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U.S. Army Corps of Engineers

Omaha District
Offutt AFB, Nebraska

SENECA ARMY DEPOT ACTIVITY
TIME CRITICAL REMOVAL ACTION
METAL SITES – SEAD 67
SENECA COUNTY
ROMULUS, NEW YORK

Contract No. DACA45-98-D-0004
Task Order No. 0035

FINAL
COMPLETION REMOVAL REPORT

February 2005

01M-0007

WESTON SOLUTIONS

FINAL

COMPLETION REMOVAL REPORT
TIME-CRITICAL REMOVAL ACTION
METALS SITE – SEAD 67
SENECA COUNTY
ROMULUS, NEW YORK

Contract No. DACA45-98-D-0004
Task Order No. 0035

Prepared for

U.S. ARMY CORPS OF ENGINEERS,
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February 2005

W.O. No. 20074.515.035

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LIST OF ACRONYMS

"SB"	Site Background
µg/kg	micrograms per kilogram
bgs	below ground surface
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
COCs	contaminants of concern
cPAHs	carcinogenic PAHs
cy	cubic yards
EPA	U.S. Environmental Protection Agency
ESI	Expanded Site Inspection
ft	feet
ft^2	square feet
GPS	Global Positioning System
mg/kg	milligrams per kilogram
MS/MSD	matrix spike/matrix spike duplicates
NYSDEC	New York State Department of Environmental Conservation
PAHs	polynuclear aromatic hydrocarbon
PCBs	polychlorinated biphenyls
QC	Quality Control
ROD	Record of Decision
RTK	Real-Time Kinematics
SEDA	Seneca Army Depot Activity
SWMUs	Solid Waste Management Units
T&D	transportation and disposal
TAGM	Technical Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TCRA	Time Critical Removal Action
TEQ	Toxicity Equivalent
USACE	U.S. Army Corps of Engineers
WESTON®	Weston Solutions, Inc.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The Seneca Army Depot Activity (SEDA) has been closed since 1992 under the Department of Defense Base Realignment and Closure process. The land encompassing and surrounding the Solid Waste Management Units (SWMUs) that comprise SEDA is in the process of being transferred over to the public for beneficial reuse purposes. As part of the Federal Facilities Agreement, SEDA has identified removal actions that are necessary prior to completion of final remedial actions and property transfer. As part of this objective, an Expanded Site Inspection (ESI) was performed in 1993 at the Dump Site east of Sewage Treatment Plant No. 4. This site includes one SWMU, SEAD 67. Intrusive investigations were performed during the ESI at SEAD 67, which included test pitting, soil borings, installation of monitoring wells, and collection of surface water and sediment samples. Based on soil samples collected during the ESI, it was determined that the waste soil piles and berms in SEAD 67 contained elevated levels of mercury and polynuclear aromatic hydrocarbons (PAHs). Elevated concentrations were also reported for calcium, lead, manganese, and potassium, but these metals are considered non-target metals for the site. Results of groundwater and surface water samples collected during the ESI indicated that neither of these environmental receptors has been significantly impacted by historic operations at the site.

To address the elevated levels of mercury and PAHs in the site soils, SEDA tasked the U. S. Army Corps of Engineers (USACE) with performing a Time Critical Removal Action (TCRA) at the site to reduce and/or eliminate the identified sources of residual chemical materials. On 4 November 2002, USACE scoped Weston Solutions, Inc. (WESTON®) with implementation of the TCRA. In December 2002, WESTON mobilized the site, cleared 1.5 acres of vegetation, and excavated the impacted soils (including the former waste soil piles). A total of 2,104 tons of soil was transported off-site for disposal at the Seneca Meadows Landfill in Waterloo, New York. Soil sampling was conducted throughout the soil removal activities to provide guidance in delineating both the lateral and vertical limits of excavation required. Samples were analyzed for 23 Target Analyte List metals and 17 PAH parameters. Final confirmatory sample results for SEAD 67 are presented in Appendix A of this report. An evaluation of average confirmatory results and maximum confirmatory results are also presented

in Appendix A. With the exception of lead, data has been compared with the cleanup goals for the site, which are based on the New York Technical Administrative Guidance Memorandum (TAGM) No. 4046 Cleanup Objective Values. Where no cleanup value exists (denoted as Site Background (SB) in the TAGM), SB has been replaced with the 95th Percentile of SEDA Soil Background Data (5/13/98). The cleanup goal for lead is based on the U.S. Environmental Protection Agency Risk Based Residential Cleanup Goal.

A total of 23 confirmation samples (8 floor and 15 perimeter) were analyzed in Area 1 of SEAD 67 to verify sufficient delineation and removal of impacted site soils from this area. Sample results indicated there were three exceedances in Area 1 for mercury. The average result for mercury in Area 1 is 0.08 milligrams per kilogram (mg/kg), which is below the cleanup goal of 0.1 mg/kg. Area 1 sample results also indicated exceedances for the following PAHs: Benzo(a)anthracene; Benzo(a)pyrene; Benzo(k)fluoranthene; Chrysene; and Dibenzo(a,h)anthracene. Although there were exceedances for five PAH parameters, an evaluation of the Benzo(a)pyrene Toxicity Equivalent (TEQ) did not result in an exceedance of the 10,000 micrograms per kilogram (µg/kg) limit for total carcinogenic PAHs (cPAHs) in Area 1. The overall average Benzo(a)pyrene TEQ for Area 1 is 598 µg/kg.

A total of 56 confirmation samples (35 floor and 21 perimeter) were analyzed in Area 2 to verify sufficient delineation and removal of impacted site soils in this area. Sample results indicated there were five exceedances in Area 2 for mercury. The average result for mercury in Area 2 is 0.08 mg/kg, which is below the cleanup goal of 0.1 mg/kg. Area 2 sample results also indicated exceedances for the following PAHs: benzo(a)pyrene and dibenzo(a,h)anthracene. Although there were exceedances for these two PAH parameters, an evaluation of the Benzo(a)pyrene TEQ did not result in an exceedance of the 10,000 µg/kg limit for total cPAHs in Area 2. The overall average Benzo(a)pyrene TEQ for Area 2 is 73 µg/kg.

Based on the confirmatory sample results obtained following excavation of impacted soils at SEAD 67, it is recommended that no further action is required at this site. The previously identified potential threat to the public and the environment as identified in the ESI and presented in the *Final Action Memorandum and Decision Document* (Parsons, 2002), has been substantially reduced and/or eliminated based on a reduction in levels of metals and PAHs

detected in soils associated with the SEAD 67 site. In addition to the reduction in contaminant levels, no apparent Comprehensive Environmental Response, Compensation, and Liability Act releases were identified. It is intended that this completion report, in conjunction with the *Proposed Remedial Action Plan* (to be submitted under separate cover by USACE) will serve as the basis for the Record of Decision for site closure and transfer of the SEDA property.

SECTION 1

INTRODUCTION

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

This Final Completion Removal Report documents the completion of the Time Critical Removal Action (TCRA) performed at the SEAD 67 Solid Waste Management Unit (SWMU) located at the Seneca Army Depot Activity (SEDA) in Romulus, Seneca County, New York. The work was performed by Weston Solutions, Inc. (WESTON®) for the U.S. Army Corps of Engineers (USACE), Omaha District under Contract No. DACA45-98-D-0004, Task Order No. 0035.

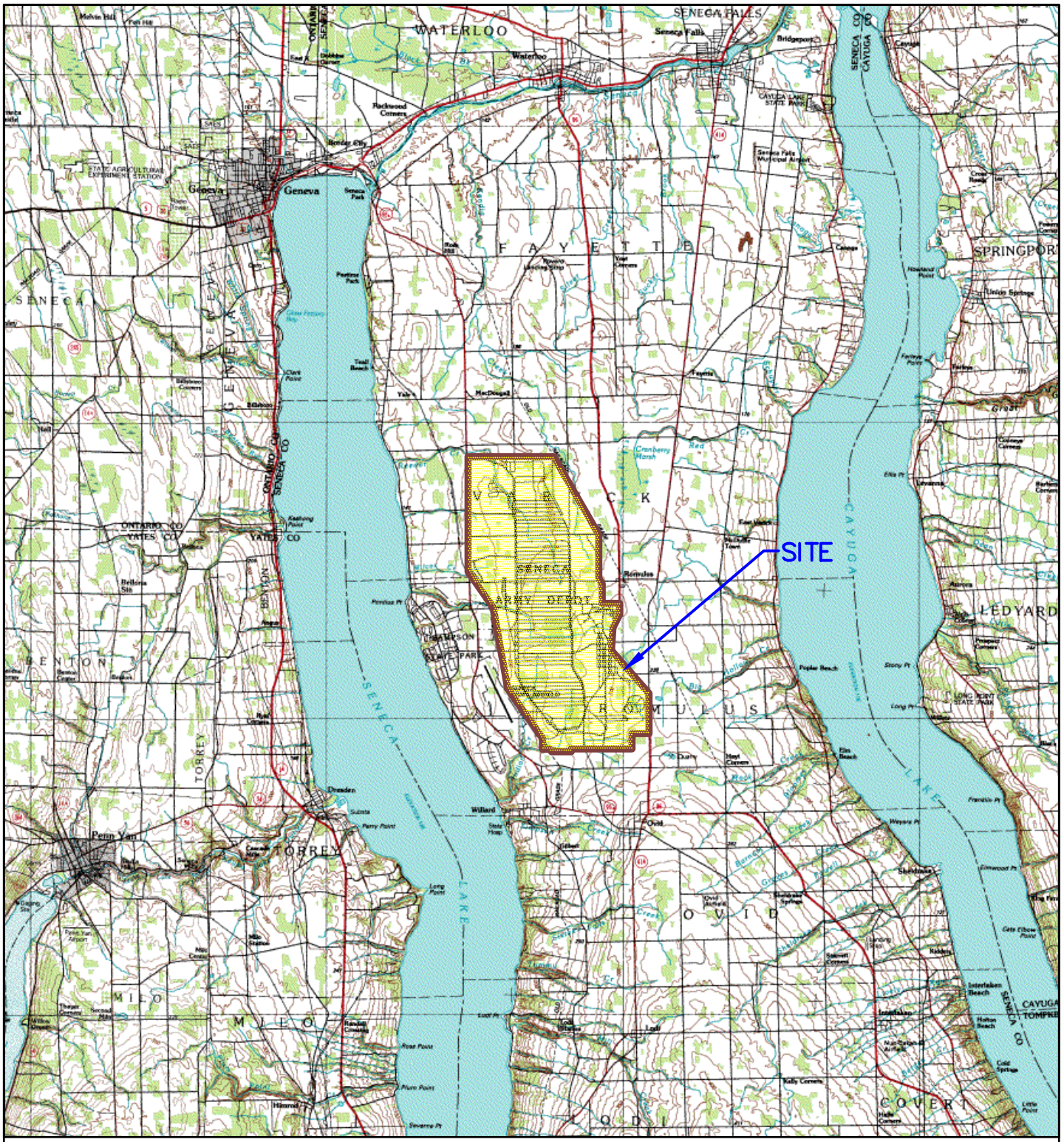
Seneca Army Depot Activity was placed on the Superfund list in 1992 in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and has been undergoing investigation and remediation since that time. The facility was designated for closure in 1992 under the Department of Defense Base Realignment and Closure process.

The TCRA was performed in accordance with the *Final Task Work Plan* (WESTON, November 2002) and *Final Action Memorandum and Decision Document* (Parsons, 2002), which were both drafted as part of the CERCLA process. The removal action was initiated in compliance with Section 11 of the SEDA Federal Facilities Agreement that describes removal actions as viable options for eliminating potential threats.

The goal of a TCRA is to abate, prevent, minimize, stabilize, mitigate, and/or eliminate the threat to public health, welfare, or the environment. The results of the TCRA presented in this completion report, along with the Record of Decision (ROD), will serve as the basis for providing clean closure for the SEAD 67 site.

1.2 SITE DESCRIPTION

Seneca Army Depot Activity is a U.S. Army facility located in Romulus, Seneca County, New York (refer to Figure 1-1). The facility property occupies approximately 10,600 acres, is bound to the west by State Route 96A and to the east by State Route 96. Geneva and Rochester are located to the northwest (14 and 50 miles, respectively); Syracuse is 50 miles to the



SOURCE:
USGS TOPOGRAPHY MAPS; GENEVA SOUTH, DRESDEN, OVID, & ROMULUS – NEW YORK QUADS

GRAPHIC SCALE
3 1.5 0 1.5 3
APPROXIMATE SCALE IN MILES

TIME CRITICAL REMOVAL ACTION
METALS SITES – SEADS 67
SENECA ARMY DEPOT ACTIVITY (SEDA)
ROMULUS, NEW YORK

DEPARTMENT OF THE ARMY
OMAHA DISTRICT
CORPS OF ENGINEERS
OFFUTT AFB, NEBRASKA

SITE LOCATION MAP

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DRAWN	BEG
DATE	MAR 2004
FIGURE NO.	1-1

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northeast, and Ithaca is 31 miles to the south. The surrounding area is mainly used for agriculture.

The SEAD 67 site is located in the central eastern portion of SEDA, immediately south of West Romulus Road and east of Sewage Treatment Plant No. 4. The area is undeveloped, and heavily vegetated with low brush and deciduous trees. There is a power line running through the property parallel to, and approximately 50 feet (ft) south, of West Romulus Road. Three wells are also located south of West Romulus Road; one upgradient and two downgradient of the former waste soil piles shown in Figure 1-3.

A total of five waste soil piles and two berms were formerly staged at the SEAD 67 site (Piles 1 through 7 in Figure 1-3). These included: a grass covered 10-ft-diameter waste soil pile and a 5-ft-diameter waste soil pile located approximately 50 ft and 70 ft respectively, to the south of West Romulus Road; a 10-ft-diameter waste soil pile and a 60-ft long brush covered berm located approximately 225 ft south of the road; and two smaller waste soil piles located to the south of the berm. All waste soil piles and berms were approximately 3 to 4 ft high; except for the 10-ft-diameter pile that was approximately 5 ft high. A Site Map showing the location of the former waste piles, monitoring wells, and other site features is included as Figure 1-2.

The topography of the site slopes gently to the west to an unnamed stream, which is approximately 250 ft away from the former waste piles and berm structures. The stream is a Class C surface water body that flows north beneath West Romulus Road into a regulated wetland area. Downstream of the wetland, the stream enters into Kendig Creek. The stream also receives discharge from Sewage Treatment Plant No. 4, which is located west of the SEAD 67 site (refer to Figure 1-2).

1.3 SITE BACKGROUND

Historically, little is known about the origin of the five waste piles and two berms that formerly occupied SEAD 67, or the dates soil was placed in the area. Due to the thick vegetation at the site, it is suspected that the waste piles and berms were placed in the area many years ago.

