Wet Guidelines (December 1990); EPA 340/1-90-018 Asbestos/NESHAP Regulated ACM Guidance (1990); State of New York Department of Labor Industrial Code Rule No. 56; title 9 Code of Federal Regulations (CFR) 1910.1001 General Industry; Title 29 CFR 1926.1101 Asbestos Standard for the Construction Industry; title 29 CFR 1910.134 Respiratory Protection and, US Army Corps of Engineers (USACE) Safety and Health Requirements Manual, EM 385-1-1. During this portion of the excavation work, real-time air monitoring was performed for asbestos and the work was completed by personnel suited in Level C PPE. Soil excavated

from this grid cell [approximately 17 cubic yards (cy)] was live-loaded into double-lined dump trucks and was transported off-site for disposal as ACM at Seneca Meadows Landfill. Post-excavation confirmatory sampling was conducted by Sci Labs, Inc. using polarized light microscopy (PLM) and indicated negative results for ACM at a depth of 6 inches; therefore, additional soil removal for ACM was not required.

At the other areas, excavations were advanced to a depth of six inches below grade using an excavator with a 4-ft. wide grading bucket. Under this approach, approximately 5150 cy of soil were excavated from the sites. Once all excavations reached the planned depth (e.g., 6 inches) confirmational sampling was performed. Under the proposed TCRA excavation plan, digging at an excavation area could be halted if all confirmational sample results showed that target analyte (i.e., arsenic, mercury, and zinc) concentrations were less than or equal to cleanup objectives (TAGMs); alternatively, digging continued within specific grid blocks if confirmational sampling results indicated target analyte levels above the cleanup goals. If the results of a floor confirmational sample failed to meet the cleanup criteria, then the excavation continued to a greater depth, typically in 6 to 12 inch steps, while the bounds of the grid were extended outwardly if a perimeter sample did not achieve the cleanup criteria. Based on this process, the majority of the grid cells or quadrants advanced at SEADs-50/54 were excavated to a final depth of 6 inches; 5 grid cells were excavated to a final depth of 9 inches; 46 quadrants were excavated to a final depth of 12 inches; 1 grid cell was excavated to a final depth of 15 inches; 20 grid cells were excavated to a depth of 18 inches; and 7 quadrants were excavated to a final depth of 2 feet or greater below grade before reaching satisfactory confirmatory soil sample results (2 quadrants in Area 1; 1 quadrant in Area 3; 1 quadrant in Area 4; and 3 quadrants in Area 6). The deepest excavation performed in any of the areas was located at quadrant FX-023 in Area 4 where the final excavation extended 6 feet below

grade. Excavations extending below 6 inches resulted in the excavation of an additional 1,880 cy of soil being removed (total excavated 7,030 cy).

Confirmatory soil samples were collected from the bottom and either the perimeter or sidewall of the each grid cell or quadrant within the overall area of excavation. Initially, most excavation areas were subdivided into 30 foot by 30 foot grids, and confirmatory samples from the excavation floor or bottom were collected as five-point composites from each 900 square foot area (or fraction thereof). At Area 7 (drainage ditch), each grid cell was approximately 10 feet wide by 90 feet long. Each part of the five-point floor composite sample was collected from a depth of 2 to 6 inches below the base of the excavation.

Perimeter samples were collected beyond the bounds of each excavation advanced to a depth of either 6 or 12 inches. Perimeter confirmational samples were collected as discrete grab samples at bound locations of each grid (one per every 30 feet or less). Each perimeter sample was collected at a point 1 foot beyond the bounds of the excavation. At excavations advanced to depths of greater than 12 inches, sidewall samples were collected at grid marker positions at locations roughly halfway down the face of the excavation wall.

Based on the preliminary plan for the TCRA, the Army anticipated that a total of 423 (262 floor and 161 perimeter/sidewall) samples would be collected and analyzed as part of the TCRA. However, due to the need to expand the vertical and horizontal extent of several of the excavations, a final total of 607 confirmational samples (402 floor and 205 perimeter/sidewall) were collected and submitted for analysis. The distribution of confirmatory samples (floor and perimeter) over the surface area for each of the 7 areas were: Area 1 [110,260 square feet (ft²), 229 floor, 57 perimeter]; Area 2 (10,670 ft², 16 floor, 18 perimeter); Area 3 (10,220 ft², 16 floor, 16 perimeter); Area 4 (54,200 ft², 89 floor, 46 perimeter); Area 5 (23,250 ft², 26 floor, 23 perimeter); Area 6

(3,510 ft², 16 floor, 43 perimeter); and, Area 7 (9,150 ft², 10 floor, 2 perimeter).

The majority (approximately 80 percent) of all confirmatory samples collected were analyzed for the three target analytes, arsenic, mercury, and zinc using EPA Method SW-846/6010B. The remainder of the confirmatory samples (approximately 20 percent) were analyzed for 26 TAL metals via the same method. Additionally, approximately 20 percent of the collected soil samples were also analyzed to quantify 17 TCL PAHs concentrations.

A summary of the final confirmational soil sample results is presented in **Table 6** for metals and the 17 PAH compounds characterized during the TCRA. Generally these data indicate that the TCRA was effective in alleviating the potential threat posed by these contaminants at the site as a result of the action. The TCRA data indicate that the majority of the remaining PAHs concentrations present at the site are reduced to levels below TAGM cleanup objectives. Exceptions to this general rule are noted for dibenz(a,h)anthracene, benzo(a)anthracene, and benzo(a)pyrene, which still exhibit sporadic detections that exceed NYSDEC's TAGM cleanup objectives. However, even for these three PAHs, the maximum concentrations found are reduced by a factor of 10 to 20 from what was observed in the data collected during the ESI. The maximum concentrations detected in confirmatory sampling for these three compounds, respectively, were 35, 290, and 320 µg/Kg (versus 840, 5200, and 3700 µg/Kg in the ESI). Total concentration measured for total carcinogenic PAHs is considerably lower than the 10 mg/Kg (i.e., ppm) total threshold recommended for soil at SEAD-26.

Confirmational data also indicated that that the overall concentrations of metals found at SEAD-50/54 were decreased on a site-wide basis. A summary of the site-wide and individual excavation area averages are presented in **Table 7**. Based on the analysis of site-wide averages, only the average concentration measured for thallium (i.e., 2.82

mg/Kg) was found to exceed its TAGM cleanup objective level. The average concentrations for all other metals detected in confirmational samples were less than the TAGM cleanup objectives. However, the confirmational data did indicate that isolated spots continued to exist where concentrations of metals, including the three primary metals drivers (arsenic, mercury, and zinc) were present at levels exceeding the TAGM cleanup goals.

5.3 Statistical analysis

Based on the overall TCRA results for metals (i.e., generally the site-wide averages showed that the site's cleanup objective had been achieved), the Army requested a determination from the EPA and the NYSDEC regarding whether its effort under the TCRA was complete. In response to this request, a statistical analysis was performed on the confirmatory samples by the EPA National Exposure Research Laboratory (NERL) on the results obtained during the TCRA compared to the results of the SEDA-wide background soil dataset. NERL's stated objective of the analysis was to determine if contaminant concentrations found at SEAD-50/54 after the removal action were comparable to Depot background concentrations. The NERL used 2 statistical tests (95% Upper Confidence Limits (UTLs) and the 2 sample non-parametric Mann-Whitney test) to test the comparability of the SEAD-50/54 data with the Depot background dataset and concluded that "contaminant concentrations for arsenic, mercury, and zinc at the SEAD-50/54 Site (after final excavation) are not consistent with the background level contaminant concentrations."

At the subsequent request of the Army, Parsons conducted a review of the NERL's statistical analysis procedures and conclusions, and prepared a memo to SEDA, dated January 21, 2004, concluding that NERL's analysis was flawed, and, as a result, their conclusions were in error. In support of its findings, Parsons highlighted the Army's stated goal for the time-critical removal action at SEAD-50/54 which was presented in the "Action Memorandum and

Decision Document, Time-Critical Removal Actions, Four Metals Sites (SEADs 24, 50/54, & 67), *Final*' (Parsons, August 2002) and was:

"The objectives of a removal action are to comply with ARARs and reduce the overall threat to human health and the environment to an acceptable level at the site. Therefore, to reduce the threat that appears to exist near the Tank Farm, the Army is proposing to conduct an action that focuses on the removal of soil that has been impacted by asbestos, arsenic, mercury, and polynuclear aromatic hydrocarbons at elevated concentrations. Specifically, the Army is proposing to address shallow soil contamination (i.e., soil in top 6 inches) that has been identified at five locations within the Tank Farm, as well as within two lengths of the drainage ditches that surround the Tank Farm."