LEGEND

- 696 — GROUND CONTOUR AND ELEVATION
- PAVED ROAD
- RAILROAD
- STREAM
- WETLAND
- UTILITY POLE
- BRUSH
- AREA TO BE REMEDIATED
- MW67-1 — MONITORING WELL

GRAPHIC SCALE

100 50 0 50 100

APPROXIMATE SCALE IN FEET

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

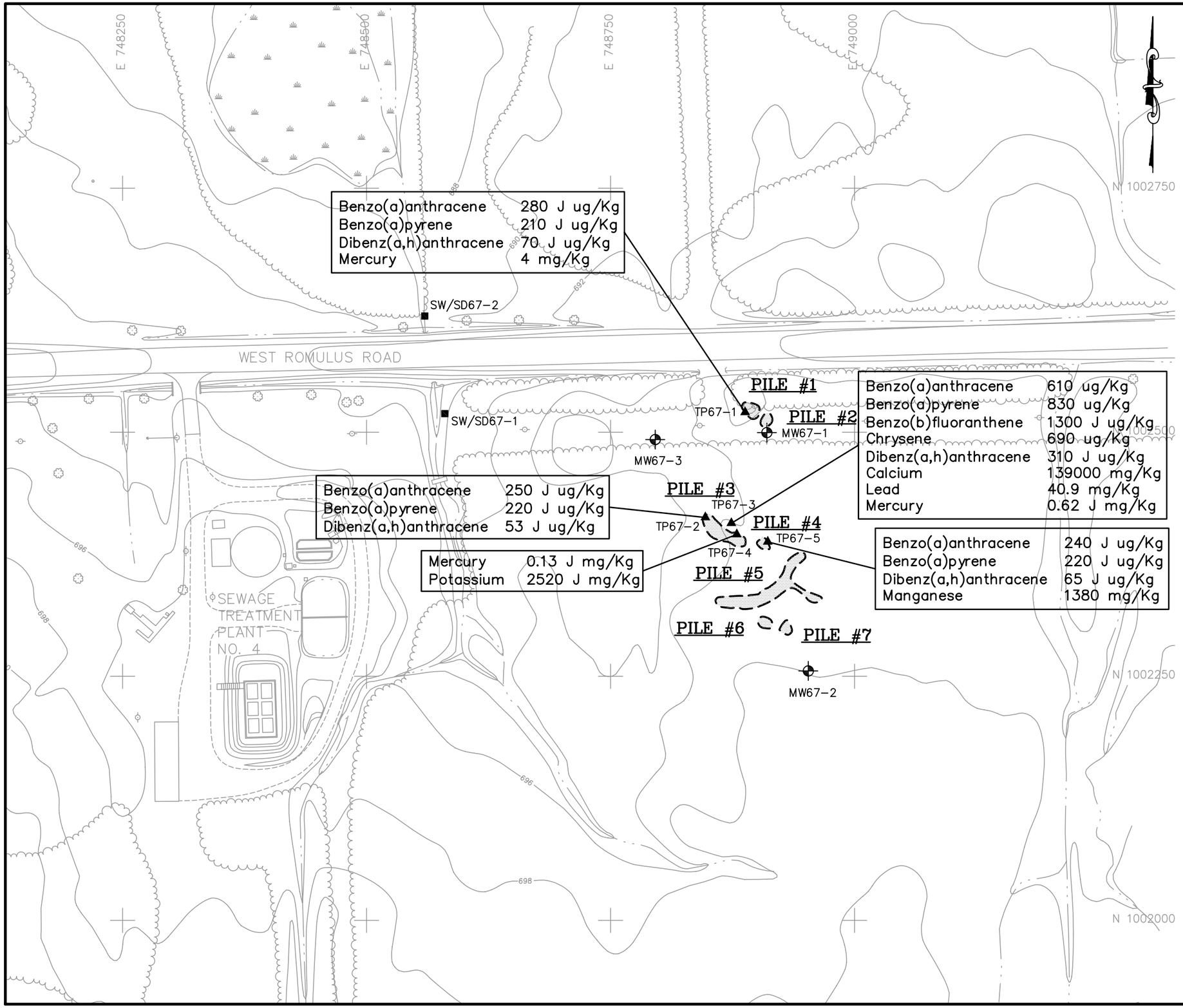
DEPARTMENT OF THE ARMY
OMAHA DISTRICT
CORPS OF ENGINEERS
OFFUTT AFB, NEBRASKA

SEAD-67
DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO. 4
SENECA ARMY DEPOT ACTIVITY

SITE MAP

DRAWN	DATE	FIGURE NO.
A.J.M.	MAR 2004	1-2
CHECKED	W.O. NO.	
C.G.K.	20074-515-035	

M:\Design\DWG\ACOE\SENECA\SEADs\SEAD 67 FINAL REPORT\FIG 1-2.dwg, Layout1, 3/4/2004 9:59:50 AM, girardeb, 1:1



LEGEND

- 696 — GROUND CONTOUR AND ELEVATION
- PAVED ROAD
- RAILROAD
- STREAM
- WETLAND
- UTILITY POLE
- BRUSH
- AREA TO BE REMEDIATED
- MW67-1 — MONITORING WELL
- SW/SD67-1 — SURFACE WATER/ SEDIMENT SAMPLE
- TP67-1 — TEST PIT SAMPLES

GRAPHIC SCALE

100 50 0 50 100

APPROXIMATE SCALE IN FEET

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
OMAHA DISTRICT
CORPS OF ENGINEERS
OFFUTT AFB, NEBRASKA

SEAD-67
DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO. 4
SENECA ARMY DEPOT ACTIVITY

ANALYTES EXCEEDING TAGM RECOMMENDED SOIL CLEANUP OBJECTIVES

DRAWN	DATE	FIGURE NO.
A.J.M.	MAR 2004	1-3
CHECKED C.G.K.	W.O. NO. 20074-515-035	

M:\Design\DWG\ACOE\SENECA\SEADs\SEAD 67 FINAL REPORT\FIG 1-3.dwg, Layout1, 3/4/2004 10:03:55 AM, girardeb, 1:1

1.4 PREVIOUS INVESTIGATION

An Expanded Site Inspection (ESI) was performed at SEAD 67 in 1993. Intrusive investigations performed as part of the ESI included test pitting, soil borings, installation of monitoring wells, and collection of surface water and sediment samples. Based on eight soil samples (five from test pits and three from soil borings) collected during the ESI, it was determined that soils in the waste soil piles and berms contained elevated levels of metals and polynuclear aromatic hydrocarbon (PAHs). Maximum concentrations were reported in surface soils as follows for the contaminants of concern (COCs): 4 milligrams per kilogram (mg/kg) for mercury; 610 micrograms per kilogram (µg/kg) for benzo(a)anthracene; 830 µg/kg for benzo(a)pyrene; 1,300 µg/kg for benzo(b)flouranthene; 690 µg/kg for chrysene; and 310 µg/kg for dibenzo(a,h)anthracene. Elevated concentrations were also reported for calcium, lead, manganese, and potassium, but these metals are not considered primary COCs. Based on three groundwater samples and two surface water samples collected during the ESI, it was determined that the groundwater and surface water were not significantly impacted by historic operations at the site. Sediment in the drainage ditch east of the sewage treatment plant was found to contain elevated levels of pesticides (alpha-chlordane, endosulfan 1 and 4,4-dichlorodiphenyl trichlorothane), PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene], and indeno(1,2,3-cd)pyrene), and metals (copper, manganese, nickel, and silver) from the two samples collected. No soil, groundwater, surface water, or sediment samples exceeded the cleanup goals for pesticides or polychlorinated biphenyls (PCBs). The location of analytes that exceeded the cleanup goals for soils, and the respective concentrations found during the ESI, are shown in Figure 1-3. The potential source release locations (Piles 1-7) as identified in the *Final Action Memorandum and Decision Document* (Parsons, 2002), are also shown in Figure 1-3.

Following the ESI, it was determined that releases of hazardous constituents, consisting primarily of the metal mercury and semi-volatile contaminants (mainly PAHs), had occurred at SEAD 67. In order to address the release, SEDA tasked USACE with performing a TCRA at the site to reduce and/or eliminate the identified sources of residual chemical materials.

SECTION 2

SITE MANAGEMENT

2. SITE MANAGEMENT

2.1 PROJECT ORGANIZATION

Weston Solutions, Inc. coordinated all work activities with USACE, Omaha District, USACE, New York District (located at SEDA), and SEDA. A list of primary representatives from each firm is listed below:

FIRM/REPRESENTATIVE	**ROLE**
SEDA	
Mr. Steven Absolom	Base Environmental Coordinator
USACE	
Mr. Thomas Westenburg:	Project Manager
Mr. Thomas Battaglia[1]:	Contracting Officers Representative and On-site Representative
WESTON	
Mr. Christopher Kane:	Project Manager
Mr. Edwin Benton & Mr. Miles Gelatt [1]:	Site Manager
Mr. Steven Kirejczyk[1]:	Site Safety and Health Officer/Quality Control (QC) Officer and Sample Technician
SUBCONTRACTORS	
Sessler Wrecking[1]:	Sitework Services
Severn Trent Laboratories	Laboratory Analytical Services
SJB Drilling[1]:	Drilling Services

Note: [1] On-site

2.2 PROJECT SCHEDULE

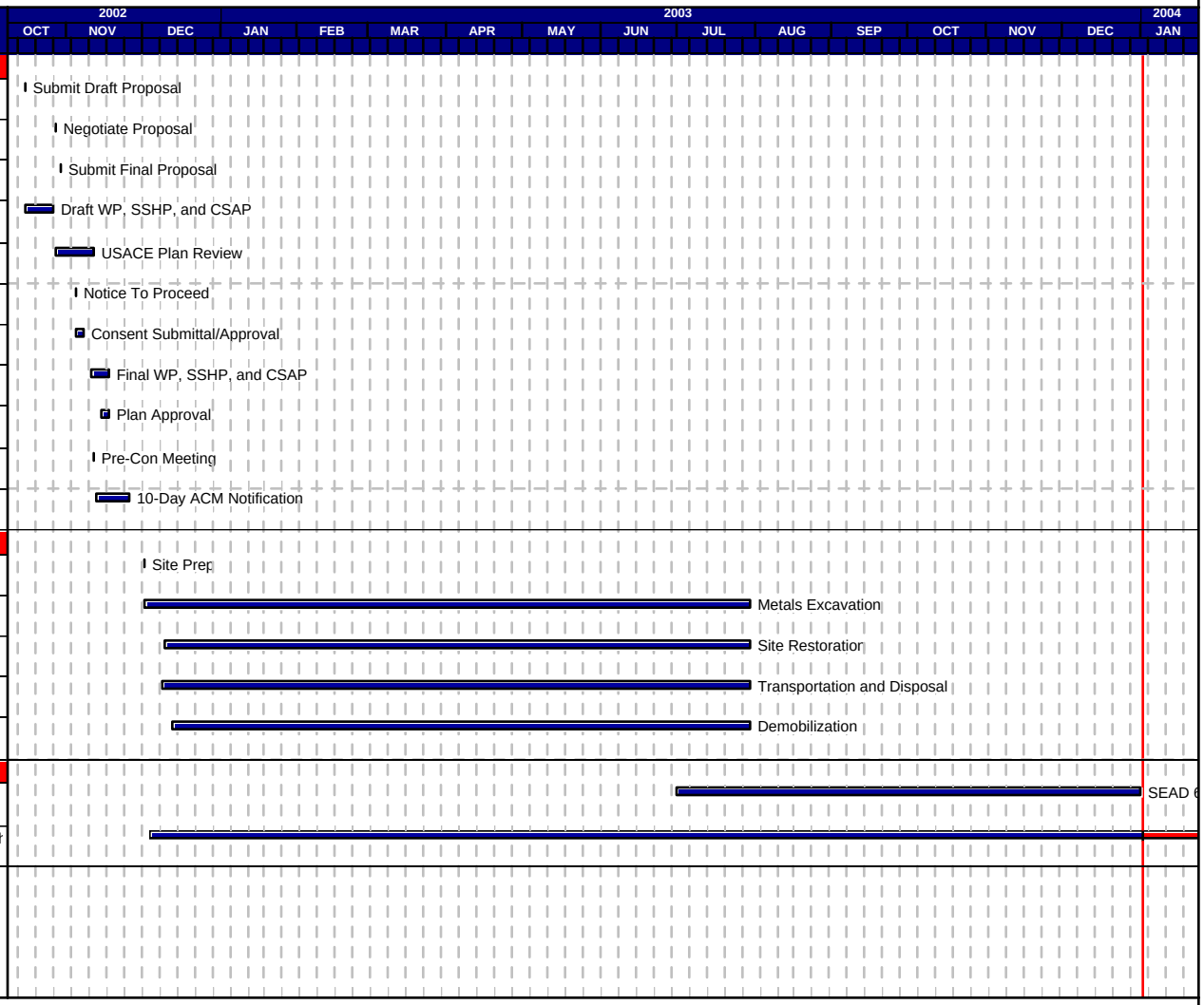
The project schedule shown in Figure 2-1 summarizes the start and completion dates for each activity.

2.3 MEETINGS

On 9 September 2002, personnel from the USACE Omaha District, USACE New York District, and WESTON conducted a site visit and project kick-off meeting to discuss project objectives and Scope of Work (USACE, September 2002). A Pre-Construction Meeting was held between USACE and WESTON on 12 November 2002, to discuss logistics, safety, submittals, and QC and Quality Assurance. This meeting was followed by a site walk on 13 November 2002.

FIGURE 2-1
TIME CRITICAL REMOVAL ACTION
SEADS 50/54, 24 & 67
SENECA ARMY DEPOT
ROMULUS, NY

Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float
1000 - PLANNING						
1010	Submit Draft Proposal	1d	0	16OCT02 A	16OCT02 A	
1020	Negotiate Proposal	1d	0	28OCT02 A	28OCT02 A	
1030	Submit Final Proposal	1d	0	30OCT02 A	30OCT02 A	
1040	Draft WP, SSHP, and CSAP	5d	0	16OCT02 A	28OCT02 A	
1050	USACE Plan Review	3d	0	28OCT02 A	12NOV02 A	
1060	Notice To Proceed	1d	0	05NOV02 A	05NOV02 A	
1070	Consent Submittal/Approval	3d	0	05NOV02 A	08NOV02 A	
1080	Final WP, SSHP, and CSAP	4d	0	11NOV02 A	18NOV02 A	
1090	Plan Approval	1d	0	15NOV02 A	18NOV02 A	
1100	Pre-Con Meeting	1d	0	12NOV02 A	12NOV02 A	
1110	10-Day ACM Notification	10d	0	13NOV02 A	27NOV02 A	
2400 - SEAD 67 SITEWORK						
2420	Site Prep	1d	0	02DEC02 A	03DEC02 A	
2430	Metals Excavation	1d	0	02DEC02 A	31JUL03 A	
2440	Site Restoration	1d	0	10DEC02 A	31JUL03 A	
2450	Transportation and Disposal	1d	0	09DEC02 A	31JUL03 A	
2460	Demobilization	1d	0	13DEC02 A	31JUL03 A	
3000 - CLOSEOUT						
3015	SEAD 67 Report	30d	0	01JUL03 A	02JAN04	
3020	Closeout Project	90d	30d	04DEC02 A	24FEB04	2340h



Start date	**16OCT02**
Finish date	**24FEB04**
Data date	**02JAN04**
Run date	**08FEB05**
Page number	**1A**

FIGURE 2-1
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
CONTRACT NO.: DACA45-98-D-0004

Prepared by:
WESTON SOLUTIONS

- **Early bar**
- **Progress bar**
- **Critical bar**
- **Summary bar**
- **Start milestone point**
- **Finish milestone point**

SECTION 3

SITE ACTIVITIES

3. SITE ACTIVITIES

The primary objective of this project was to perform a TCRA to reduce or eliminate any potential threat that exists at SEAD 67 due to elevated levels of mercury and PAHs that were identified during the ESI. The results of this removal action along with the ROD will serve as the basis for providing clean closure for the SEAD 67 site. To accomplish this objective, WESTON performed the following tasks:

- **Task 1. Mobilization**: This task included procurement and mobilization of all equipment and personnel necessary to perform site activities.
- **Task 2. Site Preparation**: This task included laying out work areas, installing and maintaining erosion and sedimentation controls (as applicable), clearing the site of vegetation, and establishing work zones.
- **Task 3. Soil Removal**: This task consisted of removing the five soil piles and two berms followed by removal of surface soils to a depth of 12 inches to eliminate any immediate threats associated with the presence of site contaminants.
- **Task 4. Sampling and Analysis**: This task included the collection and analysis of post excavation confirmatory samples in Areas 1 and 2 to verify the vertical and horizontal limits of soil removal necessary to achieve site closure.
- **Task 5. Transportation and Disposal**: This task included the preparation of waste manifests and off-site transportation and disposal (T&D) of non-hazardous soil.
- **Task 6. Site Restoration**: This task included removal of erosion and sedimentation controls.
- **Task 7**. **Demobilization**: This task included the removal of equipment and supplies from the site following completion of project objectives.

3.1 TASK 1 – MOBILIZATION

Weston Solutions, Inc. mobilized the site on 11 November 2002. The mobilization task included the procurement and delivery of equipment and personnel necessary to implement all aspects of the work as defined in the *Final Task Work Plan* (WESTON, 2002). This task included moving into office space provided by SEDA, mobilizing construction equipment and project personnel, and familiarizing project personnel with the site and project requirements.

3.2 TASK 2 – SITE PREPARATION

In order to prepare the site for intrusive operations, the site was surveyed, air monitoring was performed, erosion and sedimentation controls were installed, the site was cleared of all vegetation, a central staging area was identified, and both SEDA and Dig-Safe (No. 11122-065-055) were contacted to verify utility locations. A summary of these tasks is included in Subsections 3.2.1 through 3.2.4.

3.2.1 Survey

A Model 5700 Trimble Real-Time Kinematics (RTK) Global Positioning System (GPS) was used to survey the waste soil piles and berms located within SEAD 67 prior to excavation. Due to tree cover and poor GPS reception at the SEAD 67 site, WESTON utilized the control point located at the Area 44a site. Once the RTK's position was acquired and confirmed, the perimeter of the five soil piles and two berms were staked out and flagged. Survey information was used to delineate and confirm soil pile and berm locations, and to control the lateral and vertical limits of excavation during subsequent removal efforts.

3.2.2 Air Monitoring

Prior to commencement of site work, air monitoring was performed within the work zone in accordance with the U.S. Environmental Protection Agency (EPA), the New York State Department of Health Community Air Monitoring Program, and the New York State Department of Environmental Conservation (NYSDEC) Fugitive Dust Suppression and Particulate Monitoring guidelines. No elevated particulate levels were noted prior to excavation.

Based on historical data, background particulate concentrations and heavy precipitation, air monitoring was not performed during site work activities. Additional dust suppression was not required, and all work activities were conducted in Level D Modified personal protective equipment.

3.2.3 Erosion and Sedimentation Control

Erosion and sedimentation controls consisting of hay bales and/or silt fences, and stakes were installed to manage storm water runoff within the work areas, at drainage outlet points, and at the materials stockpile area. Additional erosion controls were placed along the drainage swale adjacent to West Romulus Road.

During the course of the project, it was not necessary to collect or store storm water since all of the soil piles and berms were located above existing ground surface. In addition, because the site drains east to west and the drainage swale provides storm water relief, no ponding of water was encountered during the limited soil excavation period.

3.2.3 Clearing

Clearing limits were established by delineating the limits of excavation on the north, south, east, and west borders of SEAD 67 using painted lines and/or survey flagging. The vegetation, consisting of light brush, tall grass, and trees was removed with an excavator. Trees 6 inches in diameter and larger were left standing. Clearing activities were completed on 2 December 2003. The total area cleared was approximately 1.5 acres.

3.2.4 Staging Area

In order to contain and control soil removed from the site, a soil staging area was located adjacent to the SEAD 50/54 site. This staging area was located off-site of SEAD 67 to minimize the lateral extent of disturbed area within SEAD 67. Soil from the initial excavation effort at SEAD 67 (the five waste soil piles and two berms) was loaded into an articulated haul truck, and transported to the temporary staging area where it was stockpiled on a concrete pad located southwest of SEAD 50/54 (adjacent to Avenue H and the existing rail location). All stockpiled material was covered with 6-mil polyethylene sheeting and weighted down on a daily basis to prevent erosion of the pile by wind, rain, snow, and/or storm water. These controls were maintained throughout the project and removed following completion of site activities.

All material excavated from the site following removal of the waste soil piles and berms was either segregated inside the area being excavated or live-loaded for off-site disposal without temporary stockpiling.

3.3 TASK 3 – SOIL REMOVAL

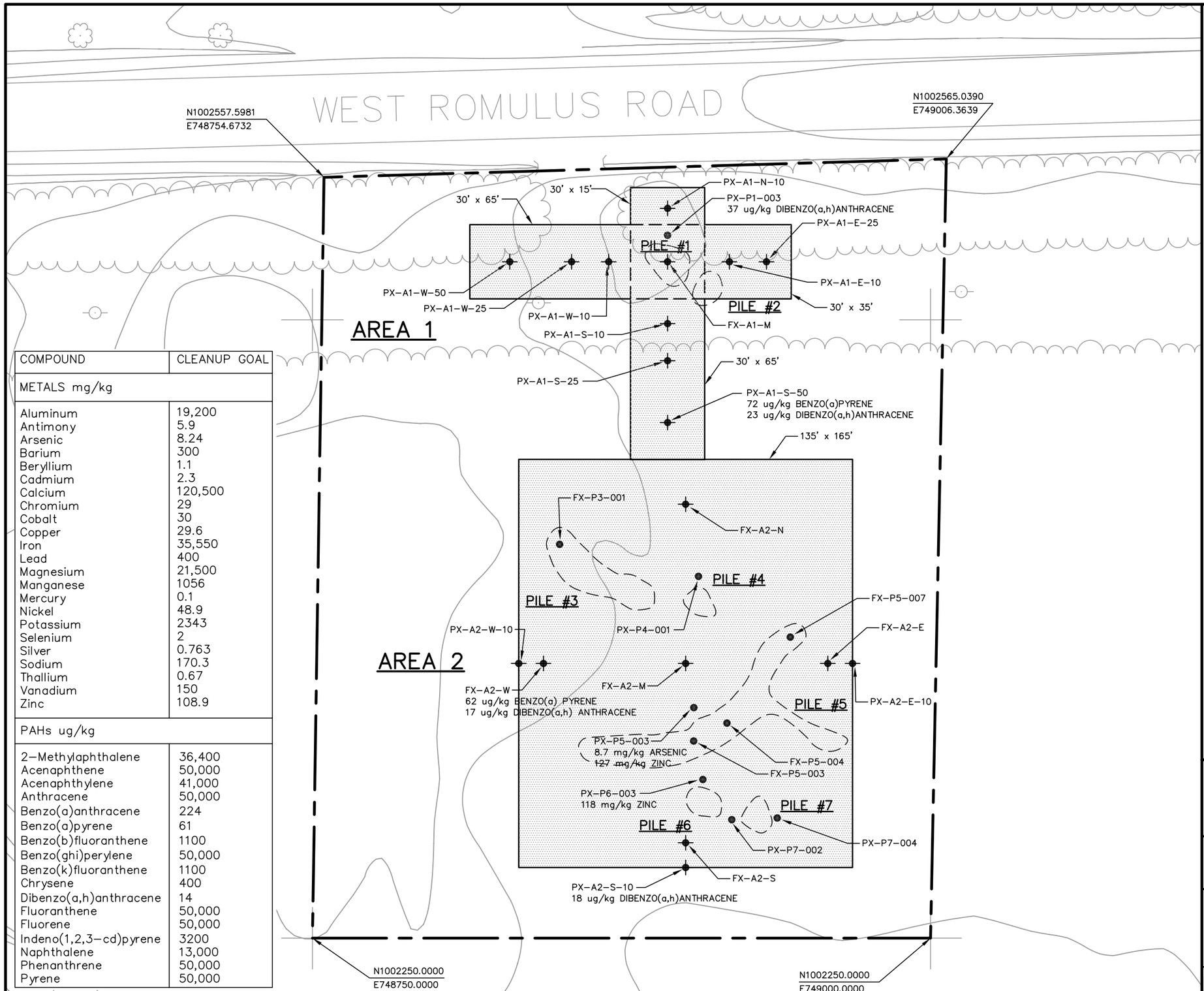
As shown in Figure 3-1, a total of seven piles [representing the five former waste soil piles and two berms identified in the *Final Action Memorandum and Design Document* (Parsons, 2002) were found to be impacted by elevated concentrations of metals (mercury) and PAHs during the 1993 ESI. These locations were designated for removal to eliminate a potential threat to human health and/or the environment that could exist due to the the abandoned soil.

Initial excavation activities to remove the former waste soil piles in SEAD 67 were performed between 2 December 2002 and 3 December 2002. An excavator was used to remove approximately 249 cubic yards (cy) of impacted soil to the existing surface grade. The excavated material was transported in articulated haul trucks to the temporary staging area located at SEAD 50/54. Initially, the volume of soil to be removed from SEAD 67 was estimated to be 150 cy [*Final Action Memorandum and Design Document* (Parsons, 2002)]; however, elevated levels of mercury and/or PAHs were reported in many of the initial post excavation samples at concentrations above the cleanup goals. Consequently, following removal of the seven waste soil piles, additional excavation and sampling activities were conducted with USACE approval.

To delineate the lateral and vertical extents of the additional excavations required at the former waste soil pile locations, soil borings were advanced in two areas to a depth of 2 ft; Excavation Area 1 encompassed the area bordering the former location of Piles 1 and 2, while Excavation Area 2 encompassed the area bordering Piles 3, 4, 5, 6 and 7. Boring locations are shown in Figure 3-1.

3.3.1 Excavation Area 1

As shown in Figure 3-1, Excavation Area 1 which encompasses a total of 6,300 square feet (ft^2) subdivided into five areas measuring: 30 ft by 15 ft; 30 ft by 35 ft; 30 ft by 65 ft; 30 ft by 65 ft;



COMPOUND	CLEANUP GOAL
METALS mg/kg	
Aluminum	19,200
Antimony	5.9
Arsenic	8.24
Barium	300
Beryllium	1.1
Cadmium	2.3
Calcium	120,500
Chromium	29
Cobalt	30
Copper	29.6
Iron	35,550
Lead	400
Magnesium	21,500
Manganese	1056
Mercury	0.1
Nickel	48.9
Potassium	2343
Selenium	2
Silver	0.763
Sodium	170.3
Thallium	0.67
Vanadium	150
Zinc	108.9
PAHs ug/kg	
2-Methylaphthalene	36,400
Acenaphthene	50,000
Acenaphthylene	41,000
Anthracene	50,000
Benzo(a)anthracene	224
Benzo(a)pyrene	61
Benzo(b)fluoranthene	1100
Benzo(ghi)perylene	50,000
Benzo(k)fluoranthene	1100
Chrysene	400
Dibenzo(a,h)anthracene	14
Fluoranthene	50,000
Fluorene	50,000
Indeno(1,2,3-cd)pyrene	3200
Naphthalene	13,000
Phenanthrene	50,000
Pyrene	50,000

LEGEND

- 696 — GROUND CONTOUR AND ELEVATION
- PAVED ROAD
- UTILITY POLE
- BRUSH
- SOIL PILE
- LIMIT OF SOIL REMOVAL
- SITE PERIMETER (LIMIT OF CLEARING)
- CONFIRMATORY SAMPLE LOCATION
- BORING/CONFIRMATORY SAMPLE LOCATION

NOTES

1. ALL SOIL PILES WERE REMOVED DURING INITIAL EXCAVATION.
2. ALL EXCAVATION WAS PERFORMED TO A DEPTH OF 1'.
3. ALL SAMPLE LOCATIONS ARE BASED ON FINAL DATA.

GRAPHIC SCALE

40 20 0 20 40

APPROXIMATE SCALE IN FEET

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
OMAHA DISTRICT
CORPS OF ENGINEERS
OFFUTT AFB, NEBRASKA

SEAD-67
DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO. 4
SENECA ARMY DEPOT ACTIVITY

SAMPLE LOCATION MAP

DRAWN	DATE	FIGURE NO.
A.J.M.	MAR 2004	3-1
CHECKED	W.O. NO.	
C.G.K.	20074-515-035	

M:\Design\DWG\ACOE\SENECA\SEADs\SEAD 67 FINAL REPORT\FIG 3-1.dwg, Layout1, 3/16/2004 1:47:24 PM, murrot, 1:1

and 30 ft by 30 ft. Based on a review of the initial post-excavation analytical data, these areas were established around the perimeter of former waste soil Pile 1 and boring locations to delineate the vertical and horizontal extents of excavation.

Additional soil was removed to a depth of 12 inches from within Area 1 between 24 June 2003 and 27 June 2003, using an excavator with a 4-ft wide grading bucket. Based on the excavation limits shown in Figure 3-1, an additional volume of 234 cy of soil was removed from this area for a cumulative total of 483 cy. Additional information on confirmatory sampling is presented in Subsection 3.4.

3.3.2 Excavation Area 2

As shown in Figure 3-1, Excavation Area 2 encompasses a total of 22,275 ft^2 represented by one area measuring 135 ft by 165 ft. Based on a review of the initial post-excavation analytical data, this area was established around the perimeter of former waste soil Piles 3 through 7 and boring locations to delineate the vertical and horizontal extents of excavation. Additional soil was removed to a depth of 12 inches from within Area 2 between 24 June 2003 and 27 June 2003, using an excavator with a 4-ft wide grading bucket. Based on the excavation limits shown in Figure 3-1, an additional volume of 825 cy of soil was removed from this area for a cumulative total of 1,308 cy. Additional information on confirmatory sampling is presented in Subsection 3.4.

3.4 TASK 4 – CONFIRMATORY SAMPLING AND ANALYSIS

Following removal of the former waste soil piles, initial confirmatory samples were collected from the surface soils beneath the former piles and from the perimeter of each pile. Initial sample locations are shown in Figure 3-3 of WESTON's *Chemical Sampling and Analysis Plan* dated November 2002. A total of 38 confirmation samples were initially collected from within the excavation limits of Areas 1 and 2, and analyzed for metals (mercury), and PAHs [benzo(a)pyrene and dibenzo(a,h)anthracene]. Approximately 20% of those samples were analyzed for the full suite of Target Analyte List (TAL) metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc)

and 17 Target Compound List (TCL) PAHs (2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenzo(ah)anthracene, fluoranthene, fluorine, indeno(123-cd)pyrene, naphthalene, phenanthrene, and pyrene).

Following collection of soil borings and additional excavations in Areas 1 and 2, final confirmatory samples were collected from SEAD 67. Soil boring sample locations and final confirmatory sample locations are shown in Figures 3-1 and 3-2, respectively in this report. A total of 79 final confirmation samples were collected within the excavation limits of Areas 1 and 2. All of the samples were analyzed for mercury, and approximately 27% of those samples were also analyzed for the full suite of TAL metals (listed above) and TCL PAHs (listed above).

The total number of initial and final confirmation samples collected from SEAD 67 is summarized in Table 3-1.

Table 3-1
Summary of Confirmation Soil Samples Collected

	Number of Initial Samples			Number of Final Samples			Total		
SEAD 67 Area	**Floor**	**Perimeter**	**Subtotal**	**Floor**	**Perimeter**	**Subtotal**	**Floor**	**Perimeter**	**Total**
1	2	4	6	8	15	23	10	19	29
2	12	20	32	35	21	56	47	41	88
Total	**14**	**24**	**38**	**43**	**36**	**79**	**57**	**60**	**117**

Note: The totals above do not include duplicate or QC samples

Quality Control samples were also collected throughout implementation of the TCRA. These included internal field duplicates and matrix spike/matrix spike duplicates (MS/MSD). One duplicate sample was collected for every 10 field samples (10%). One MS/MSD sample was collected for every 20 field samples (5%).