Parsons argued that the work completed at SEAD-50/54 achieved these results. Specifically, with respect to the identified asbestos issue, the Army developed data as part of the removal action that indicated that the suspected localized detection of the Asbestos identified at SEAD-50/54 during earlier work was no longer present based on additional sampling and analysis completed as part of the overall time-critical removal action. These data were reported in the Completion Report that was submitted by Weston Solutions, Inc. in December 2003.

Furthermore, Parsons indicated that the potential threat resulting from potential exposure to arsenic and mercury at the Site had been greatly reduced. Initial concentration measured for arsenic in the shallow soils at the Site ranged upwards to 151 mg/Kg whereas the highest concentrations detected in the soil after the removal action was performed was 41.9 mg/Kg. Similarly, 20 percent of the samples collected and analyzed during the ESI exceeded the Depot-specific soil cleanup objective and the maximum concentration determined for arsenic (i.e., 21.5 mg/Kg) in background samples before the work was performed whereas after the removal of soil, fewer than 10 percent of all samples

characterized for arsenic (425 total) contained concentrations that exceeded the Depot-specific cleanup objective and only 2 of 425 sample results exhibited concentrations above the maximum concentration found for arsenic in the background data set. Finally, after the removal action, the Site-wide average concentration of arsenic determined from the analysis of all 425 samples was 6.2 mg/Kg which compared very favorably with the Depot-wide background average concentration for arsenic of 5.2 mg/Kg, and is greatly reduced from the prior average Site concentration determined during the ESI which was 20.9 mg/Kg.

Similar reductions were observed for mercury, where only two out of 419 total samples had concentrations that exceeded the State's recommended soil clean up level of 0.1 mg/Kg or the Depot-wide maximum mercury concentration of 0.13 mg/Kg. The overall site average concentration determined for mercury after the removal action is 0.047 mg/Kg, which again compared favorably to the Depot-wide background average of 0.038 mg/Kg.

With reference to the PAH compounds identified, the sampling results provided in the Completion Report indicate that there was a large reduction (at least a factor of 10 fold) for each of the maximum concentrations of carcinogenic PAHs previously detected at the site, and that the total concentration measured for total carcinogenic PAHs was considerably lower than the 10 mg/Kg (i.e., ppm) total threshold recommended for soil at SEAD-26.

Finally, Parsons highlighted certain additional points about the statistical evaluation that was performed by NERL personnel. NERL indicated that it had conducted the analysis in accordance with procedures described in two guidance documents, identified as EPA (1989) which is entitled "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities Interim Final Guidance" (EPA/530-SW-89-026) and the Addendum to Interim Final Guidance (EPA, 1992). Within the analysis report, EPA NERL stated:

"It is observed that arsenic dataset consists of an outlier, 21.5 ppm. The 95% UTL and the 95% UPL for arsenic have been computed with and without the outlier."

And additionally:

"For example, for arsenic, the 95% UTL=8.0 ppm (instead of the maximum value= 21.5 ppm which may represent an outlier) can be used as the background threshold value. An exceedance of 8.0 ppm by a site arsenic concentration from an area of concern may be considered as an indication of contamination possibly requiring further remediation action. It is noted that there are several site observations from the final excavation (from the final 6" lift) which exceed the 95% UTLs as listed in Table 1 suggesting that possible contamination due to site activities may still exist at the SEAD50/54 Site."

Thus, NERL said that they had removed one piece of data from the background data set to further substantiate their claim that the Depot-wide background and the Site-specific confirmational analyses were different. Parsons countered this analysis methodology and indicated that EPA's own guidance, as stated in the 1992 reference, specifically warned against the removal of statistical outliers until a specific reason for the outlier could be determined. Parsons indicated that this had not been done, so the indicated data value, in accordance with EPA guidance, should be treated as a true, but extreme, value and a member of the Depot-wide data set.

Parsons also indicated that NERL had not indicated within its statistical analysis that even if all of the noted arsenic exceedances of recommended soil cleanup levels were removed from the Site-specific data set and replaced with values equivalent to either the Site-wide average value or a value that is just below the recommended soil cleanup level, the comparison of the data sets would still indicate that

the Site-wide data set was not consistent with the Depot-wide background data set. Thus, in either situation, Site-wide data that was fully compliant with the stated soil cleanup level objective defined for the Site would still be statistically different from the background data set. Given this information, Parsons questioned whether any Site-wide data set from SEAD-50/54 could ever be judged statistically comparable to the Depot-wide data set.

Parsons concluded that the TCRA completed at SEAD-50/54 achieved the results set out and no further action was warranted for SEAD-50/54. The EPA and NYSDEC accepted the review of the statistical analysis performed, and concluded that the stated goals of the TCRA had been met (NYSDEC, 2003; EPA, 2004).

6 REGULATORY STATUS

The Army recommends that these two SWMUs be designated a "No Further Action" site under CERCLA.

7 SUMMARY OF THE REMEDIAL GOALS AND PROPOSED ACTION

The selected remedy for any site should, at a minimum, eliminate or mitigate all significant threats to the public health or the environment presented by the hazardous waste present at the site. The Army believes that information and data developed for SEAD-50/54 discussed in this Proposed Plan indicate that existing conditions found at the site satisfy this objective.

Based on the findings of the investigations and activities completed for the sites, the Army has selected No Further Action as the remedy for two SWMUs, SEAD-50/54. These selections are based on the Army's determination that these sites do not pose a significant threat to human health or the environment.

It should be noted that land within the Planned Industrial/Office Development (PID) area and Warehousing area, which includes land occupied by SEAD-50/54, is the subject of a separate Proposed Plan and Final ROD ["Final ROD for Sites Requiring Institutional Controls in the Planned Industrial/Office Development or Warehousing Areas" (Parsons, 2004)] in which institutional controls (ICs), including an area-wide groundwater use and a residential activity use restriction, have been implemented.

8 REFERENCES

EPA, Army, and NYSDEC, 1993 - Federal Facility Agreement Under CERCLA Section 120, Docket Number: II-CERCLA-FFA-00202, January 1993.

EPA, 2004 - Email from Julio Vazquez, RPM to Steve Absolom, BRAC Environmental Coordinator at the SEDA, Re: RA Completion Report for SEAD-50/54, stating that the goals for the SEAD-50/54 have been met, February 2004.

EPA, 2002 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Integrated Manual, NTIS-PB2002105715, EPA SW-846, 2002.

EPA, 2001 - National Primary Drinking Water Standards, EPA 816-F-01-007, March 2001

EPA, 1999 - A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, EPA 540-R-98-031, OSWER 9200.1-23P, PB98-963241, July 1999.

NYSDEC, 2003 – Email from John Swartwout, Section Chief to EPA 2 Region Julio Vazquez, Re: DRAFT Completion Removal Report, stating that no additional investigation or excavation in SEAD-50/54 is necessary, October 2003.

NYSDEC, 2000 - Division of Water Technical and Operational Guidance Series 1.1.1 (TOGS 1.1.1), Ambient Water Quality Standards and Guidance

Values and Groundwater Effluent Limitations, June 1998 as amended January 1999 and April 2000.

NYSDEC, 1999 - Technical Guidance for Screening Contaminated Sediments, November 1993, as amended July 1994, March 1998, and January 1999.

NYSDEC, 1994 - Technical and Administrative Guidance Memorandum #4046, Determination of Soil Cleanup Objectives and Cleanup Levels, Jan 24, 1994.

Parsons, 2004 – Memorandum to Seneca Army Depot Activity "Seneca Army Depot Activity – Statistical Analysis of SEAD-50/54 TCRA Data and Proposed Plan", January 2004.

Parsons, 2002 – Action Memorandum and Decision Document, Time-Critical Removal Actions, Four Metal Sites (SEADs 24, 50/54, & 67), Seneca Army Depot Activity, Final, August 2002.

Parsons, 1995 - Expanded Site Inspection, Eight Moderately Low Priority AOCs, SEADs 5, 9, 12 (A and B), (43, 56, 69), 44 (A and B), 50, 58 and 59, Draft Final, December 1995

Title 40, Code of Federal Regulations, Part 261, Identification and Listing of Hazardous Waste.

Title 40 Code of Federal Regulations, Part 300, National Oil and Hazardous Substances Pollution Contingency Plan.

Title 42 US Code Chapter 103, Comprehensive Environmental Response, Compensation, and Liability, Section 9620.

USATHAMA, 1988 - Update of the Initial Installation Assessment of Seneca Army Depot, NY, prepared by Environmental Science and Engineering Inc. (ESE), Report No. AMXTH-IR-A-157(U), August 1988.

USATHAMA, 1980 - Installation Assessment of Seneca Army Depot, Report No. 157, Aberdeen Proving Grounds, MD, January 1980.

Weston Solutions, Inc., 2003 – Completion Removal Report of SEAD-50/54, Seneca Army Depot Activity, Final, 2003.

GLOSSARY

Aquifer

An aquifer is a saturated permeable geologic unit or rock formation that can store significant quantities of water and transmit the water under ordinary hydraulic gradients, possibly to wells.

Area of Concern (AOC)

Areas of Concern (AOCs) include both solid waste management units where releases of hazardous substances may have occurred and locations where there has been a release or threat of a release in the environment of a hazardous substance, pollutant or contaminant (including radionuclides) under CERCLA.

Army Corps of Engineer (USACE)

The engineering organization of the U.S. Army. The districts involved in the Seneca Army Depot Activity project include the New York District (CENAN), the New England District (CENED), and the Engineering and Support Center, Huntsville (CEHNC).

Asbestos Containing Material (ACM)

Asbestos-containing material (ACM), is defined by the Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP), as any material containing more than one percent (1%) asbestos

Baseline Risk Assessment (BRA)

A baseline risk assessment is an assessment conducted before cleanup activities begin at a site to identify and evaluate the threat to human health and the environment. After remediation has been completed, the information obtained during a baseline risk assessment can be used to determine whether the cleanup levels were reached.

Base Realignment and Closure (BRAC)

A congressionally mandated process that involves closure of military bases. The goal of BRAC is to transition the former bases from military uses to civilian reuse, with the intent of minimizing the negative effects of base closure by spurring

economic development and growth. The SEDA was listed as a base to be closed in October 1995. Base closure is in the process of being performed.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA:

Established prohibitions and requirements concerning closed and abandoned hazardous waste sites;

Provided for liability of persons responsible for releases of hazardous waste at these sites; and

Established a trust fund to provide for cleanup when no responsible party could be identified.

The law authorizes two kinds of response actions:

Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response.

Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on EPA's National Priorities List (NPL).

CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous

substances, pollutants, or contaminants. The NCP also established the NPL.

CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986

Cleanup

Cleanup is the term used for actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and or the environment. The term sometimes is used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Closure (Under RCRA)

RCRA closure is a process for preventing the release of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground water, surface water, or the atmosphere from a hazardous waste management facility after the facility stops receiving waste. The closure process may involve waste removal and management, decontamination and decommissioning of equipment, application of final covers, and other release-preventing actions. The process also involves developing a closure plan, having the plan approved as part of the facility's permit, and implementing the plan when the facility closes. Closure occurs after the facility accepts the final shipment of hazardous waste (unless the facility qualifies for a delay of closure). (Reference: <http://tis.eh.doe.gov/oepa/guidance/rcra/closur.pdf>)

Closure (Department of Defense)

Under the Department of Defense's definition, closure means that all missions of the base will cease or be relocated. All personnel (military, civilian, and contractor) will either be eliminated or relocated. The entire base will be excessed and the property disposed. (Reference: <http://www.hqda.army.mil/acsimweb/brac/braco.htm>)

Community Environmental Response Facilitation Act (CERFA – Public Law 102-426)

The Community Environmental Response Facilitation Act (CERFA) was passed by Congress in 1992, and amended Section 9620(h) of CERCLA, which addresses Federal real property transfers. In enacting the legislation Congress stated that the closure of Federal facilities has an adverse impact on local economies and that delays in remediating contaminated real property add to this burden by delaying the conversion of such property to productive uses. The statute applies to real property owned by the Department of Defense and on which the U.S. plans to terminate Federal government operations, as well as to real property that has been used as a military installation and which is being closed or realigned pursuant to base closure. Federal entities with control over such properties must identify those upon which no hazardous substances or petroleum products/derivatives were stored for more than one year, released, or disposed of by examining relevant sources of data such as property deeds, aerial photographs, or other similar documents. Subsequent transfers or sales of the identified properties by the limited states must contain assurances that the U.S. will assume full responsibility for any response or corrective action that may become necessary after the transfer of property is completed. Where hazardous substances or petroleum products/derivatives were stored for more than one year, released, or disposed of on the U.S.-owned real property, the Federal entity with control of the property must notify the state of any lease entered into by the controlling Federal entity that will remain in effect after operations cease. The notification must be sent to the state prior to the signing of the lease, and must inform the state of the name of the lessee, and a description of the uses permitted under the condition of the lease. (Reference: http://www.ntc.blm.gov/learningplace/res_CERFA.html)

Completion Report

A report that documents and certifies that conditions found at an Area of Concern (AOC) do not constitute a threat to public health, welfare or the environment and that further remedial measures are not necessary. Such documentation shall meet, to the extent practicable and as necessary under the specific facts pertaining to the AOC, the requirements of EPA's RCRA Facility Investigation Guidance, EPA's Guidance for Conducting RI/FSs under CERCLA, and any subsequent amendments to these documents and all other applicable federal or state guidance.

Contaminant

A contaminant is any physical, chemical, biological, or radiological substance or matter present in any media at concentrations that may result in adverse effects on air, water, or soil.

Deactivation Furnace

A Deactivation Furnace is an incineration system designed to demilitarize obsolete or unserviceable ammunition items, and to dispose of bulk propellant, explosives, or pyrotechnic wastes generated during the process of manufacture and assembly.

Detection Limit

The lowest concentration of a chemical that can be distinguished reliably from a zero concentration.

Disposal

Disposal is the final placement or destruction of toxic, radioactive or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials from removal actions or accidental release. Disposal may be accomplished through the use of approved secure landfills, surface impoundments, land farming, deep well injection, or ocean dumping.

Environmental Protection Agency (EPA)

The Federal regulatory agency responsible for enforcing the environmental rules and regulations of the United States. Representatives from the EPA

Region 2, which includes New York State, are involved in the review and oversight of the environmental work being conducted at the Seneca Army Depot Activity.

Expanded Site Investigation (ESI)

An expanded investigation that typically includes media sampling and analyses. An ESI is performed following a Preliminary Site Investigation to obtain more information regarding the concentrations of pollutants at a site.

Federal Facilities Agreement (FFA) also known as the Interagency Agreement (IAG)

An agreement signed between EPA, NYSDEC and the Army that describes the process for identifying, investigating and remediating sites at the Seneca Army Depot Activity.

GA Groundwater Standard

A water quality standard promulgated by the NYSDEC that establishes a minimum quality of a groundwater supply that could be used as a source of drinking water.

Groundwater

Groundwater is the water that flows beneath the earth's surface that fills pores between such materials as sand, soil, or gravel and that often supplies wells and springs. *See also Aquifer.*

Heavy Metal

The term heavy metal refers to a group of toxic metals including arsenic, chromium, copper, lead, mercury, silver, and zinc. Heavy metals often are present at industrial sites at which operations have included battery recycling and metal plating.

Hydrogeology

Hydrogeology is the study of groundwater, including its origin, occurrence, movement, and quality.

Incinerator

A furnace or container used for burning waste materials.

Inorganic Compounds

An inorganic compound is a compound that generally does not contain carbon atoms (although carbonate and bicarbonate compounds are notable exceptions). Examples of inorganic compounds include various metals.