The data summarized in this report references cleanup goals in evaluating the horizontal and vertical limits of excavation. For comparison purposes, the New York Technical Administrative Guidance Memorandum (TAGM) No. 4046 Cleanup Objective Values were used for the cleanup goal for all site-specific target compounds identified in the 1993 ESI (mercury and all PAHs).

Non-target metal compounds that were reviewed in accordance with the TAGM No. 4046 values included barium, cobalt, selenium, and vanadium. With the exception of lead, all other non-target metals were compared with the 95th Percentile Background Numbers for SEDA where no TAGM value exists [denoted as Site Background ("SB") in the TAGM] or where comparisons to "SB" are allowed in lieu of the default TAGM 4046 values. The 95th Percentile Background Numbers have been used by SEDA at other SEADs in evaluating closure status. The cleanup goal for lead is based on the EPA Risk Based Residential Cleanup Goal. Final results for carcinogenic PAHs (cPAHs) were also compared to a Benzo(a)pyrene Toxicity Equivalent (TEQ) limit of 10,000 µk/kg. The Benzo(a)pyrene TEQ is calculated by multiplying the concentration of each cPAH in a given sample by the appropriate TEQ multiplier and then summing the results to obtain the corresponding TEQ for the cPAHs. The cPAHs and associated TEQ multipliers include the following:

- Benzo(a)pyrene = 1.0
- Dibenzo(a,h)anthracene = 1.0
- Benzo(a)anthracene = 0.1
- Benzo(b)fluoranthene = 0.1
- Indeno(1,2,3-cd)pyrene = 0.1
- Benzo(k)fluoranthene = 0.01
- Chrysene = 0.01

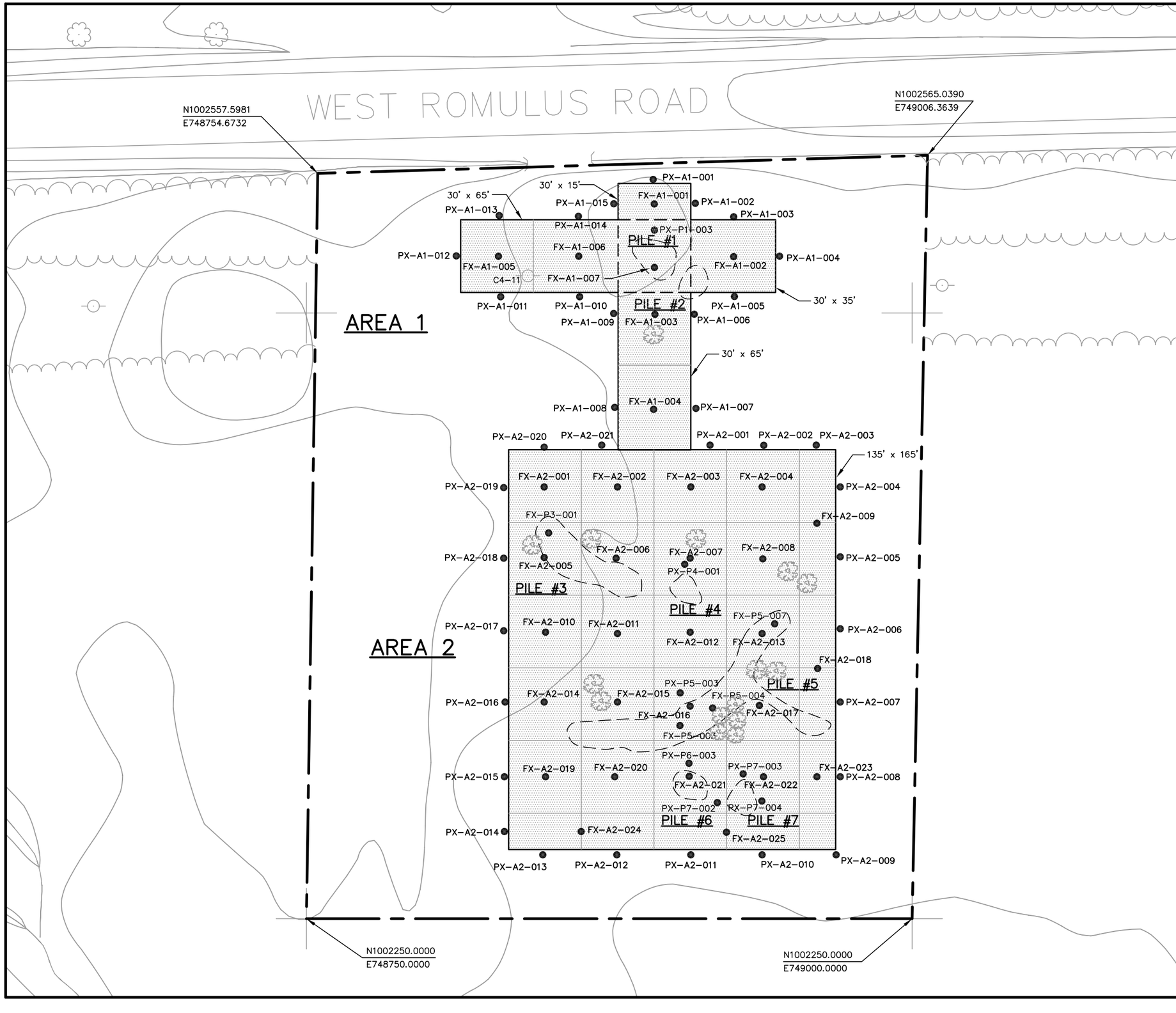
A summary of the sampling and analysis performed during excavation activities is outlined in Subsections 3.4.1 and 3.4.2.

3.4.1 Area 1 Sampling and Analysis

A total of six confirmation samples (two composite floor samples and four discrete sidewall samples) were initially collected in Area 1 following removal of former waste soil Piles 1 and 2. One (1) of the initial confirmation samples was analyzed for the full suite of TAL metals (23 metals) using EPA Method SW-846/6010B and TCL PAHs using EPA Method SW-846/3541/3540B/8270C. The remaining samples were analyzed for mercury only. All six samples exceeded the cleanup goal of 0.1 mg/kg for mercury with a maximum concentration of 1.1 mg/kg reported at PX-P1-03. A total of four additional non-target metals were reported at concentrations above the cleanup goals as follows: antimony (13.6 mg/kg); cadmium (3.5 mg/kg); selenium (19 mg/kg); and thallium (25.5 mg/kg). Also at sample location

PX-P1-03, concentrations were reported above the cleanup goals for the following PAHs, benzo(a)pyrene (150 µg/kg) and dibenzo(a,h)anthracene (37 µg/kg). Additional sampling was not performed for the non-target metals that exceeded the cleanup goals; however, to address the mercury and two PAH exceedances, WESTON further investigated the area by collecting soil boring samples using a drill rig. To determine the lateral extent required for further excavation, samples were collected at 10 ft, 25 ft, and 50 ft increments to the north, south, east and west of the footprint represented by former waste soil Pile 1. Samples were collected at 0-1 ft, 1-2 ft, 2-3 ft, and 3-4 ft depth intervals to determine the vertical extent required for further excavation. Refer to Figure 3-1 for investigative boring sample locations. Out of the 40 samples collected from the 10 soil boring locations shown in Figure 3-1, a total of 14 samples were analyzed to confirm the final lateral and vertical extents required for additional excavation in Area 1. Out of the 14 confirmation samples, six were analyzed for mercury with a maximum detected concentration of 0.074 mg/kg reported at sample location PX-A1-SS-S-25(0-1). The cleanup goal for mercury is 0.1 mg/kg. A total of 10 out of the 14 samples were analyzed for the two PAH parameters, benzo(a)pyrene and dibenzo(a,h)anthracene, with maximum concentrations of 72 µg/kg and 23 µg/kg, respectively, reported at sample location PX-A1-S-50. The cleanup goals for benzo(a)pyrene and dibenzo(a,h)anthracene are 61 µg/kg and 14 µg/kg, respectively. Although exceedances were reported for these two PAH parameters, an evaluation of the Benzo(a)pyrene TEQ did not result in an exceedance of the 10,000 µg/kg limit for total cPAHs in Area 1. The area was excavated to a depth of 1 ft to the lateral limits shown in Figure 3-1. Soil boring results are included in Appendix A.

On 11 May 2004, 8 confirmatory floor samples and 15 confirmatory perimeter samples were collected from the Area 1 excavation. Samples were collected as discrete grab samples between 2-6 inches below ground surface (bgs). Refer to Figure 3-2 for sample locations and Appendix A for sample results. Of the 23 confirmatory samples collected in Area 1, two floor samples and three perimeter samples were analyzed for the full suite of TAL metals and TCL PAHs. The remaining samples were analyzed for arsenic, mercury, and zinc only. An evaluation of the maximum confirmatory sample results for Area 1 (refer to Appendix A), indicates three exceedances in Area 1 for mercury. However, the overall average result for mercury in Area 1 is 0.08 mg/kg, which is below the cleanup goal of 0.1 mg/kg. Maximum confirmatory sample results also indicate exceedances for the following PAHs in Area 1: benzo(a)anthracene;



LEGEND

- 696 — GROUND CONTOUR AND ELEVATION
- PAVED ROAD
- UTILITY POLE
- BRUSH
- TREE
- FORMER FOOTPRINT OF SOIL PILE
- LIMIT OF SOIL REMOVAL
- SITE PERIMETER (LIMIT OF CLEARING)
- CONFIRMATORY SAMPLE LOCATION

NOTES

1. ALL EXCAVATION WAS PERFORMED TO A DEPTH OF 1'.
2. ALL CONFIRMATORY SAMPLE LOCATIONS REPRESENT FINAL EXCAVATION LIMITS.
3. PX SAMPLES REPRESENT PERIMETER SAMPLES COLLECTED ON SURFACE, 1' OUTSIDE THE LIMIT OF EXCAVATION.
4. FX SAMPLES REPRESENT FLOOR SAMPLES COLLECTED ON THE SURFACE OF THE LIMIT OF EXCAVATION.
5. ALL SAMPLES COLLECTED AS GRABS.

GRAPHIC SCALE

40 20 0 20 40

APPROXIMATE SCALE IN FEET

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
OMAHA DISTRICT
CORPS OF ENGINEERS
OFFUTT AFB, NEBRASKA

SEAD-67
DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO. 4
SENECA ARMY DEPOT ACTIVITY

CONFIRMATORY SOIL SAMPLE LOCATION MAP

DRAWN	DATE	FIGURE NO.
BEG	DEC 2004	3-2
CHECKED	W.O. NO. 20074-515-035	

M:\Design\DWG\ACOE\SENECA\SEADs\SEAD 67 FINAL REPORT\FIG 3-1 and 3-2.dwg, 3-2, 12/14/2004 11:42:53 AM, girardeb, 1:1

benzo(a)pyrene; benzo(k)fluoranthene; chrysene; and dibenzo(a,h)anthracene. However, evaluation of the Benzo(a)pyrene TEQ does not result in an exceedance of the 10,000 µg/kg limit for total cPAHs in Area 1. The overall average Benzo(a)pyrene TEQ for Area 1 is 598 ug/kg.

3.4.2 Area 2 Sampling and Analyses

A total of 32 confirmation samples (12 composite floor samples and 20 discrete sidewall samples) were initially collected in Area 2 following removal of former waste soil piles 3, 4, 5, 6, and 7. Seven (7) of the initial confirmation samples were analyzed for the full suite of TAL metals (23 metals) using EPA Method SW-846/6010B, and TCL PAHs using EPA Method SW-846/3541/3540B/8270C. The remaining samples were analyzed for mercury only. Twenty-six of the 32 samples analyzed for mercury exceeded the cleanup goal of 0.1 mg/kg with a maximum concentration of 10 mg/kg, reported at PX-P3-03. A total of five additional non-target metals were reported at concentrations above the cleanup goals as follows: arsenic (8.7 mg/kg); copper (78.8 mg/kg); selenium (24 mg/kg); silver (4.7 mg/kg); and thallium (31.8 mg/kg). A total of three out of the seven samples analyzed for all PAHs had reportable concentrations above the cleanup goals for benzo(a)pyrene and dibenzo(a,h)anthracene, with maximum concentrations of 470 µg/kg and 75 µg/kg, respectively. Additional sampling was not performed for the non-target metals that exceeded the cleanup goals; however, to address the 26 mercury and 3 PAH exceedances, WESTON further investigated the area using a drill rig to collect soil boring samples. Samples were collected at eight locations in Area 2 within a 135-ft by 165-ft perimeter limit encompassing the footprint represented by the former waste soil piles. To determine the lateral extent required for further excavation, samples were collected to the north, south, east, and west of the former waste soil piles. Samples were collected at 0-1 ft, 1-2 ft, 2-3 ft, and 3-4 ft depth intervals to define the vertical extents required for additional excavation. Refer to Figure 3-1 for investigative boring sample locations. Out of the 32 samples collected from 8 boring locations, a total of 10 samples were analyzed to confirm the final lateral and vertical extents required for additional excavation in Area 2. Out of the 10 confirmation samples, 8 were analyzed for mercury with a maximum detected concentration of 0.097 mg/kg reported at FX-A2-SS-W(0-1). The cleanup goal for mercury is 0.1 mg/kg. A total of 8 out of the 10 samples were also analyzed for the two PAH parameters, benzo(a)pyrene, and

dibenzo(a,h)anthracene. A maximum detected concentration of 62 µg/kg was reported for benzo(a)pyrene at FX-A2-W. The cleanup goal for benzo(a)pyrene is 61 µg/kg. A maximum detected concentration of 18 µg/kg was reported for dibenzo(a,h)anthracene at PX-A2-S-10. The cleanup goal for dibenzo(a,h)anthracene is 14 µg/kg. Although exceedances were reported for these two PAHs, an evaluation of the Benzo(a)pyrene TEQ did not result in an exceedance of the 10,000 µg/kg limit for total cPAHs in Area 2. Therefore, the area was excavated to a depth of 1 ft to the lateral limits shown in Figure 3-1. Soil boring results are included in Appendix A.

On 11 May 2004, 35 confirmatory floor samples and 21 confirmatory perimeter samples were collected from the Area 2 excavation. Samples were collected as discrete grab samples between 2-6 inches bgs. Refer to Figure 3-2 for sample locations and Appendix A for confirmatory sample results. A total of 12 floor samples and 4 perimeter samples were analyzed for the full suite of TAL metals and TCL PAHs. The remaining samples were analyzed for arsenic, mercury, and zinc only. Evaluation of the maximum confirmatory sample results for Area 2 (refer to Appendix A), indicates five exceedances in Area 2 for mercury; however, the overall average result for mercury in Area 2 is 0.08 mg/kg, which is below the cleanup goal of 0.1 mg/kg. Maximum confirmatory sample results for Area 2 also indicate exceedances for benzo(a)pyrene and dibenzo(a,h)anthracene. Although there were exceedances for two PAH parameters, an evaluation of the Benzo(a)pyrene TEQ does not result in an exceedance of the 10,000 µg/kg limit for total cPAHs in Area 2. The overall average Benzo(a)pyrene TEQ for Area 2 is 73 ug/kg.

3.4.3 Waste Characterization Sampling

Waste disposal samples were utilized as the basis for characterizing excavated soil for off-site landfill disposal. All excavated material was stockpiled prior to transportation and off-site disposal. A representative waste disposal characterization sample was collected from each stockpile as a five-point composite at a rate of one composite sample per 750 tons of impacted soil.

A total of three samples were collected and analyzed for waste characterization from SEAD 67. Each waste characterization sample was analyzed for TCL procedure metals using EPA Method SW-846/1311/6010B, volatile organic compounds using EPA Method SW-846/5035A/8260B, semi-volatile organic compounds using EPA Method SW-846-3541/3540B/8270C, PCBs using

EPA Method SW-846-3541/3540B/8082, and Pesticides using EPA Method SW-846-3541/3540B/8081A. Waste characterization samples were also analyzed for reactivity-cyanide using EPA Method 7.3.3.2/9014, reactivity-sulfide using EPA Method 7.3.4.2/9034, corrosivity using EPA Method 9045C, and hydrogen ion concentration and. No QC samples were collected from the waste characterization samples.