Landfill

A sanitary landfill is a land disposal site for non-hazardous solid wastes at which the waste is spread in layers compacted to the smallest practical volume.

Lead

Lead is a heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations. *See also Heavy Metal.*

Mean Sea Level (MSL)

The average height of the sea surface, based upon hourly observation of the tide height on the open coast or in adjacent waters that have free access to the sea. In the United States, it is defined as the average height of the sea surface for all stages of the tide over a nineteen year period. Mean sea level, commonly abbreviated as MSL and referred to simply as 'sea level,' serves as the reference surface for all altitudes in upper atmospheric studies.

(Reference:

<http://earthobservatory.nasa.gov:81/Library/glossary.php3?xref=mean%20sea%20level>)

Mercury

Mercury is a heavy metal that can accumulate in the environment and is highly toxic if breathed or swallowed. Mercury is found in thermometers, measuring devices, pharmaceutical and agricultural chemicals, chemical manufacturing, and electrical equipment. *See also Heavy Metal.*

Maximum Contaminant Level (MCL)

Established under the Safe Drinking Water Act as concentrations of pollutants considered protective for

drinking water.

Monitoring Well

A monitoring well is a well drilled at a specific location on or off a hazardous waste site at which groundwater can be sampled at selected depths and studied to determine the direction of groundwater flow and the types and quantities of contaminants present in the groundwater.

National Contingency Plan (NCP)

The NCP, formally the National Oil and Hazardous Substances Contingency Plan, is the major regulatory framework that guides the Superfund response effort. The NCP is a comprehensive body of regulations that outlines a step-by-step process for implementing Superfund responses and defines the roles and responsibilities of EPA, other federal agencies, states, private parties, and the communities in response to situations in which hazardous substances are released into the environment. *See also Superfund.*

National Exposure Research Laboratory (NERL)

EPA's National Exposure Research Laboratory (NERL) is comprised of several divisions with diversified research specialties. NERL conducts research and development that leads to improved methods, measurements and models to assess and predict exposures of humans and ecosystems to harmful pollutants and other conditions in air, water, soil, and food.

National Priorities List (NPL)

The NPL is EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response under Superfund. Inclusion of a site on the list is based primarily on the score the site receives under the HRS. Money from Superfund can be used for cleanup only at sites that are on the NPL. EPA is required to update the NPL at least once a year. *See also Hazard Ranking System and Superfund.*

New York State Department of Environmental Conservation (NYSDEC)

NYSDEC's missions include detecting and controlling sources of pollution, protecting and managing New York's natural resources, informing and educating the public about environment, natural resources, and government's actions to protect them.

NFA

No Further Action.

NYCRR

The New York State compilation of Codes, Rules, and Regulations.

Organic Chemical or Compound

An organic chemical or compound is a substance produced by animals or plants that contains mainly carbon, hydrogen, and oxygen.

Percent Solids

A physical determination used to measure the amount of solid material (i.e., normally defined as non-volatile material at 105 °C) that is contained in a sample such as a soil or sediment.

Permeability

Permeability is a characteristic that represents a qualitative description of the relative ease with which rock, soil, or sediment will transmit a fluid (liquid or gas).

Pesticide

A pesticide is a substance or mixture of substances intended to prevent or mitigate infestation by, or destroy or repel, any pest. Pesticides can accumulate in the food chain and or contaminate the environment if misused.

Polychlorinated Biphenyl (PCB)

PCBs are a group of toxic, persistent chemicals, produced by chlorination of biphenyl, that once were used in high voltage electrical transformers because they conducted heat well while being fire resistant and good electrical insulators. These contaminants

typically are generated from metal degreasing, printed circuit board cleaning, gasoline, and wood preserving processes. Further sale or use of PCBs in the United States was banned in 1979.

Polycyclic Aromatic Hydrocarbon (PAH)

A PAH is a chemical compound that contains more than one fused benzene ring. They are commonly found in petroleum fuels, coal products, and tar.

Preliminary Assessment and Site Investigation (PA/SI)

A PA/SI is the process of collecting and reviewing available information about a known or suspected hazardous waste site or release. The PA/SI usually includes a visit to the site.

Proposed Plan

The Proposed Plan is the first step in the remedy selection process. The Proposed Plan provides information supporting the decisions of how the preferred alternative was selected. It summarizes the site information and how the alternatives comply with the requirements of the NCP and CERCLA. The Proposed Plan is provided to the public for comment. The responses to the Proposed Plan comments are provided in the ROD.

Record of Decision (ROD)

A ROD is a legal, technical, and public document that explains which cleanup alternative will be used at a Superfund NPL site. The ROD is based on information and technical analysis generated during the remedial investigation and feasibility study (RI/FS) and consideration of public comments and community concerns. *See also Preliminary Assessment and Site Investigation and Remedial Investigation and Feasibility Study.*

Release

A release is any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, leaching, dumping, or disposing into the environment of a hazardous or toxic chemical or extremely hazardous

substance, as defined under RCRA. See also *Resource Conservation and Recovery Act*.

Remedial Action (RA)

A RA is the actual construction or implementation of a remedy at a site or portion thereof.

Remedial Investigation and Feasibility Study (RI/FS)

The RI/FS is the step in the Superfund cleanup process that is conducted to gather sufficient information to support the selection of a site remedy that will reduce or eliminate the risks associated with contamination at the site. The RI involves site characterization through collection of data and information necessary to characterize the nature and extent of contamination at the site. The RI also determines whether the contamination presents a significant risk to human health or the environment. The FS focuses on the development of specific response alternatives for addressing contamination at a site.

Resource Conservation and Recovery Act (RCRA)

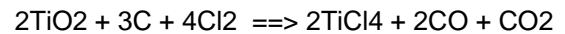
RCRA is a federal law enacted in 1976 that established a regulatory system to track hazardous substances from their generation to their disposal. The law requires the use of safe and secure procedures in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent the creation of new, uncontrolled hazardous waste sites.

Risk Assessment

The process of assessing and analyzing threats that contaminants found at a site pose to surrounding populations and the environment. The resulting analysis is used as a preliminary, conservative estimate of the potential level of threat that is posed so that appropriate and cost-effective countermeasures can be identified and implemented.

Rutile Ore

A black or reddish brown mineral in large thick crystals or a yellow mineral as inclusions or in thin crystals. Rutile is a major ore of titanium, a metal used for high tech alloys because of its light weight, high strength and resistance to corrosion. Titanium is isolated by heating a mixture of its rutile ore and charcoal with chlorine at 700 to 1000 degC:



The resulting titanium tetrachloride is then reduced with magnesium metal.

Sediment Criteria

Technical guidance provided by NYSDEC, the Division of Fish and Wildlife, that describes allowable sediment quality for a variety of chemicals. The values provided in this document have been adopted as screening levels for comparison to site data. Exceedances of these values provides that basis for further evaluation and decision making.

Seismic Refraction

Seismic refraction measures is the velocity that a compression wave travels through a material. The compression wave velocity is measured by placing sensitive motion detectors on the ground surface, then impacting the ground with an object such as a sledgehammer. An oscilloscope measures the travel time of the compression wave to each motion detector. Mathematical analysis of the travel times will produce a profile of changes in compression wave velocity, which can then determine the type of material below the ground.

Semivolatile Organic Compound (SVOC)

SVOCs, composed primarily of carbon and hydrogen atoms, have boiling points greater than 2000°C. Common SVOCs include PCBs and phenol. See also *Phenol and Polychlorinated Biphenyl*.

Seneca Army Depot Activity (SEDA)

A 10,634-acre military facility, constructed in 1941,

located in central New York responsible for storage and management of military commodities, including munitions. The depot ceased military operations in 2000. Environmental cleanup activities will continue until all sites have been addressed.

Seneca County Board of Supervisors

The board that oversees Seneca County's governmental affairs.

Significant Threat

The term refers to the level of contamination that a state would consider significant enough to warrant an action. The thresholds vary from state to state.

Soil Boring

Soil boring is a process by which a soil sample is extracted from the ground for chemical, biological, and analytical testing to determine the level of contamination present.

Solid Waste

Any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous materials resulting from industrial, commercial, mining, and agricultural activities and from community activities

Solid Waste Management Unit (SWMU)

A SWMU is a RCRA term used to describe a contiguous area of land on or in which where solid waste, including hazardous waste, was managed. This includes landfills, tanks, land treatment areas, spills and other areas where waste materials were handled. Identification of all SWMUs at SEDA was performed as part of the RCRA Part B Permit Application process.

Subsurface

Underground, or beneath the surface.

Surface Water

Surface water is all water naturally open to the

atmosphere, such as rivers, lakes, reservoirs, streams, and seas.

Superfund

Superfund is the trust fund that provides for the cleanup of hazardous substances released into the environment, regardless of fault. The Superfund was established under CERCLA and subsequent amendments to CERCLA. The term Superfund also is used to refer to cleanup programs designed and conducted under CERCLA and its subsequent amendments. See also *Comprehensive Environmental Response, Compensation, and Liability Act*.

Technical Administrative Guidance Memorandum (TAGM)

TAGMs are technical guidance publications provided by NYSDEC that describes various processes and procedures recommended by NYSDEC for the investigation and remediation of hazardous waste sites. One TAGM, No. 4046, provides guideline values for recommended soil cleanup levels at waste sites.

Time Critical Removal Action (TCRA)

A TCRA can be used to eliminate possible threats, and to expedite the closure process and lessen, and perhaps eliminate, any possible threats, current or future that these sites may pose to human health and the environment.

Total Petroleum Hydrocarbon (TPH)

TPH refers to a measure of concentration or mass of petroleum hydrocarbon constituents present in a given amount of air, soil, or water

Volatile Organic Compound (VOC)

A VOC is one of a group of carbon-containing compounds that evaporate readily at room temperature. Examples of VOCs include trichloroethane; trichloroethylene; and BTEX. These contaminants typically are generated from metal degreasing, printed circuit board cleaning, gasoline, and wood preserving processes.

Water Table

A water table is the boundary between the saturated and unsaturated zones beneath the surface of the earth, the level of groundwater, and generally is the level to which water will rise in a well.

**TABLE 1
SUMMARY OF SOIL ANALYSIS RESULTS - ESI**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

COMPOUND	UNITS	MAXIMUM DETECT	FREQUENCY OF DETECTION	CRITERIA VALUE (a)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF SAMPLES
Volatile Organics							
Acetone	ug/Kg	83	7%	200	0	1	15
Semivolatile Organics							
4-Methylpheno	ug/Kg	310	20%	900	0	3	15
Acenaphthene	ug/Kg	930	13%	50000 (*)	0	2	15
Anthracene	ug/Kg	1500	20%	50000 (*)	0	3	15
Benzo(a)anthracene	ug/Kg	5200	40%	220	3	6	15
Benzo(a)pyrene	ug/Kg	3700	40%	61	5	6	15
Benzo(b)fluoranthene	ug/Kg	4400	40%	1100	1	6	15
Benzo(g,h,i)perylene	ug/Kg	1800	27%	50000 (*)	0	4	15
Benzo(k)fluoranthene	ug/Kg	4000	40%	1100	1	6	15
bis(2-Ethylhexyl)phthalate	ug/Kg	1800	100%	50000 (*)	0	15	15
Carbazole	ug/Kg	1100	20%	50000 (*)	0	3	15
Chrysene	ug/Kg	5500	40%	400	3	6	15
Dibenz(a,h)anthracene	ug/Kg	840	20%	14	3	3	15
Dibenzofuran	ug/Kg	260	7%	6200	0	1	15
Di-n-butylphthalate	ug/Kg	56	80%	8100	0	12	15
Fluoranthene	ug/Kg	14000	80%	50000 (*)	0	12	15
Fluorene	ug/Kg	590	13%	50000 (*)	0	2	15
Indeno(1,2,3-cd)pyrene	ug/Kg	1800	33%	3200	0	5	15
Phenanthrene	ug/Kg	7800	67%	50000 (*)	0	10	15
Phenol	ug/Kg	31	7%	30	1	1	15
Pyrene	ug/Kg	12000	73%	50000 (*)	0	11	15
Pesticides/PCB							
4,4'-DDD	ug/Kg	2.2	7%	2900	0	1	15
4,4'-DDE	ug/Kg	4.8	27%	2100	0	4	15
4,4'-DDT	ug/Kg	4.1	27%	2100	0	4	15
Aldrin	ug/Kg	1.3	7%	41	0	1	15
alpha-Chlordane	ug/Kg	3.8	7%	540	0	1	15
Aroclor-1242	ug/Kg	75	20%	1000(b)	0	3	15
Aroclor-1254	ug/Kg	75	13%	1000(b)	0	2	15
Aroclor-1260	ug/Kg	25	7%	1000(b)	0	1	15
Dieldrin	ug/Kg	59	13%	440	0	2	15
Endosulfan I	ug/Kg	13	7%	900	0	1	15
Endrin	ug/Kg	2.8	7%	100	0	1	15
Heptachlor	ug/Kg	1.3	7%	100	0	1	15
Heptachlor epoxide	ug/Kg	2.4	13%	20	0	2	15
Metals							
Aluminum	mg/Kg	15300	100%	19300	0	15	15
Antimony	mg/Kg	7.1	93%	5.9	1	14	15
Arsenic	mg/Kg	151	100%	8.2	3	15	15
Barium	mg/Kg	115	100%	300	0	15	15
Beryllium	mg/Kg	0.71	100%	1.1	0	15	15
Cadmium	mg/Kg	0.8	87%	2.3	0	13	15
Calcium	mg/Kg	120000	100%	121000	0	15	15
Chromium	mg/Kg	60.7	100%	29.6	5	15	15
Cobalt	mg/Kg	12.6	100%	30	0	15	15
Copper	mg/Kg	35.2	100%	33	1	15	15
Iron	mg/Kg	30000	100%	36500	0	15	15
Lead	mg/Kg	398	100%	24.8	13	15	15
Magnesium	mg/Kg	48300	100%	21500	1	15	15
Manganese	mg/Kg	722	87%	1060	0	13	15
Mercury	mg/Kg	0.37	100%	0.1	2	15	15
Nickel	mg/Kg	42.6	100%	498	0	15	15
Potassium	mg/Kg	2170	100%	2380	0	15	15
Selenium	mg/Kg	1.1	93%	2	0	14	15
Silver	mg/Kg	0.34	13%	0.75	0	2	15
Sodium	mg/Kg	136	80%	172	0	12	15
Vanadium	mg/Kg	26.2	100%	150	0	15	15
Zinc	mg/Kg	152	100%	110	3	15	15
Other Analyses							
Total Solids	%W/W	88	100%		0	15	15

NOTES:

a) NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046

b) The TAGM value for PCBs is 1000 ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils

* = As per TAGM, total VOCs < 10 ppm; total Semi-VOCs < 500 ppm; individual semi-VOCs < 50 ppm.

**TABLE 2
SUMMARY SOIL SAMPLE ASBESTOS ANALYSIS RESULTS**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

ES Sample ID	Asbestos (% Type)	Other Material
SS50-1	10-15 % Chrysotile	Binder, Quartz, 3-5 % Organic Fiber
SS50-2	Not Detected	Binder, Quartz, 15-25 % Organic Fiber
SS50-3	Not Detected	Binder, Quartz, 10-15 % Organic Fiber
SS50-4	Not Detected	Binder, Quartz, 1-3 % Organic Fiber
SS50-5	Not Detected	Binder, Quartz, 15-25 % Organic Fiber
SS50-6	Not Detected	Binder, Quartz, 15-25 % Organic Fiber
SS50-7	Not Detected	Binder, Quartz, 15-25 % Organic Fiber
SS50-8	Not Detected	Binder, Quartz, 5-10 % Organic Fiber
SS50-9	Not Detected	Binder, Quartz, 35-45 % Organic Fiber
SS50-10	Not Detected	Binder, Quartz, 10-15 % Organic Fiber
SS50-11	Not Detected	Binder, Quartz, 10-15 % Organic Fiber
SS50-12	Not Detected	Binder, Quartz, 5-10 % Organic Fiber
SS50-13	Not Detected	Binder, Quartz, 10-15 % Organic Fiber
SS50-14	Not Detected	Binder, Quartz, 1-3 % Organic Fiber
SS50-15	Not Detected	Binder, Quartz, 5-10 % Organic Fiber
SS50-16	Not Detected	Binder, Quartz, 3-5 % Organic Fiber