The waste characterization analytical results from SEAD 67 soils did not exhibit any hazardous waste characteristics; therefore, the material was classified and profiled as a non-hazardous metal and PAH contaminated soil for T&D. A summary of waste characterization data is included in Appendix B.

3.5 TASK 5 – TRANSPORTATION AND DISPOSAL

Approximately 1,654 tons of non-hazardous metal and PAH-contaminated soil were removed from SEAD 67 between 16 July and 31 July 2003, as a result of the TCRA performed in Areas 1 and 2. Soil was shipped to the Seneca Meadows Landfill located in Waterloo, New York. A summary containing the manifest number, shipment date, truck numbers, scale weights, and tare weights is included in Appendix C. Manifests are on file with SEDA, and will be submitted under separate cover upon request.

3.6 TASK 6 – SITE RESTORATION

Site restoration was not conducted at SEAD 67. The site is located in a remote area, east of the prison water treatment plant in the center of SEDA, surrounded by dense hardwoods and underbrush, and there is no planned use for this area. Based on the limited removal depth of 12 inches, no backfill was brought into the site.

3.7 TASK 7 – DEMOBILIZATION

Upon completion of soil removal activities, USACE inspected the excavation areas within SEAD 67 in August 2003 to ensure that that site limits were completed in accordance with the project objectives. Since the excavation, sampling, and T&D efforts were performed intermittently over the 6 month period between 02 November 2002 and 1 August 2003,

equipment was demobilized from the site in a phased manner following completion of each activity. Final demobilization was performed on 1 August 2003, following completion of T&D activities.

3.8 CONCLUSION

This final report documents completion of the metals and PAH removal from the SEAD 67 SWMU in accordance with the WESTON *Final Task Work Plan* (WESTON, 2002), which was prepared in accordance with the *Final Action Memorandum and Design Document* (Parsons, 2002). During the TCRA conducted at SEAD 67, WESTON removed a total of seven former waste soil piles that were identified as the source for metals (mercury) and PAH impacted soil at the site. Following removal of the waste soil piles, additional soil was excavated to a 1 ft depth from the surrounding area. All excavated soils were disposed off-site as non-hazardous material.

Following a comparison of confirmatory sample results with the cleanup goals, it is concluded that the horizontal and vertical extents of elevated levels of mercury and PAHs in soil have been sufficiently delineated and removed from SEAD 67. As a result, the potential threat to human health and the environment posed by the formerly impacted site soils has been eliminated through the source reduction and removal efforts described in this report. The confirmatory soil sample results presented in this report indicate that the average mercury content in SEAD 67 soils is below the 0.1 mg/kg cleanup goal for mercury. Confirmatory soil sample results also indicate that neither the maximum result nor the site-wide average for total cPAHs in SEAD 67 soils exceeds the Benzo(a)pyrene TEQ of 10,000 µg/kg. Based on these results, it is recommended that USACE, SEDA, NYSDEC, and EPA evaluate this site for closure and/or transfer status.

SECTION 4

REFERENCES

4. REFERENCES

New York State Department of Environmental Conservation (NYSDEC) *Technical and Administrative Guidance Memorandum No. 4046, Determination of Soil Cleanup Objectives and Cleanup Levels*, January 1994.

Omaha District Corps of Engineers, *Final Scope of Work for Rapid Response Action – Metal Sites – SEADs 24, 50/54, & 67, Seneca Army Depot, Romulus, NY*, 30 September 2002.

Parsons, *Final Action Memorandum and Decision Document, Time-CriticalRemoval Actions, Four Metals Sites (SWMU's SEAD-24, 50/54, and 67)*, August 2002.

U.S. Army Corps of Engineers (USACE), *USACE Requirements for the Preparation of Sampling and Analysis Plans*, EM-200-1-3, (1994).

U.S. Army Corps of Engineers (USACE), *Safety and Health Requirements Manual*, EM 385-1-1, September 1996.

United States Environmental Protection Agency (EPA), *Management of Remediation Waste Under RCRA*, EPA530–F–98–026, October 1998.

Weston Solutions, Inc. (WESTON), *Chemical Sampling and Analysis Plan*, November 2002

Weston Solutions, Inc. (WESTON), *Final Task Work Plan*, November 2002

APPENDIX A

ANALYTICAL RESULTS FOR SEAD 67 AREAS 1 AND 2

Table Notes

1. The Cleanup goal is based on the New York Technical Administrative Guidance Memorandum (TAGM) No.4046
Recommended Soil Cleanup Objectives. Values denoted as Site Background ("SB") in TAGM 4046 were compared with the highlighted values (95th percentile of Seneca Army Depot (SEDA) Site Background) in lieu of the TAGM "SB" since no background cleanup objectives exist for certain parameters.

2. U.S. Environmental Protection Agency Risk Based Residential Cleanup Goal for lead

3. Where exceedances for individual PAHs exist, evaluation of the Benzo(a)pyrene Toxicity Equivalent for total carcinogenic PAHs (cPAHs) would not exceed the 10,000 µg/kg limit for total cPAHs for any sample collected. The cPAHs include: benzo(a)pyrene; dibenzo(a,h)anthracene; benzo(a,h)anthracene; benzo(b)fluoranthene; indeno(1,2,3-cd)pyrene; benzo(k)fluouranthene; and chrysene.

4. Benzo(a)pyrene TEQ for carcinogenic PAHs is calculated by multiplying the individual cPAH results by the applicable factor from the list below, and then summing the results:

Benzo(a)pyrene = 1.0
Dibenzo(a,h)anthracene = 1.0
Benzo(a)anthracene = 0.1
Benzo(b)fluoranthene = 0.1
Indeno(1,2,3-cd)pyrene = 0.1
Benzo(k)fluoranthene = 0.01
Chrysene = 0.01

mg/kg= milligram per kilogram

µg/kg= microgram per kilogram

B= Result is less than the CRDL/Reporting Limit (RL), but >/= to the Instrument Detection Limit/method detection limit (MDL).

H= Alternate peak selection upon analytical review

J= Result is less than the RL, but greater than or equal to the MDL.

M= Manually integrated compound.

N= Matrix spike/matrix spike duplicate (MS/MSD): Spike recovery exceeds the upper or lower control limits.

E = Result exceeded calibration range, secondary dilution required.

A = Concentration exceeds the instrument calibration range or below the RL.

U= Analyte was not detected at or above the RL.

95th percentile of SEDA Site Background

Result Exceeds Cleanup Criteria

Confirmatory Sample Results for Area 1 Soil
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Compound	Cleanup Goal[1]	SEAD67-FX-A1-SS-001-FS	SEAD67-FX-A1-SS-002-FS	SEAD67-FX-A1-SS-003-FS	SEAD67-FX-A1-SS-004-FS	SEAD67-FX-A1-SS-005-FS	SEAD67-FX-A1-SS-006-FS	SEAD67-FX-A1-SS-007-FS	SEAD67-PX-P1-SS-003-FS	SEAD67-PX-A1-SS-001-FS	SEAD67-PX-A1-SS-002-FS	SEAD67-PX-A1-SS-003-FS	SEAD67-PX-A1-SS-004-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
Aluminum	19,200					12100			13200				
Antimony	5.9					0.56 U			13.6 u				
Arsenic	8.24	5.6	5.3	4.4	4.9	4.1	5.7	5.8	4.9 J	4.9	4.7 B	3.5 B	4.4
Barium	300					53.7			71.8				
Beryllium	1.1					0.65 B			0.69 J				
Cadmium	2.3					0.49 U			3.5 u				
Calcium	120,500					1770			3080				
Chromium	29					18.1			19.8				
Cobalt	30					10.8			11				
Copper	29.6					15.9			19.5				
Iron	35,550					24500			24100				
Lead[2]	400					11.6			19.3				
Magnesium	21,500					3810			3890				
Manganese	1,056					445			438				
Mercury	0.1	0.038 B	0.047 B	0.079 B	0.056 B	0.039 B	0.032 B	0.032 B		0.055 B	0.079 B	0.064 B	0.064 B
Nickel	48.9					26.3			26				
Potassium	2,343					649			1250				
Selenium	2					0.79 U			18.6 u				
Silver	0.763					0.16 U			0.41 J				
Sodium	170.3					56.4			82.8 J				
Thallium	0.67					0.98 U			25.5 u				
Vanadium	150					18.5			20.1				
Zinc	108.9	64.7	72.8	51.7	68.1	55	69.9	61.7	66.3	64.6	54.6	44.1	49.2
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400					34 U			420 u				
Acenaphthene	50,000					18 U			420 u				
Acenaphthylene	41,000					13 U			27 J				
Anthracene	50,000					21 J			40 J				
Benzo(a)anthracene	224					57 J			160 J				
Benzo(a)pyrene	61					53							
Benzo(b)fluoranthene	1,100					47 U			130 J				
Benzo(ghi)perylene	50,000					30 J							
Benzo(k)fluoranthene	1,100					51 J			160 J				
Chrysene	400					60 J			190 J				
Dibenzo(a,h)anthracene	14					11 M			37 J				
Fluoranthene	50,000					110 J			340 J				
Fluorene	50,000					24 U			420 u				
Indeno(1,2,3-cd)pyrene	3,200					29 J			97 J				
Naphthalene	13,000					39 U			420 u				
Phenanthrene	50,000					87 J			260 J				
Pyrene	50,000					110 J			400 J				
Benzo(a)pyrene TEQ[4]	10,000					78.41			79.2				

Confirmatory Sample Results for Area 1 Soil
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Compound	Cleanup Goal[1]	SEAD67-PX-A1-SS-005-FS	SEAD67-PX-A1-SS-006-FS	SEAD67-PX-A1-SS-007-FS	SEAD67-PX-A1-SS-008-FS	SEAD67-PX-A1-SS-009-FS	SEAD67-PX-A1-SS-010-FS	SEAD67-PX-A1-SS-011-FS	SEAD67-PX-A1-SS-012-FS	SEAD67-PX-A1-SS-013-FS	SEAD67-PX-A1-SS-014-FS	SEAD67-PX-A1-SS-015-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
Aluminum	19,200	9220					16000					13800
Antimony	5.9	0.62 U					0.52 U					0.68 U
Arsenic	8.24	3.7 B	4 B	4.6	5.4	4.1 B	7.1	4 B	5.1	5.2	5.1	5.8
Barium	300	99.5					79.2					67.6
Beryllium	1.1	0.55 B					1.2					0.68 B
Cadmium	2.3	0.55 U					0.46 U					0.59 U
Calcium	120,500	3160					2160					3440
Chromium	29	13.3					25.6					20.1
Cobalt	30	5.2					15.7					12
Copper	29.6	16					36.6					20.1
Iron	35,550	16100					35300					25500
Lead[2]	400	25.8					18					24.2
Magnesium	21,500	2410					5200					4150
Manganese	1,056	320					959					436
Mercury	0.1	0.075 B	0.082 B	0.095 B	0.32	0.2	0.046 B	0.061 B	0.056 B	0.067 B	0.11	0.063 B
Nickel	48.9	15.2					41.9					27.4
Potassium	2,343	720					1080					1290
Selenium	2	0.87 U					0.73 U					1 B
Silver	0.763	0.17 U					0.15 U					0.19 U
Sodium	170.3	41.8 B					34.7 B					58
Thallium	0.67	1.1 U					0.91 U					1.2 U
Vanadium	150	17					24.9					21.9
Zinc	108.9	49.6	60.6	78.4	67.2	66.5	85.1	47.9	63.9	69.9	64	70.6
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400	83 U					34 U					160 U
Acenaphthene	50,000	44 U					18 U					90 J
Acenaphthylene	41,000	130 J					32 J					380 J
Anthracene	50,000	200 J					46 J					500 J
Benzo(a)anthracene	224	440 J					110 J					1100 J
Benzo(a)pyrene	61	420					110					1100
Benzo(b)fluoranthene	1,100	460 J					100					910 J
Benzo(ghi)perylene	50,000	280 J					60					630 J
Benzo(k)fluoranthene	1,100	460 J					110					1300 J
Chrysene	400	540 J					130 J					1400 J
Dibenzo(a,h)anthracene	14	96 M					21 M					220
Fluoranthene	50,000	1100					250 J					2700
Fluorene	50,000	59 U					25 U					190 J
Indeno(1,2,3-cd)pyrene	3,200	260 J					58 J					620 J
Naphthalene	13,000	94 U					39 U					180 U
Phenanthrene	50,000	870 J					210 J					2200
Pyrene	50,000	900 J					220					2300
Benzo(a)pyrene TEQ[4]	10,000	642					160.2					1,610

Confirmatory Sample Results for Area 2 Soil
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Compound	Cleanup Goal[1]	SEAD67-FX-P3-SS-001-FS	SEAD67-PX-P4-SS-001-FS	SEAD67-FX-P5-SS-003-FS	SEAD67-FX-P5-SS-004-FS	SEAD67-FX-P5-SS-007-FS	SEAD67-PX-P5-SS-003-FS	SEAD67-PX-P6-SS-003-FS	SEAD67-PX-P7-SS-002-FS	SEAD67-PX-P7-SS-003-FS	SEAD67-PX-P7-SS-004-FS	SEAD67-FX-A2-SS-001-FS	SEAD67-FX-A2-SS-002-FS	SEAD67-FX-A2-SS-003-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	19,200	13700	13700	12700		12300	13800	13700		12400				
Antimony	5.9	16.9 u	15.6 u	1.6 u		14.5 u	14.6 u	14.8 u		17.2 u				
Arsenic	8.24	6.7 J	5.3 J	5.8		4.8 J	8.7 j	6 J		5.6 J		4.4	4.6	5.7
Barium	300	145	140	102		91.2	111	104		118				
Beryllium	1.1	0.84 J	0.79 J	0.7		0.74 J	0.83 j	0.81 J		2.9 u				
Cadmium	2.3	4.3 u	4 u	1.3 u		3.7 u	3.7 u	3.8 u		4.4 u				
Calcium	120,500	7520	3860	6310		9750	11000	5970		4630				
Chromium	29	21.3	20.4	21.3		19.9	24	23.5		17.9				
Cobalt	30	10.9	8.5	11.7		10.2	12.9	12.9		7.9				
Copper	29.6	23.9	19.6	52.5		22.6	78.8	44.5		20.3				
Iron	35,550	25600	23300	25100		23000	32800	28000		20700				
Lead[2]	400	34.5	20.6	24.1		17.7	36.2	22		24				
Magnesium	21,500	4400	3760	4760		4710	6540	5330		3230				
Manganese	1,056	799	456	632		379	510	403		475				
Mercury	0.1		0.08		0.082	0.071 J			0.1		0.098 J	0.041 B	0.028 B	0.042 B
Nickel	48.9	30	24	31.1		28.8	35.9	35.4		20.4				
Potassium	2,343	2330	1660	1680		1750	1720	1710		1770				
Selenium	2	23.1 u	21.3 u	2.1 u		19.9 u	20 u	20.2 u		23.6 u				
Silver	0.763	4.3 u	4 u	3.4		3.7 u	2.2 j	4.7		4.4 u				
Sodium	170.3	99.1 J	72.1 J	83.9		89.2 J	97.1 j	76.3 J		72.8 J				
Thallium	0.67	31.8 u	29.3 u	4 u		27.3 u	27.4 u	27.8 u		32.4 u				
Vanadium	150	23.3	23	19		18	21.6	20.4		21.6				
Zinc	108.9	106	77.6	107		86	127	118		68.3		57.6	58.6	76.2
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400	470 u	450 u	37 u		430 u	450 u	440 u		500 u				
Acenaphthene	50,000	25 J	450 u	20 u		430 u	450 u	32 J		500 u				
Acenaphthylene	41,000	110 J	25 J	15 u		430 u	450 u	440 u		500 u				
Anthracene	50,000	130 J	26 J	25 J		430 u	41 j	43 J		500 u				
Benzo(a)anthracene	224		97 J	90 J		33 J	200 J	180 J		32 J				
Benzo(a)pyrene	61					34 J				35 J				
Benzo(b)fluoranthene	1,100	330 J	91 J	76 J		430 u	200 J	130 J		500 u				
Benzo(ghi)perylene	50,000	170 J	50 J	49 J		430 u	47 J	75 J		500 u				
Benzo(k)fluoranthene	1,100	460 J	93 J	82 J		430 u	200 J	210 J		500 u				
Chrysene	400		120 J	100 J		39 J	230 J	210 J		43 J				
Dibenzo(a,h)anthracene	14													
Fluoranthene	50,000	890	190 J	150 J		57 J	270 J	340 J		67 J				
Fluorene	50,000	57 J	450 u	27 u		36 J	450 u	440 u		500 u				
Indeno(1,2,3-cd)pyrene	3,200	180 J	56 J	52 J		430 u	59 J	84 J		500 u				
Naphthalene	13,000	470 u	450 u	43 u		430 u	450 u	440 u		500 u				
Phenanthrene	50,000	720	150 J	120 J		38 J	150 J	250 J		45 J				
Pyrene	50,000	1300	250 J	210 J		78 J	340 J	420 J		77 J				
Benzo(a)pyrene TEQ[4]		56	27	24		128	50	44		144				