Note:
Bulk Asbestos Analysis by polarized light microscopy

**TABLE 3
SUMMARY OF GROUNDWATER ANALYSIS RESULTS -ESI**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

PARAMETER	UNITS	MAXIMUM DETECT	FREQUENCY OF DETECTION	CRITERIA VALUE (a)	NUMBER ABOVE CRITERIA
SEMIVOLATILE ORGANICS					
Di-n-octylphthalate	ug/L	5	100%	50	0
METALS					
Aluminum	ug/L	1790	100%	50 (b)	2
Arsenic	ug/L	2.2	100%	5 (c)	0
Barium	ug/L	96.5	100%	1000	0
Calcium	ug/L	153000	100%	NA	NA
Chromium	ug/L	3	100%	50	0
Cobalt	ug/L	4.9	100%	NA	NA
Copper	ug/L	1.4	100%	200	0
Iron	ug/L	5070	100%	300	2
Magnesium	ug/L	40200	100%	NA	NA
Manganese	ug/L	1040	100%	50 (b)	3
Mercury	ug/L	0.05	100%	0.7	0
Nickel	ug/L	8	100%	100	0
Potassium	ug/L	10400	100%	NA	NA
Silver	ug/L	0.76	100%	50	0
Sodium	ug/L	91200	100%	20000	2
Thallium	ug/L	3	100%	2 (d)	1
Vanadium	ug/L	3	100%	NA	NA
Zinc	ug/L	20.2	100%	5000 (b)	0

NOTES:

- a) NY State Class GA Groundwater Standard (TOGS 1.1.1, June 1998), except as noted below.
- b) US EPA Secondary Drinking Water Regulation, non-enforceable (EPA 822-B-00-001, Summer 2000)
- c) US EPA Maximum Contaminant Limit announced 10/31/01. Source <http://www.epa.gov/safewater/arsenic.html>
- d) US EPA National Primary Drinking Water Standards, EPA 816-F-01-007 March 2001

Table obtained from Final Action Memorandum and Decision Document, Time-Critical Removal Actions, Four Metal Sites (SEADs 24, 50/54, & 67) (Parsons, 2002)

**TABLE 4
SUMMARY OF SURFACE WATER ANALYSIS RESULTS - ESI**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

PARAMETER	UNITS	MAXIMUM DETECT	FREQUENCY OF DETECTION	NYS CRITERIA VALUE (a,b)	NUMBER ABOVE CRITERIA
METALS					
Aluminum	ug/L	376	100%	100	1
Arsenic	ug/L	22.1	67%	150	0
Barium	ug/L	34.3	100%	NA	NA
Calcium	ug/L	85200	100%	NA	NA
Chromium	ug/L	1.3	67%	139.5	0
Copper	ug/L	2.1	100%	17.3	0
Iron	ug/L	575	100%	300	1
Lead	ug/L	0.89	33%	1.46	0
Magnesium	ug/L	13200	100%	NA	NA
Manganese	ug/L	67.9	100%	NA	NA
Nickel	ug/L	1.7	67%	99.9	0
Potassium	ug/L	3140	100%	NA	NA
Sodium	ug/L	11200	100%	NA	NA
Vanadium	ug/L	1.1	33%	14	0
Zinc	ug/L	10.5	100%	159.2	0

NOTES:

- a) The New York State Ambient Water Quality Standards and Guidance Values for Class C surface water (June 1998)
- b) Hardness dependent values assume a hardness of 216.4 mg/L (depot site-wide average)

Table obtained from Final Action Memorandum and Decision Document, Time-Critical Removal Actions, Four Metal Sites (SEADs 24, 50/54, & 67) (Parsons, 2002)

**TABLE 5
SUMMARY OF SEDIMENT ANALYSIS RESULTS - ESI**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

PARAMETER	UNITS	MAXIMUM DETECT	FREQUENCY OF DETECTION	CRITERIA VALUE (a)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES
Volatile Organic Compounds							
2-Butanone	ug/Kg	11	33%	2700	0	1	3
Semivolatile Organic Compounds							
4-Methylphenol	ug/Kg	110	67%	900	0	2	3
Acenaphthene	ug/Kg	160	33%	50000	0	1	3
Anthracene	ug/Kg	480	33%	50000	0	1	3
Benzo(a)anthracene	ug/Kg	1400	100%	224	1	3	3
Benzo(a)pyrene	ug/Kg	1200	100%	61	2	3	3
Benzo(b)fluoranthene	ug/Kg	1300	100%	1100	1	3	3
Benzo(g,h,i)perylene	ug/Kg	790	100%	50000	0	3	3
Benzo(k)fluoranthene	ug/Kg	1200	100%	1100	1	3	3
Carbazole	ug/Kg	250	33%		0	1	3
Chrysene	ug/Kg	1500	100%	400	1	3	3
Dibenz(a,h)anthracene	ug/Kg	260	33%	14	1	1	3
Dibenzofuran	ug/Kg	97	33%		0	1	3
Fluoranthene	ug/Kg	3500	100%	50000	0	3	3
Fluorene	ug/Kg	310	33%	50000	0	1	3
Indeno(1,2,3-cd)pyrene	ug/Kg	770	100%	3200	0	3	3
Phenanthrene	ug/Kg	2700	100%	50000	0	3	3
Pyrene	ug/Kg	4000	100%	50000	0	3	3
Pesticides and PCBs							
4,4'-DDE	ug/Kg	4.3	33%	2100	0	1	3
Aldrin	ug/Kg	2.2	33%	41	0	1	3
alpha-Chlordane	ug/Kg	8	33%	540	0	1	3
Aroclor-1242	ug/Kg	120	33%	1000	0	1	3
Aroclor-1260	ug/Kg	56	33%	1000	0	1	3
Endosulfan I	ug/Kg	15	67%	900	0	2	3
Metals							
Aluminum	mg/Kg	16300	100%	19300	0	3	3
Antimony	mg/Kg	3.3	100%	5.9	0	3	3
Arsenic	mg/Kg	62.7	100%	8.2	2	3	3
Barium	mg/Kg	117	100%	300	0	3	3
Beryllium	mg/Kg	0.75	100%	1.1	0	3	3
Cadmium	mg/Kg	0.8	100%	2.3	0	3	3
Calcium	mg/Kg	31400	100%	121000	0	3	3
Chromium	mg/Kg	25.1	100%	29.6	0	3	3
Cobalt	mg/Kg	9.3	100%	30	0	3	3
Copper	mg/Kg	25.5	100%	33	0	3	3
Iron	mg/Kg	26800	100%	36500	0	3	3
Lead	mg/Kg	49.6	100%	24.8	2	3	3
Magnesium	mg/Kg	6400	100%	21500	0	3	3
Manganese	mg/Kg	1380	100%	1060	1	3	3
Mercury	mg/Kg	0.02	33%	0.1	0	1	3
Nickel	mg/Kg	29.4	100%	49	0	3	3
Potassium	mg/Kg	2530	100%	2380	1	3	3
Sodium	mg/Kg	121	67%	172	0	2	3
Vanadium	mg/Kg	28.8	100%	150	0	3	3
Zinc	mg/Kg	243	100%	110	2	3	3
Other Analytes							
Total Solids	%W/W	78.7	1		0	3	3

NOTES:

a) NYSDEC Technical and Administrative Guidance Memorandum # 4046, January 1994

Table obtained from Final Action Memorandum and Decision Document, Time-Critical Removal Actions, Four Metal Sites (SEADs 24, 50/54, & 67) (Parsons, 2002)