Confirmatory Sample Results for Area 2 Soil
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Compound	Cleanup Goal[1]	SEAD67-FX-A2-SS-004-FS	SEAD67-FX-A2-SS-005-FS	SEAD67-FX-A2-SS-006-FS	SEAD67-FX-A2-SS-007-FS	SEAD67-FX-A2-SS-008-FS	SEAD67-FX-A2-SS-009-FS	SEAD67-FX-A2-SS-010-FS	SEAD67-FX-A2-SS-011-FS	SEAD67-FX-A2-SS-012-FS	SEAD67-FX-A2-SS-013-FS	SEAD67-FX-A2-SS-014-FS	SEAD67-FX-A2-SS-015-FS	SEAD67-FX-A2-SS-016-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	19,200		11900					12000					13600	
Antimony	5.9		0.52 U					0.5 U					0.55 U	
Arsenic	8.24	6.3	4.9	5.1	4.2 B	5.1	3.3 B	5.3	5.5	6.8	4.6	5.9	6	6.2
Barium	300		122					146					113	
Beryllium	1.1		0.79 B					0.7 B					0.89 B	
Cadmium	2.3		0.46 U					0.44 U					0.48 U	
Calcium	120,500		2400					3190					3550	
Chromium	29		18.1					18.8					22	
Cobalt	30		12.6					11.6					11.4	
Copper	29.6		19.5					23.6					26.5	
Iron	35,550		25500					26200					29800	
Lead[2]	400		13.4					11.6					13.2	
Magnesium	21,500		3900					4620					4790	
Manganese	1,056		928					729					645	
Mercury	0.1	0.044 B	0.067 B	0.12	0.077 B	0.055 B	0.099 B	0.036 B	0.058 B	0.099 B	0.081 B	0.027 B	0.065 B	0.046 B
Nickel	48.9		28.5					33					35.6	
Potassium	2,343		727					687					748	
Selenium	2		0.73 U					0.7 U					0.77 U	
Silver	0.763		0.15 U					0.14 U					0.15 U	
Sodium	170.3		24.4 B					32.4 B					29.9 B	
Thallium	0.67		0.9 U					0.87 U					0.95 U	
Vanadium	150		20					20.4					23.7	
Zinc	108.9	55.2	62.7	68.9	81.4	66.7	47.9	60.4	64.2	79.2	71.4	59.4	71.7	77.7
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400		34 U					34 U					76 U	
Acenaphthene	50,000		18 U					18 U					41 U	
Acenaphthylene	41,000		13 U					13 U					30 U	
Anthracene	50,000		15 U					15 U					41 J	
Benzo(a)anthracene	224		18 U					18 U					86 J	
Benzo(a)pyrene	61		10 U					10 U					87	
Benzo(b)fluoranthene	1,100		47 U					46 U					100 U	
Benzo(ghi)perylene	50,000		21 U					21 U					51 J	
Benzo(k)fluoranthene	1,100		48 U					47 U					110 U	
Chrysene	400		21 U					21 U					95 J	
Dibenzo(a,h)anthracene	14		10 U					10 U					23 UM	
Fluoranthene	50,000		27 U					27 U					190 J	
Fluorene	50,000		25 U					24 U					54 U	
Indeno(1,2,3-cd)pyrene	3,200		22 U					22 U					49 U	
Naphthalene	13,000		39 U					39 U					87 U	
Phenanthrene	50,000		29 U					29 U					170 J	
Pyrene	50,000		23 U					23 U					170 J	
Benzo(a)pyrene TEQ[4]			29					29					135.55	

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Compound	Cleanup Goal[1]	SEAD67-FX-A2-SS-017-FS	SEAD67-FX-A2-SS-018-FS	SEAD67-FX-A2-SS-019-FS	SEAD67-FX-A2-SS-020-FS	SEAD67-FX-A2-SS-021-FS	SEAD67-FX-A2-SS-022-FS	SEAD67-FX-A2-SS-023-FS	SEAD67-FX-A2-SS-024-FS	SEAD67-FX-A2-SS-025-FS	SEAD67-PX-A2-SS-001-FS	SEAD67-PX-A2-SS-002-FS	SEAD67-PX-A2-SS-003-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	19,200				11700					10300			
Antimony	5.9				0.54 U					0.57 U			
Arsenic	8.24	4.4 B	6.1	4.7	5.1	5.5	6.7	5.8	4.5 B	5	5.2	4.4	5.2
Barium	300				76.3					96.1			
Beryllium	1.1				0.73 B					0.71 B			
Cadmium	2.3				0.48 U					0.5 U			
Calcium	120,500				2440					2530			
Chromium	29				19.3					17.1			
Cobalt	30				10.3					12.3			
Copper	29.6				19.8					19.8			
Iron	35,550				25300					24700			
Lead[2]	400				11.5					14.6			
Magnesium	21,500				4290					3420			
Manganese	1,056				433					577			
Mercury	0.1	0.042 B	0.036 B	0.046 B	0.038 B	0.036 B	0.091 B	0.033 B	0.053 B	0.044 B	0.091 B	0.094 B	0.082 B
Nickel	48.9				29					25.7			
Potassium	2,343				587					529			
Selenium	2				0.76 U					0.8 U			
Silver	0.763				0.15 U					0.16 U			
Sodium	170.3				27.9 B					25.4 B			
Thallium	0.67				0.94 U					0.99 U			
Vanadium	150				20					19.5			
Zinc	108.9	61.3	66.3	65.2	59.7	50.9	82.6	64.3	59.3	52	72.2	76.2	78.3
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400				34 U					35 U			
Acenaphthene	50,000				18 U					19 U			
Acenaphthylene	41,000				13 U					14 U			
Anthracene	50,000				14 U					15 U			
Benzo(a)anthracene	224				18 U					19 U			
Benzo(a)pyrene	61				10 U					10 U			
Benzo(b)fluoranthene	1,100				45 U					48 U			
Benzo(ghi)perylene	50,000				20 U					21 U			
Benzo(k)fluoranthene	1,100				47 U					49 U			
Chrysene	400				20 U					21 U			
Dibenzo(a,h)anthracene	14				10 U					10 U			
Fluoranthene	50,000				26 U					28 U			
Fluorene	50,000				24 U					25 U			
Indeno(1,2,3-cd)pyrene	3,200				22 U					23 U			
Naphthalene	13,000				38 U					40 U			
Phenanthrene	50,000				29 U					30 U			
Pyrene	50,000				23 U					24 U			
Benzo(a)pyrene TEQ[4]					29					30			

Confirmatory Sample Results for Area 2 Soil
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Compound	Cleanup Goal[1]	SEAD67-PX-A2-SS-004-FS	SEAD67-PX-A2-SS-005-FS	SEAD67-PX-A2-SS-006-FS	SEAD67-PX-A2-SS-007-FS	SEAD67-PX-A2-SS-008-FS	SEAD67-PX-A2-SS-009-FS	SEAD67-PX-A2-SS-010-FS	SEAD67-PX-A2-SS-011-FS	SEAD67-PX-A2-SS-012-FS	SEAD67-PX-A2-SS-013-FS	SEAD67-PX-A2-SS-014-FS	SEAD67-PX-A2-SS-015-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	19,200		11500					11700					8720
Antimony	5.9		0.69 U					0.65 U					0.69 U
Arsenic	8.24	5.6	4.1 B	4.3 B	4.3	5	5	4.4 B	4.3 B	4.1 B	3.7 B	4.8 B	3.8 B
Barium	300		121					164					72.3
Beryllium	1.1		0.72 B					0.81 B					0.51 B
Cadmium	2.3		0.61 U					0.57 U					0.61 U
Calcium	120,500		5260					4520					3860
Chromium	29		16.2					17					12.6
Cobalt	30		7.3					7.4					7
Copper	29.6		25.1					19.7					15.2
Iron	35,550		19300					21100					16700
Lead[2]	400		29.9					18.4					21.7
Magnesium	21,500		3410					3110					2590
Manganese	1,056		450					485					530
Mercury	0.1	0.11 B	0.1 B	0.13	0.13 B	0.1 B	0.093 B	0.093 B	0.072 B	0.071 B	0.099 B	0.089 B	0.069 B
Nickel	48.9		21.1					20.4					15.9
Potassium	2,343		914					735					807
Selenium	2		1 B					0.91 U					0.97 U
Silver	0.763		0.19 U					0.18 U					0.19 U
Sodium	170.3		45.3 B					36.8 B					26 B
Thallium	0.67		1.2 U					1.1 U					1.2 U
Vanadium	150		18.7					19.8					15.6
Zinc	108.9	76.9	76.6	71.4	69.7	76.9	68.6	57.8	57.2	59.5	56.5	98.3	53.5
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400		42 U					41 U					85 U
Acenaphthene	50,000		22 U					22 U					46 U
Acenaphthylene	41,000		16 U					16 U					33 U
Anthracene	50,000		23					17 U					36 U
Benzo(a)anthracene	224		62					29					58 J
Benzo(a)pyrene	61		63					29					66
Benzo(b)fluoranthene	1,100		57 U					55 U					120 U
Benzo(ghi)perylene	50,000		38					25 U					52 U
Benzo(k)fluoranthene	1,100		75					57 U					120 U
Chrysene	400		79					35					80 J
Dibenzo(a,h)anthracene	14		12 UM					12 UM					25 UM
Fluoranthene	50,000		140					61					130 J
Fluorene	50,000		30 U					29 U					61 U
Indeno(1,2,3-cd)pyrene	3,200		35					26 U					55 U
Naphthalene	13,000		48 U					47 U					97 U
Phenanthrene	50,000		110					43					100 J
Pyrene	50,000		130					55					130 J
Benzo(a)pyrene TEQ[4]			92					53					116

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Compound	Cleanup Goal[1]	SEAD67-PX-A2-SS-016-FS	SEAD67-PX-A2-SS-017-FS	SEAD67-PX-A2-SS-018-FS	SEAD67-PX-A2-SS-019-FS	SEAD67-PX-A2-SS-020-FS	SEAD67-PX-A2-SS-021-FS
Depth (inches)		2"-6"	2"-6"	2"-6"	2"-6"	2"-6"	2"-6"
Metals		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	19,200					9900	
Antimony	5.9					0.62 U	
Arsenic	8.24	4.8 B	5.4	6.2	5.2 B	4.8	5.5
Barium	300					240	
Beryllium	1.1					0.67 B	
Cadmium	2.3					0.54 U	
Calcium	120,500					6020	
Chromium	29					15.4	
Cobalt	30					9	
Copper	29.6					20.8	
Iron	35,550					20100	
Lead[2]	400					56.9	
Magnesium	21,500					3370	
Manganese	1,056					775	
Mercury	0.1	0.098 B	0.071 B	0.093 B	0.092 B	0.16	0.1 B
Nickel	48.9					22.5	
Potassium	2,343					1340	
Selenium	2					0.86 U	
Silver	0.763					0.17 U	
Sodium	170.3					29.7 B	
Thallium	0.67					1.1 U	
Vanadium	150					17.4	
Zinc	108.9	68.9	75	106	91.7	91.7	78.7
PAHs[3]		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene	36,400					78 U	
Acenaphthene	50,000					42 U	
Acenaphthylene	41,000					47 J	
Anthracene	50,000					50 J	
Benzo(a)anthracene	224					120 J	
Benzo(a)pyrene	61					120	
Benzo(b)fluoranthene	1,100					120 J	
Benzo(ghi)perylene	50,000					75 J	
Benzo(k)fluoranthene	1,100					140 J	
Chrysene	400					150 J	
Dibenzo(a,h)anthracene	14					27 M	
Fluoranthene	50,000					240 J	
Fluorene	50,000					56 U	
Indeno(1,2,3-cd)pyrene	3,200					73 J	
Naphthalene	13,000					89 U	
Phenanthrene	50,000					190 J	
Pyrene	50,000					230 J	
Benzo(a)pyrene TEQ[4]						181	

MAXIMUM FINAL RESULTS FOR SOIL

Maximum Confirmatory Sample Results for SEAD 67 Soil

Time Critical Removal Action

SENECA Army Depot

AREA 1			Floor Samples			Perimeter Samples		
Compound	Cleanup Goal[1]	Total No. of Samples Analyzed	No. of Samples Analyzed	No. of Exceedences	Max Result	No. of Samples Analyzed	No. of Exceedences	Max Result
Metals (mg/Kg)								
Aluminum	19,200	5	2	0	13,200	3	0	16,000
Antimony	5.9	5	2	**1**	13.6 U	3	0	0.68 U
Arsenic	8.24	23	8	0	5.8	15	0	7.1
Barium	300	5	2	0	71.8	3	0	99.5
Beryllium	1.1	5	2	0	0.69 J	3	**1**	1.2
Cadmium	2.3	5	2	**1**	3.5 U	3	0	0.6 U
Calcium	120,500	5	2	0	3,080	3	0	3,440
Chromium	29	5	2	0	19.8	3	0	25.6
Cobalt	30	5	2	0	11	3	0	15.7
Copper	29.6	5	2	0	19.5	3	**1**	36.6
Iron	35,550	5	2	0	24,500	3	0	35,300
Lead[2]	400	5	2	0	19.3	3	0	25.8
Magnesium	21,500	5	2	0	3,890	3	0	5,200
Manganese	1,056	5	2	0	445	3	0	959
Mercury	0.1	22	7	0	0.079 B	15	**3**	0.32
Nickel	48.9	5	2	0	26.3	3	0	41.9
Potassium	2,343	5	2	0	1250	3	0	1,290
Selenium	2	5	2	**1**	18.6 U	3	0	1.0 B
Silver	0.763	5	2	0	0.41 J	3	0	0.19 U
Sodium	170.3	5	2	0	82.8 J	3	0	58.0
Thallium	0.67	5	2	**2**	25.5 U	3	**3**	1.2 U
Vanadium	150	5	2	0	20.1	3	0	24.9
Zinc	108.9	23	8	0	72.8	15	0	85.1
PAHs (ug/Kg)								
2-Methylnaphthalene	36,400	5	2	0	420 U	3	0	160
Acenaphthene	50,000	5	2	0	420 U	3	0	90 U
Acenaphthylene	41,000	5	2	0	27 U	3	0	380 J
Anthracene	50,000	5	2	0	40 J	3	0	500 J
Benzo(a)anthracene	224	5	2	0	160 J	3	**2**	1,100 J
Benzo(a)pyrene	61	4	1	0	53	3	**3**	1,100 J
Benzo(b)fluoranthene	1,100	5	2	0	130 U	3	0	910
Benzo(g,h,i)perylene	50,000	4	1	0	30 J	3	0	630 J
Benzo(k)fluoranthene	1,100	5	2	0	160 J	3	**1**	1,300 J
Chrysene	400	5	2	0	190 J	3	**2**	1,400 J
Dibenzo(a,h)anthracene	14	5	2	**1**	37 J	3	**3**	220 J
Fluoranthene	50,000	5	2	0	340 J	3	0	2,700
Fluorene	50,000	5	2	0	420 U	3	0	190
Indeno(1,2,3-cd)pyrene	3,200	5	2	0	97 J	3	0	620 J
Naphthalene	13,000	5	2	0	420 U	3	0	180 J
Phenanthrene	50,000	5	2	0	260 J	3	0	2,200 U
Pyrene	50,000	5	2	0	400 J	3	0	2,300