**TABLE 6
SUMMARY OF TCRA SOIL ANALYSIS RESULTS**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

COMPOUND ¹	UNITS	MAXIMUM DETECT	FREQUENCY OF DETECTION	CRITERIA VALUE	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF SAMPLES
METALS							
Aluminum	ug/Kg	19200	99%	19300	0	94	95
Antimony	ug/Kg	162	20%	5.9	4	19	93
Arsenic	ug/Kg	41.9	100%	8.2	42	425	425
Barium ²	ug/Kg	337	100%	300	1	94	94
Beryllium	ug/Kg	1	95%	1.1	0	89	94
Cadmium	ug/Kg	1.1	18%	2.3	0	17	94
Calcium	ug/Kg	64300	100%	121000	0	94	94
Chromium	ug/Kg	41.2	100%	29.6	4	94	94
Cobalt ²	ug/Kg	25.4	100%	30	0	94	94
Copper	ug/Kg	40.4	100%	33	2	94	94
Iron	ug/Kg	34700	100%	36500	0	94	94
Lead ³	ug/Kg	117	100%	400	0	94	94
Magnesium	ug/Kg	21200	100%	21500	0	94	94
Manganese	ug/Kg	2510	100%	1060	10	94	94
Mercury ²	ug/Kg	0.56	71%	0.1	2	298	420
Nickel	ug/Kg	49.9	100%	49	1	94	94
Potassium	ug/Kg	3490	100%	2380	13	94	94
Selenium ²	ug/Kg	0	0%	2	0	0	94
Silver	ug/Kg	0.39	3%	0.75	0	3	91
Sodium	ug/Kg	235	100%	172	3	94	94
Thallium	ug/Kg	0	0%	0.7	0	0	94
Vanadium ²	ug/Kg	31.3	100%	150	0	94	94
Zinc	ug/Kg	1960	100%	110	43	418	418
SEMIVOLATILE ORGANIC COMPOUNDS							
2-Methylnaphthalene ²	ug/Kg	0	0%	36400	0	0	97
Acenaphthene ²	ug/Kg	0	0%	50000	0	0	97
Acenaphthylene ²	ug/Kg	37	5%	41000	0	5	97
Anthracene ²	ug/Kg	45	14%	50000	0	14	97
Benzo(a)anthracene ²	ug/Kg	290	48%	224	1	47	97
Benzo(a)pyrene ²	ug/Kg	320	51%	61	16	49	97
Benzo(b)fluoranthene ²	ug/Kg	370	26%	1100	0	25	97
Benzo(ghi)perylene ²	ug/Kg	180	29%	50000	0	28	97
Benzo(k)fluoranthene ²	ug/Kg	320	26%	1100	0	25	97
Chrysene ²	ug/Kg	340	55%	400	0	53	97
Dibenzo(a,h)anthracene ²	ug/Kg	35	6%	14	6	6	97
Fluoranthene ²	ug/Kg	540	65%	50000	0	63	97
Fluorene ²	ug/Kg	0	0%	50000	0	0	97
Indeno(1,2,3-cd)pyrene ²	ug/Kg	150	27%	3200	0	26	97
Naphthalene ²	ug/Kg	0	0%	13000	0	0	97
Phenanthrene ²	ug/Kg	200	42%	50000	0	41	97
Pyrene ²	ug/Kg	610	66%	50000	0	64	97

Notes

1. The cleanup goal is the 95 percentile of the SEDA site background data, unless otherwise noted.
2. New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) # 4046 defined value
3. EPA Risk based residential cleanup goal for lead.

**TABLE 7
SITE-WIDE AND INDIVIDUAL AVERAGES OF TCRA SOIL ANALYSIS RESULTS**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

Compound	TAGM (Cleanup Goal)	Units	Area 1			Area 2			Area 3		
			Floor	Perimeter	All	Floor	Perimeter	All	Floor	Perimeter	All
Metals											
Aluminum	19300	mg/Kg	13,134	12,296	12,715	15,950	13,988	14,969	17,667	15,128	16,397
Antimony	5.9	mg/Kg	1.7	2.6	2.1	0.9	1.0	1.0	1.0	1.0	1.0
Arsenic	8.2	mg/Kg	5.9	5.3	5.6	5.1	4.7	4.9	6.3	5.2	5.7
Barium ²	300	mg/Kg	111	65	88	106	76	91	87	73	80
Beryllium	1.1	mg/Kg	0.7	0.6	0.7	0.8	0.7	0.7	0.8	0.7	0.8
Cadmium	2.3	mg/Kg	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
Calcium	121000	mg/Kg	11,163	17,348	14,256	5,350	15,703	10,526	18,703	24,880	21,792
Chromium	29.6	mg/Kg	20	21	20	24	30	27	27	30	29
Cobalt ²	30	mg/Kg	10	10	10	13	11	12	15	12	13
Copper	33	mg/Kg	17	22	19	19	25	22	23	28	26
Iron	36500	mg/Kg	23,193	23,315	23,254	25,875	26,050	25,963	31,800	28,120	29,960
Lead ³	400	mg/Kg	29	33	31	42	85	64	32	64	48
Magnesium	21500	mg/Kg	5,460	5,912	5,686	4,183	9,490	6,836	8,210	7,920	8,065
Manganese	1060	mg/Kg	875	447	661	804	500	652	801	484	643
Mercury ²	0.1	mg/Kg	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04
Nickel	49	mg/Kg	23	31	27	26	30	28	39	41	40
Potassium	2380	mg/Kg	1,289	1,509	1,399	1,658	2,278	1,968	2,263	2,894	2,579
Selenium ²	2	mg/Kg	1.6	1.6	1.6	1.2	1.3	1.3	1.4	1.3	1.4
Silver	0.75	mg/Kg	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.3	0.3
Sodium	172	mg/Kg	64	77	71	72	95	84	129	104	116
Thallium	0.7	mg/Kg	2.9	3.0	3.0	2.2	2.5	2.4	2.6	2.6	2.6
Vanadium ²	150	mg/Kg	22	19	21	25	21	23	26	23	24
Zinc	110	mg/Kg	78	162	120	73	82	78	89	90	90

Notes:

1. The cleanup goal is the 95 percentile of the SEDA site background data, unless otherwise noted.
2. New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) # 4046 defined value
3. EPA Risk based residential cleanup goal for lead.

**TABLE 7
SITE-WIDE AND INDIVIDUAL AVERAGES OF TCRA SOIL ANALYSIS RESULTS**

**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

Compound	TAGM (Cleanup Goal)	Area 4			Area 5			Area 6		
		Floor	Perimeter	All	Floor	Perimeter	All	Floor	Perimeter	All
¹Metals										
Aluminum	19300	14,893	13,286	14,089	15,260	14,225	14,743	16,000	15,200	15,600
Antimony	5.9	1.1	1.1	1.1	1.6	42.1	21.9	1.0	1.2	1.1
Arsenic	8.2	7.2	7.4	7.3	6.1	5.4	5.7	6.9	12.5	9.7
Barium ²	300	84	65	75	117	77	97	107	105	106
Beryllium	1.1	0.7	0.6	0.7	0.8	0.7	0.8	0.8	0.7	0.8
Cadmium	2.3	0.9	1.0	1.0	1.1	1.1	1.1	0.8	0.9	0.9
Calcium	121000	18,259	10,157	14,208	5,278	12,163	8,720	3,380	3,720	3,550
Chromium	29.6	22	22	22	22	24	23	21	21	21
Cobalt ²	30	13	12	13	11	11	11	12	11	11
Copper	33	22	23	23	19	22	21	18	21	20
Iron	36500	27,679	25,457	26,568	24,860	25,850	25,355	24,400	23,733	24,067
Lead ³	400	19	33	26	28	52	40	28	27	28
Magnesium	21500	7,824	5,257	6,540	4,470	6,198	5,334	3,820	4,030	3,925
Manganese	1060	720	499	610	790	498	644	697	548	623
Mercury ²	0.1	0.05	0.05	0.05	0.06	0.04	0.05	0.07	0.07	0.07
Nickel	49	33	33	33	25	32	28	24	26	25
Potassium	2380	1,653	2,024	1,839	1,592	1,839	1,715	1,840	2,603	2,222
Selenium ²	2	1.4	1.5	1.5	1.8	1.8	1.8	1.3	1.5	1.4
Silver	0.75	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Sodium	172	97	71	84	62	75	68	49	48	48
Thallium	0.7	2.7	2.7	2.7	3.4	3.3	3.3	2.5	2.7	2.6
Vanadium ²	150	22	19	20	25	21	23	25	24	24
Zinc	110	78	86	82	82	176	129	70	81	76

Notes:

1. The cleanup goal is the 95 percentile of the SEDA site background data, unless otherwise noted.
2. New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) # 4046 defined value.
3. EPA Risk based residential cleanup goal for lead.