Maximum Confirmatory Sample Results for SEAD 67 Soil

Time Critical Removal Action

SENECA Army Depot

AREA 2			Floor Samples			Perimeter Samples		
Compound	Cleanup Coal1	Total No. of Samples Collected	No. of Samples Collected	No. of Exceedences	Max Result	No. of Samples Collected	No. of Exceedences	Max Result
Metals (mg/Kg)								
Aluminum	19,200	16	12	0	13,800	4	0	11,700
Antimony	5.9	16	12	**6**	17.2 U	4	0	0.7 U
Arsenic	8.2	53	32	**1**	8.7 J	21	0	6.2
Barium	300	16	12	0	146	4	0	240
Beryllium	1.1	16	12	**1**	2.90 U	4	0	0.8 B
Cadmium	2.3	16	12	**6**	4.4 U	4	0	0.6 U
Calcium	120,500	16	12	0	11,000	4	0	6,020
Chromium	29	16	12	0	24	4	0	17
Cobalt	30	16	12	0	12.9	4	0	9.0
Copper	30	16	12	**3**	78.8	4	0	25.1
Iron	35,550	16	12	0	32,800	4	0	21,100
Lead[2]	400	16	12	0	36.2	4	0	56.9
Magnesium	21,500	16	12	0	6,540	4	0	3,410
Manganese	1,056	16	12	0	928	4	0	775
Mercury	0.1	51	30	**1**	0.12	21	**4**	0.16
Nickel	48.9	16	12	0	35.9	4	0	22.5
Potassium	2,343	16	12	0	2,330	4	0	1,340
Selenium	2	16	12	**7**	23.6 U	4	0	1.0 B
Silver	0.763	16	12	**7**	4.7	4	0	0.2 U
Sodium	170.3	16	12	0	99.1 J	4	0	45.3 B
Thallium	0.67	16	12	**12**	32.4 U	4	**4**	1.2 U
Vanadium	150	16	12	0	23.7	4	0	20
Zinc	108.9	53	32	**2**	127	21	0	106
PAHs (ug/Kg)								
2-Methylnaphthalene	36,400	16	12	0	500	4	0	85
Acenaphthene	50,000	16	12	0	500 U	4	0	46 U
Acenaphthylene	41,000	16	12	0	500 U	4	0	47 U
Anthracene	50,000	16	12	0	500 U	4	0	50 J
Benzo(a)anthracene	224	15	11	0	200 U	4	0	120 J
Benzo(a)pyrene	61	11	7	**1**	87 J	4	**3**	120 J
Benzo(b)fluoranthene	1,100	16	12	0	500	4	0	120
Benzo(g,h,i)perylene	50,000	16	12	0	500 U	4	0	75 J
Benzo(k)fluoranthene	1,100	16	12	0	500 U	4	0	140 J
Chrysene	400	15	11	0	230 U	4	0	150 J
Dibenzo(a,h)anthracene	14	9	5	**1**	23 J	4	**2**	27 J
Fluoranthene	50,000	16	12	0	890 UM	4	0	240 M
Fluorene	50,000	16	12	0	500	4	0	61 J
Indeno(1,2,3-cd)pyrene	3,200	16	12	0	500 U	4	0	73 U
Naphthalene	13,000	16	12	0	500 U	4	0	97 J
Phenanthrene	50,000	16	12	0	720 U	4	0	190 U
Pyrene	50,000	16	12	0	1,300	4	0	230 J

Maximum Confirmatory Sample Results for SEAD 67 Soil
Time Critical Removal Action
SENECA Army Depot

Table Notes:

1. The Cleanup goal is based on the New York Technical Administrative Cuidance Memorandum (TACM) No. 4046 Recommended Soil Cleanup Objectives. Values denoted as Site Background ("SB") in TACM were compared with the highlighted values (95th percentile of Seneca Army Depot (SEDA) Si in lieu of the TACM "SB" since no background cleanup objectives exist for certain parameters.

2. U.S. Environmental Protection Agency Risk Based Residential Cleanup Coal for lead

3. Where exceedances for individual PAHs exist, evaluation of the Benzo(a)pyrene Toxicity Equivalent for total carcinogenic PAHs (cPAHs) would not exceed the 10,000 µg/kg limit for total cPAHs for any The cPAHs include: benzo(a)pyrene; dibenzo(a,h)anthracene; benzo(a,h)anthracene; indeno(1,2,3-cd)pyrene; benzo(k)fluouranthene; and chrysene.

95th percentile of SEDA Site Background

Result Exceeds Cleanup Criteria

mg/kg= milligram per kilogram

µg/kg= microgram per kilogram

J= Result is less than the reporting limit (RL), but greater than or equal to the MDL.

U= Analyte was not detected at or above the RL.

M= Manually integrated compound.

AVERAGE FINAL RESULTS FOR SOIL

Average Confirmatory Sample Results for SEAD 67 Soil
Time Critical Removal Action
SENECA Army Depot

		Area 1			Area 2		
Compound	**Cleanup Goal[1]**	**Floor**	**Perimeter**	**All**	**Floor**	**Perimeter**	**All**
Metals (mg/kg)							
Aluminum	19,200	12,650	13,007	12,864	12,650	10,455	12,101
Antimony	5.9	7.1	0.6	3.2	8.2	0.7	6.3
Arsenic	8.24	5.09	4.77	4.88	5.46	4.77	5.18
Barium	300	63	82	74	114	149	123
Beryllium	1.1	0.7	0.8	0.8	1.0	0.7	0.9
Cadmium	2.3	2.0	0.5	1.1	2.3	0.6	1.9
Calcium	120,500	2,425	2,920	2,722	5,263	4,915	5,176
Chromium	29	19	20	19	20	15	19
Cobalt	30	11	11	11	11	8	10
Copper	29.6	17.7	24	21.6	31.0	20	28.3
Iron	35,550	24,300	25,633	25,100	25,833	19,300	24,200
Lead[3]	400	15	23	20	20	32	23
Magnesium	21,500	3,850	3,920	3,892	4,479	3,120	4,139
Manganese	1,056	442	572	520	581	560	575
Mercury	0.1	0.05	0.10	0.08	0.06	0.10	0.08
Nickel	48.9	26.2	28.2	27.4	29.8	20.0	27.3
Potassium	2,343	950	1,030	998	1,325	949	1,231
Selenium	2	10	1	4	11	1	9
Silver	0.763	0.285	0.170	0.216	2.288	0.183	1.761
Sodium	170.3	69.6	45	54.7	60.9	34	54.3
Thallium	0.67	13.24	1.1	5.9	15.4	1.2	11.8
Vanadium	150	19	21	20	21	18	20
Zinc	108.9	63.8	62.4	62.9	72.2	74.4	73.1
PAHs (µg/kg)							
2-Methylnaphthalene	36,400	227	92	146	249	62	202
Acenaphthene	50,000	219	51	118	168	33	135
Acenaphthylene	41,000	20	181	116	171	28	135
Anthracene	50,000	31	249	161	108	32	89
Benzo(a)anthracene	224	109	550	373	72	67	71
Benzo(a)pyrene	61	53	543	421	28	70	43
Benzo(b)fluoranthene	1,100	89	490	329	170	88	150
Benzo(ghi)perylene	50,000	30	323	250	121	48	103
Benzo(k)fluoranthene	1,100	106	623	416	190	98	167
Chrysene	400	125	690	464	84	86	84
Dibenzo(a,h)anthracene	14	24	112	77	13	19	15
Fluoranthene	50,000	225	1,350	900	189	143	177
Fluorene	50,000	222	91	144	176	44	143
Indeno(1,2,3-cd)pyrene	3,200	63	313	213	125	47	106
Naphthalene	13,000	230	104	154	252	70	207
Phenanthrene	50,000	174	1,093	725	147	111	138
Pyrene	50,000	255	1,140	786	245	136	218
Benzo(a)pyrene TEQ[3]	10,000	105.3	804	598	60.4	111	73

Notes:

1. The Cleanup goal is based on the New York Technical Administrative Guidance Memorandum (TAGM) No. 4046 Recommended S
Cleanup Objectives.
Values denoted as Site Background ("SB") in TAGM 4046 were compared with the highlighted values (95th percentile
of Seneca Army Depot (SEDA) Site Background) in lieu of the TAGM "SB" since no background cleanup objectives exist

2. U.S. Environmental Protective Agency Risk Based Residential Cleanup Goal for le

3. Benzo(a)pyrene TEQ for carcinogenic PAHs is calculated by multiplying the individual cPAH results by the applicable factor from the list below, and then summing the results:

Benzo(a)pyrene = 1.0	Benzo(b)fluoranthene = 0.1	Chrysene = 0.01
Dibenzo(a,h)anthracene = 1.0	Indeno(1,2,3-cd)pyrene = 0.1	
Benzo(a)anthracene = 0.1	Benzo(k)fluoranthene = 0.01	

95th percentile of SEDA Site Background

Result Exceeds Cleanup Criteria

mg/kg = milligrams per kilogram **µg/kg** = micrograms per kilogram

APPENDIX B

WASTE CHARACTERIZATION DATA

Waste Characterization Data
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Parameter	Regulatory Limits	Units	SEAD67-SP-SS-001-FS	SEAD-67-SP-SS-002-FS	SEAD-67-SP-SS-003-FS
4,4'-DDT		µg/kg	14	1.2 jd	9.2 d
Aldrin		µg/kg	2.6 u	5.1 ud	5.4 ud
alpha-BHC		µg/kg	2.2 u	4.3 ud	4.6 ud
alpha-Chlordane		µg/kg	2.2 u	4.3 ud	13 d
beta-BHC		µg/kg	2.2 u	4.3 ud	4.6 ud
delta-BHC		µg/kg	0.98 j	1.5 jd	0.94 jd
Dieldrin		µg/kg	4.3 u	8.3 ud	8.9 ud
Endosulfan I		µg/kg	2.2 u	4.3 ud	5 d
Endosulfan II		µg/kg	4.3 u	8.3 ud	8.9 ud
Endosulfan sulfate		µg/kg	4.3 u	8.3 ud	8.9 ud
Endrin	400	µg/kg	6.4 u	13 ud	14 ud
Endrin aldehyde		µg/kg	4.3 u	8.3 ud	8.9 ud
Endrin ketone		µg/kg	4.3 u	8.3 ud	8.9 ud
gamma-BHC (Lindane)	8000	µg/kg	2.2 u	1.9 jd	1.2 jd
gamma-Chlordane	600	µg/kg	2.2 u	4.3 ud	7.5 d
Heptachlor	160	µg/kg	2.2 u	2.2 jd	4.6 ud
Heptachlor epoxide		µg/kg	2.2 u	2.1 jd	4.6 ud
Methoxychlor	200000	µg/kg	22 u	43 ud	46 ud
Toxaphene	10000	µg/kg	110 u	210 ud	220 ud
SVOCs					
1,2,4-Trichlorobenzene		µg/kg	420 u	820 u	900 u
1,2-Dichlorobenzene		µg/kg	420 u	820 u	900 u
1,3-Dichlorobenzene		µg/kg	420 u	820 u	900 u
1,4-Dichlorobenzene	150000	µg/kg	420 u	820 u	900 u
2,2-oxybis (1-chloropropane)		µg/kg	420 u	820 u	900 u
2,4,5-Trichlorophenol	8000000	µg/kg	2000 u	4000 u	4400 u
2,4,6-Trichlorophenol	40000	µg/kg	420 u	820 u	900 u
2,4-Dichlorophenol		µg/kg	420 u	820 u	900 u
2,4-Dimethylphenol		µg/kg	420 u	820 u	900 u
2,4-Dinitrophenol		µg/kg	2000 u	4000 u	4400 u
2,4-Dinitrotoluene	2600	µg/kg	420 u	820 u	900 u
2,6-Dinitrotoluene		µg/kg	420 u	820 u	900 u
2-Chloronaphthalene		µg/kg	420 u	820 u	900 u
2-Chlorophenol		µg/kg	420 u	820 u	900 u
2-Methylnaphthalene		µg/kg	420 u	820 u	900 u
2-Methylphenol	4000000	µg/kg	420 u	820 u	900 u
2-Nitroaniline		µg/kg	2000 u	4000 u	4400 u
2-Nitrophenol		µg/kg	420 u	820 u	900 u
3,3-Dichlorobenzidine		µg/kg	840 u	1600 u	1800 u
3-Nitroaniline		µg/kg	2000 u	4000 u	4400 u
4,6-Dinitro-2-methylphenol		µg/kg	2000 u	4000 u	4400 u
4-Bromophenyl-phenylether		µg/kg	420 u	820 u	900 u
4-Chloro-3-methylphenol		µg/kg	420 u	820 u	900 u
4-Chloroaniline		µg/kg	420 u	820 u	900 u
4-Chlorophenyl-phenylether		µg/kg	420 u	820 u	900 u
4-Methylphenol	4000000	µg/kg	420 u	820 u	900 u
4-Nitroaniline		µg/kg	840 u	1600 u	1800 u

Waste Characterization Data
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Parameter	Regulatory Limits	Units	SEAD67-SP-SS-001-FS	SEAD-67-SP-SS-002-FS	SEAD-67-SP-SS-003-FS
4-Nitrophenol		µg/kg	2000 u	4000 u	4400 u
Acenaphthene		µg/kg	420 u	820 u	900 u
Acenaphthylene		µg/kg	130 j	92 j	900 u
Aniline		µg/kg	420 u	820 u	900 u
Anthracene		µg/kg	95 j	130 j	38 j
Benz(a)anthracene		µg/kg	280 j	340 j	130 j
Benzo(a)pyrene		µg/kg	300 j	320 j	140 j
Benzo(b)fluoranthene		µg/kg	260 j	310 j	140 j
Benzo(g,h,i)perylene		µg/kg	310 j	180 j	97 j
Benzo(k)fluoranthene		µg/kg	330 j	370 j	160 j
Benzoic acid		µg/kg	2000 u	4000 u	4400 u
Benzyl alcohol		µg/kg	420 u	820 u	900 u
Bis(2-chloroethoxy)methane		µg/kg	420 u	820 u	900 u
Bis(2-chloroethyl)ether		µg/kg	420 u	820 u	900 u
Bis(2-ethylhexyl)phthalate		µg/kg	96 j	820 ub	170 jb
Butyl benzyl phthalate		µg/kg	420 u	820 u	900 u
Chrysene		µg/kg	340 j	440 j	190 j
Dibenz(a,h)anthracene		µg/kg	130 j	100 j	900 u
Dibenzofuran		µg/kg	420 u	820 u	900 u
Diethyl phthalate		µg/kg	420 u	820 u	900 u
Dimethyl phthalate		µg/kg	420 u	820 u	900 u
Di-n-butyl phthalate		µg/kg	420 u	820 ub	900 ub
Di-n-octyl phthalate		µg/kg	420 u	820 u	900 u
Fluoranthene		µg/kg	410 j	900	310 j
Fluorene		µg/kg	420 u	68 j	900 u
Hexachlorobenzene	2600	µg/kg	420 u	820 u	900 u
Hexachlorobutadiene	10000	µg/kg	420 u	820 u	900 u
Hexachlorocyclopentadiene		µg/kg	420 u	820 u	900 u
Hexachloroethane	60000	µg/kg	420 u	820 u	900 u
Indeno(1,2,3-cd)pyrene		µg/kg	250 j	190 j	100 j
Isophorone		µg/kg	420 u	820 u	900 u
Naphthalene		µg/kg	420 u	820 u	900 u
Nitrobenzene	40000	µg/kg	420 u	820 u	900 u
N-Nitroso-di-N-propylamine		µg/kg	420 u	820 u	900 u
n-Nitrosodiphenylamine		µg/kg	420 u	820 u	900 u
Pentachlorophenol	2000000	µg/kg	2000 u	4000 u	4400 u
Phenanthrene		µg/kg	140 j	640 j	180 j
Phenol		µg/kg	420 u	820 u	900 u
Pyrene		µg/kg	460	740 j	280 j
Pyridine	100000	µg/kg	840 u	1600 u	1800 u
VOCs					
1,1,1,2-Tetrachloroethane		µg/kg	260 u	200 u	250 u
1,1,1-Trichloroethane		µg/kg	260 u	200 u	250 u
1,1,2,2-Tetrachloroethane		µg/kg	260 u	200 u	250 u
1,1,2-Trichloroethane		µg/kg	260 u	200 u	250 u
1,1-Dichloroethane		µg/kg	260 u	200 u	250 u
1,1-Dichloroethene	14000	µg/kg	260 u	200 u	250 u

Waste Characterization Data
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Parameter	Regulatory Limits	Units	SEAD67-SP-SS-001-FS	SEAD-67-SP-SS-002-FS	SEAD-67-SP-SS-003-FS
1,1-Dichloropropene		µg/kg	260 u	200 u	250 u
1,2,3-Trichlorobenzene		µg/kg	260 u	200 u	250 u
1,2,3-Trichloropropane		µg/kg	260 u	200 u	250 u
1,2,4-Trichlorobenzene		µg/kg	420 u	820 u	900 u
1,2,4-Trimethylbenzene		µg/kg	260 u	200 u	250 u
1,2-Dibromo-3-chloropropane		µg/kg	260 u	200 u	250 u
1,2-Dibromoethane (EDB)		µg/kg	260 u	200 u	250 u
1,2-Dichlorobenzene		µg/kg	260 u	200 u	250 u
1,2-Dichloroethane	10000	µg/kg	260 u	200 u	250 u
1,2-Dichloroethene (total)		µg/kg	260 u	200 u	250 u
1,2-Dichloropropane		µg/kg	260 u	200 u	250 u
1,3,5-Trimethylbenzene		µg/kg	260 u	200 u	250 u
1,3-Dichlorobenzene		µg/kg	260 u	200 u	250 u
1,3-Dichloropropane		µg/kg	260 u	200 u	250 u
1,4-Dichlorobenzene		µg/kg	260 u	200 u	250 u
2,2-Dichloropropane		µg/kg	260 u	200 u	250 u
Methyl Ethyl Ketone	4000000	µg/kg	350	200 u	250 u
2-Chloro-1,3-butadiene (chloroprene)		µg/kg	260 u	200 u	250 u
2-Chlorotoluene		µg/kg	260 u	200 u	250 u
2-Hexanone		µg/kg	260 u	200 u	250 u
3-Chloropropene (Allyl Chloride)		µg/kg	260 u	200 u	250 u
4-Chlorotoluene		µg/kg	260 u	200 u	250 u
4-Methyl-2-pentanone		µg/kg	260 u	200 u	250 u
Acetone		µg/kg	650 u	500 u	630 u
Benzene	10000	µg/kg	260 u	200 u	250 u
Bromobenzene		µg/kg	260 u	200 u	250 u
Bromochloromethane		µg/kg	260 u	200 u	250 u
Bromodichloromethane		µg/kg	260 u	200 u	250 u
Bromoform		µg/kg	260 u	200 u	250 u
Bromomethane		µg/kg	260 u	200 u	250 u
Carbon disulfide		µg/kg	260 u	200 u	250 u
Carbon tetrachloride	10000	µg/kg	260 u	200 u	250 u
Chlorobenzene	2000000	µg/kg	41 j	200 u	250 u
Chloroethane		µg/kg	260 u	200 u	250 u
Chloroform	120000	µg/kg	260 u	200 u	250 u
Chloromethane		µg/kg	260 u	200 u	250 u
cis-1,2-Dichloroethene		µg/kg	260 u	200 u	250 u
cis-1,3-Dichloropropene		µg/kg	260 u	200 u	250 u
Dibromochloromethane		µg/kg	260 u	200 u	250 u
Dibromomethane		µg/kg	260 u	200 u	250 u
Dichlorodifluoromethane		µg/kg	260 u	200 u	250 u
Ethylbenzene		µg/kg	260 u	200 u	250 u
Ethylmethacrylate		µg/kg	260 u	200 u	250 u
Isopropylbenzene		µg/kg	260 u	200 u	250 u
m&p-Xylenes		µg/kg	260 u	200 u	250 u
Methylene chloride		µg/kg	65 j	200 u	250 u
Methylmethacrylate		µg/kg	260 u	200 u	250 u
Methyl-tert-butyl-ether (MTBE)		µg/kg	260 u	200 u	250 u

Waste Characterization Data
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Parameter	Regulatory Limits	Units	SEAD67-SP-SS-001-FS	SEAD-67-SP-SS-002-FS	SEAD-67-SP-SS-003-FS
Naphthalene		µg/kg	420 u	820 u	900 u
n-Butylbenzene		µg/kg	260 u	200 u	250 u
n-Propylbenzene		µg/kg	260 u	200 u	250 u
o-Xylene		µg/kg	260 u	200 u	250 u
p-Isopropyltoluene		µg/kg	260 u	200 u	250 u
sec-Butylbenzene		µg/kg	260 u	200 u	250 u
Styrene		µg/kg	260 u	200 u	250 u
tert-Butylbenzene		µg/kg	260 u	200 u	250 u
Tetrachloroethene	14000	µg/kg	260 u	200 u	250 u
Tetrahydrofuran		µg/kg	260 u	200 u	250 u
Toluene		µg/kg	260 u	200 u	250 u
trans-1,2-Dichloroethylene		µg/kg	260 u	200 u	250 u
trans-1,3-Dichloropropene		µg/kg	260 u	200 u	250 u
trans-1,4-Dichloro-2-butene		µg/kg	260 u	200 u	250 u
Trichloroethene	10000	µg/kg	260 u	200 u	250 u
Trichlorofluoromethane		µg/kg	260 u	200 u	250 u
Trichlorotrifluoroethane		µg/kg	260 u	200 u	250 u
VinylAcetate		µg/kg	260 u	200 u	250 u
VinylChloride	4000	µg/kg	260 u	200 u	250 u

Notes:
mg/kg= milligram per kilogram
µg/kg= microgram per kilogram

SVOCs = semi-volatile organic compounds
VOCs = volatile organic compounds
PCBs = polychlorinated bi-phenyls

B= Result is less than the CRDL/Reporting Limit (RL), but >/= to the Instrument Detection Limit/method
J= Result is less than the RL, but greater than or equal to the MDL.
U= Analyte was not detected at or above the RL.
D = Surrogate ormatrix spike recoveries not obtained because extract was diluted for analysis

Waste Characterization Data
SEAD 67 Time Critical Removal Action
Seneca Army Depot

Parameter	Regulatory Limits	Units	SEAD67-SP-SS-001-FS	SEAD-67-SP-SS-002-FS	SEAD-67-SP-SS-003-FS
Inorganics					
Corrosivity (pH Solid)		yes/no	no	no	no
Ignitability		Pos/Neg	Neg	Neg	Neg
pH	2 to 2.5	pH Units	7.95	7.05	7.49
Reactivity, Cyanide	250000	µg/kg	500 u	500 u	500 u
Reactivity, Sulfide	500000	mg/kg	20 u	20 u	20 u
% Moisture		%	22.9	23	26.6
% Solids	>20	%	77.1	77	73.4
Metals					
Aluminum		mg/L	0.5 u	0.343 j	0.315 j
Antimony		mg/L	0.02 u	0.1 u	0.1 u
Arsenic	5	mg/L	0.04 u	0.2 u	0.2 u
Barium	100	mg/L	0.117	0.17	0.534
Beryllium		mg/L	0.005 u	0.025 u	0.025 u
Cadmium	1	mg/L	0.01 u	0.05 u	0.05 u
Calcium		mg/L	147 b	46.8	196
Chromium	5	mg/L	0.01 u	0.05 u	0.05 u
Cobalt		mg/L	0.01 u	0.05 u	0.05 u
Copper		mg/L	0.0024 j	0.05 u	0.0196 j
Iron		mg/L	0.2 u	1 u	1 u
Lead	5	mg/L	0.01 u	0.05 u	0.05 u
Magnesium		mg/L	4.54 b	6.17	46.9
Manganese		mg/L	0.0233	0.796	1.77
Mercury	0.2	mg/L	10 u	10 u	10 u
Nickel		mg/L	0.01 u	0.05 u	0.0122 j
Potassium		mg/L	1.83 b	5.9	3.39
Selenium	1	mg/L	0.03 u	0.15 u	0.15 u
Silver	5	mg/L	0.006 u	0.03 u	0.03 u
Sodium		mg/L	137 b	740	784
Thallium		mg/L	0.04 u	0.2 u	0.2 u
Vanadium		mg/L	0.006 u	0.03 u	0.03 u
Zinc		mg/L	0.05 u	0.25 u	0.144 j
PCBs					
Aroclor 1016		µg/kg	22 u	22 u	23 u
Aroclor 1221		µg/kg	43 u	42 u	45 u
Aroclor 1232		µg/kg	22 u	22 u	23 u
Aroclor 1242		µg/kg	22 u	22 u	23 u
Aroclor 1248		µg/kg	22 u	22 u	23 u
Aroclor 1254		µg/kg	22 u	22 u	23 u
Aroclor 1260		µg/kg	22 u	22 u	17 j
Total	1000	µg/kg	66	66	63
Pesticides					
4,4'-DDD		µg/kg	4.3 u	8.3 ud	9 d
4,4'-DDE		µg/kg	13	13 d	5.3 jd

APPENDIX C

WASTE MANIFEST SUMMARY

Soil Disposal Summary
SEAD 67
Time Critical Removal Action
SENECA Army Depot

DATE	DESTINATION	SITE LOCATION	HAULER COMPANY NAME	TRUCK ID#	LANDFILL TARE WEIGHT (LBS)	LANDFILL SCALE (LBS)	LOAD (TONS)	MANIFEST NO.
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	71	63000	35100	17.55	945
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	97	66400	38540	19.27	946
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	81	70440	42320	21.16	947
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	86	63620	35780	18.79	948
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	74	66520	38880	19.44	949
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1177	64420	36320	18.16	950
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	2477	63020	34860	17.43	951
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1477	64240	39840	19.92	952
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1077	62240	35940	17.97	953
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	377	66620	38720	19.36	955
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	71	55820	30860	15.43	954
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	97	66760	38900	19.45	956
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	86	66560	38720	19.36	957
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	81	68240	40100	20.05	958
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	74	67300	39660	19.83	959
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1177	64520	36420	18.21	960
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	2477	63620	35460	17.73	961
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1477	63820	39420	19.71	962
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1077	62970	36640	18.32	963
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	377	50980	26020	13.01	964
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	71	68380	40480	20.24	965
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	97	67540	39680	19.84	966
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	86	62080	34240	17.12	967
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	81	70340	42200	21.1	968
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	74	66100	38460	19.23	969
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1177	63960	35860	17.93	970
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	2477	65860	37700	18.85	971
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1477	65080	40680	20.34	972
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1077	64740	38440	19.22	973
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	377	59060	34100	17.05	974
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	71	72420	44520	22.26	975
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	97	67360	39500	19.75	976
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	86	70940	43100	21.55	977
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	74	71400	43760	21.88	978
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1177	72080	43980	21.99	979
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	81	73320	45180	22.59	980
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	2477	RETURNED	LOAD	FLAT	TIRE
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1477	71760	47360	23.68	982
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	1077	66980	40680	20.34	983
7/16/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving	377	53060	28100	14.05	984
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	71	67280	39380	19.69	985
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	97	64800	36940	18.47	986
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	86	66300	38460	19.23	987
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	74	70480	42840	21.42	988
7/16/03	Seneca Meadows Landfill	SEAD 67	Riccelli	81	71200	43060	21.53	989
7/17/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving		70620	42460	21.23	992
7/17/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving		66640	42240	21.12	993
7/17/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving		65120	37020	18.51	994
7/17/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving		52740	27780	13.89	995
7/17/03	Seneca Meadows Landfill	SEAD 67	Seneca Pipe and Paving		62620	36320	18.16	996
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	71	69360	41460	20.73	997
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	74	65680	38040	19.02	998
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	97	65360	37500	18.75	999
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	95	68620	40700	20.38	1000
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	94	71080	43040	21.52	1001
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	86	68560	40720	20.36	1002
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	81	70300	42160	21.08	1003
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	71	71020	43120	21.56	1004
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	74	69080	41440	20.72	1005
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	97	67680	39800	19.9	1006

* Per Load (Tons) column is based on the weights from the Seneca Meadows Landfill scale

Soil Disposal Summary
SEAD 67
Time Critical Removal Action
SENECA Army Depot

DATE	DESTINATION	SITE LOCATION	HAULER COMPANY NAME	TRUCK ID#	LANDFILL TARE WEIGHT (LBS)	LANDFILL SCALE (LBS)	LOAD (TONS)	MANIFEST NO.
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	94	69760	41720	20.86	1007
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	81	70520	42680	21.19	1008
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	95	69720	41780	20.89	1009
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	86	67240	39400	19.7	1010
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	71	68460	40560	20.28	1011
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	74	67120	39480	19.74	1012
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	97	60200	32340	16.17	1013
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	94	66020	38580	19.29	1014
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	81	65820	37680	18.84	1015
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	95	68280	40340	20.17	1016
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	86	60460	32620	16.31	1017
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	71	63960	36060	18.03	1018
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	74	67200	39560	19.78	1019
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	97	64400	36540	18.27	1020
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	81	58980	30840	15.42	1021
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	86	71700	43860	21.93	1022
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	95	69620	41680	20.84	1023
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	71	66820	38920	19.46	1024
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	74	67380	39740	19.87	1025
7/30/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	71	71960	44060	22.03	1026
7/31/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	97	67960	40100	20.05	1027
7/31/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	94	72240	44200	22.1	1028
7/31/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	95	65800	37860	18.93	1029
7/31/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	86	65200	37360	18.68	1030
7/31/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	81	61660	33520	16.76	1031
7/31/03	Seneca Meadows Landfill	SEAD 67	Riccelli Enterprises	74	70820	43180	21.59	1032

Total	**1,653.61 Tons**

* Per Load (Tons) column is based on the weights from the Seneca Meadows Landfill scale