**TABLE 7
SITE-WIDE AND INDIVIDUAL AVERAGES OF TCRA SOIL ANALYSIS RESULTS**

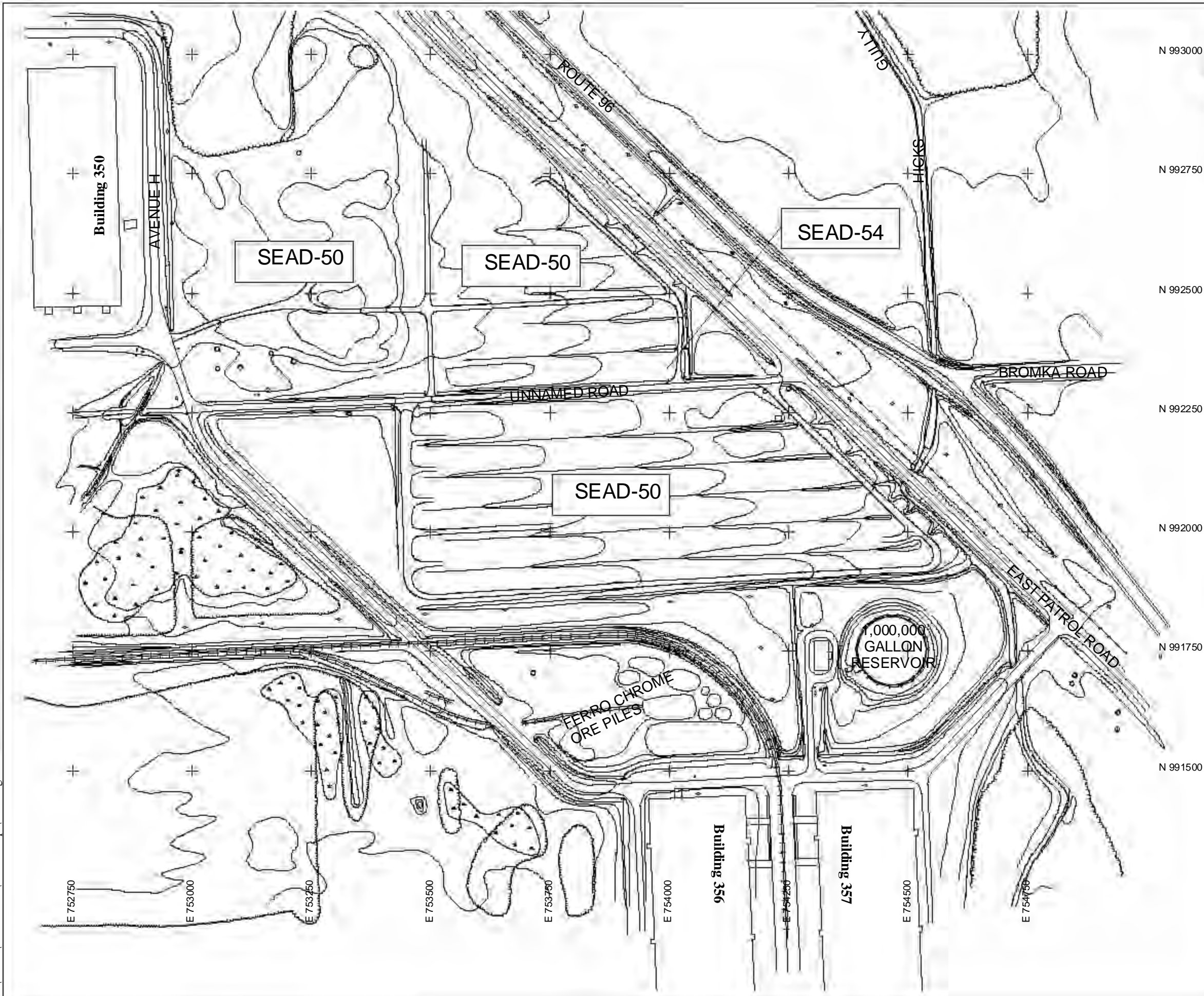
**SENECA ARMY DEPOT ACTIVITY
REMOVAL ACTION**

Compound	TAGM (Cleanup Goal)	Area 7			All Areas		
		Floor	Perimeter	All	Floor	Perimeter	All
¹Metals							
Aluminum	19300	18,050	15,300	16,675	15,851	14,203	15,027
Antimony	5.9	1.0	1.5	1.3	1.2	7.2	4.2
Arsenic	8.2	5.9	5.6	5.7	6.2	6.6	6.4
Barium ²	300	129	94	112	106	79	93
Beryllium	1.1	0.9	0.8	0.8	0.8	0.7	0.7
Cadmium	2.3	1.0	1.3	1.1	0.9	1.0	1.0
Calcium	121000	4,810	3,930	4,370	9,563	12,557	11,060
Chromium	29.6	25	26	25	23	25	24
Cobalt ²	30	11	11	11	12	11	12
Copper	33	27	27	27	21	24	22
Iron	36500	28,700	29,600	29,150	26,644	26,018	26,331
Lead ³	400	20	14	17	28	44	36
Magnesium	21500	4,780	5,470	5,125	5,535	6,325	5,930
Manganese	1060	536	384	460	746	480	613
Mercury ²	0.1	0.06	0.05	0.05	0.06	0.05	0.05
Nickel	49	32	37	35	29	33	31
Potassium	2380	2,575	2,120	2,348	1,839	2,181	2,010
Selenium ²	2	1.4	2.0	1.7	1.4	1.6	1.5
Silver	0.75	0.3	0.4	0.3	0.3	0.3	0.3
Sodium	172	155	173	164	90	92	91
Thallium	0.7	2.6	3.8	3.2	2.7	2.9	2.8
Vanadium ²	150	29	25	27	25	22	23
Zinc	110	84	86	85	79	109	94

Notes:

1. The cleanup goal is the 95 percentile of the SEDA site background data, unless otherwise noted.
2. New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) # 4046 defined value.
3. EPA Risk based residential cleanup goal for lead.

o:\seneca\Sea d245067\new sd50.apr\ROD Figure 2



N 993000
 N 992750
 N 992500
 N 992250
 N 992000
 N 991750
 N 991500

LEGEND

- PAVED ROAD
- GROUND CONTOUR AND ELEVATION
- WETLAND
- BRUSH
- CHAIN LINK FENCE
- UTILITY POLE
- APPROXIMATE LOCATION OF FIRE HYDRANT
- RAILROAD

N

100 0 100 200 300 Feet

KEY PLAN

SEAD-50
Area of Study



PARSONS

SENECA ARMY DEPOT ACTIVITY
TANK FARM
SEAD-50 AND SEAD-54

FIGURE 1
SITE MAP - SEAD 50 and SEAD 54

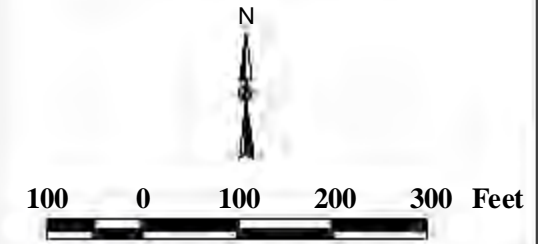
o:\seneca\Sea d245067\new sd50.apr\ROD Figure 3



LEGEND

- PAVED ROAD
- GROUND CONTOUR AND ELEVATION
- WETLAND
- BRUSH
- CHAIN LINK FENCE
- UTILITY POLE
- APPROXIMATE LOCATION OF FIRE HYDRANT
- RAILROAD
- AREA OF EXCAVATION

AREA #	sq footage
1	105,855
2	10,669
3	10,244
4	54,196
5	23,247
6	3,511
7	9,152



KEY PLAN



PARSONS

SENECA ARMY DEPOT ACTIVITY
TANK FARM
SEAD-50 AND SEAD-54

FIGURE 2
TCRA SOIL EXCAVATION LOCATIONS