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U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

FINAL

EXPANDED SITE INSPECTION
SEVEN HIGH PRIORITY SWMU's
SEAD 4, 16, 17, 24, 25, 26, AND 45

VOLUME 1 OF 2

DECEMBER 1995

EXPANDED SITE INSPECTION REPORT
SEVEN AREAS OF CONCERN
SENECA ARMY DEPOT
ROMULUS, NEW YORK

Prepared For:

Seneca Army Depot
Romulus, New York

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720447

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LIST OF ACRONYMS

AET	Actual Evapotranspiration
AMC	U.S. Army Material Command
AOC	Areas of Concern
APCS	Air Pollution Control System
AQCR	Genesee-Finger Air Quality Control Region
ARAR	Applicable or Relevant and Appropriate Requirements
1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethylene (total)
AA	Atomic absorption
AB/N's	Acid, base/neutrals
ASTM	American Society for Testing and Materials
B&B	Blasland and Bouck
Ba	Barium
BOD	Biological Oxygen Demand
bp	before present
CEC	Cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
Cl	Chloride
CLP	Contract Laboratory Program
cm	Centimeters
cm/sec	Centimeters per second
COD	Chemical Oxygen Demand
Cr	Chromium
Cu	Copper
$CaCO_3$	Calcium Carbonate
Cd	Cadmium
CRT	Cathode ray tube
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DO	Dissolved oxygen
DOT	Department of Transportation
DRMO	Defense, Revitalization and Marketing Office
EM-31	Electromagnetic
EPA	Environmental Protection Agency

LIST OF ACRONYMS
(Cont'd)

ES	Engineering-Science, Inc.
ESE	Environmental Science and Engineering
ESI	Expanded Site Inspections
FS	Feasibility Study
ft	Feet
ft/ft	Feet per foot
ft/sec	Feet per second
ft/yr	Feet per year
GAE	Geophysical anomaly excavations
GC	Gas chromatograph
gpm	Gallons per minute
GPR	Ground penetrating radar
GSSI	Geophysical Survey Systems, Inc.
HSWA	Hazardous and Solid Waste Amendments
HMX	Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine
IAG	Interagency Agreement
ICF	ICF Technology, Incorporated
Koc	Organic carbon coefficient
lb	pound
L/min	Liters per minute
MCPA	2-methyl-4-chlorophenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)proprionic acid
mg/l	Milligram per liter
mg/kg	Milligrams per kilogram
MHz	Megahertz
Miniram	Minature Real-Time Aerosol Meter
mL	Milliliter
mmhos/m	Millimhos per meter
MSL	Mean sea level
MTBE	Methyl Tertiary Butyl Ether
MW	Monitoring Well
NA	Not analyzed or not available
NBS	National Bureau of Standards
NGVD	National Geologic Vertical Datum
NO_2/N	Nitrite-Nitrogen
NO_3/N	Nitrate-Nitrogen

LIST OF ACRONYMS
(Cont'd)

NPL	National Priority List
NSF	National Sanitation Foundation
NTU	Nephelometric turbidity units
NYSDEC	New York State Department of Environmental Conservation
OB	Open Burning
OD	Open Detonation
OVM	Organic Vapor Meter
Pb	Lead
PCB	Polychlorinated biphenyls
PID	Photoionization detector
ppm	parts per million
ppmv	parts per million per volume
PSCR	Preliminary Site Characterization Report
PT	Monitoring well
PVC	Polyvinyl chloride
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RAGS	EPA Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RF	Response factor
RI	Remedial Investigation
ROD	Record of Decision
RQD	Rock Quality Designation
SB	Soil boring
SCS	Soil Conservation Service
SD	Sediment sample
SEAD	Seneca Army Depot (old name)
SEDA	Seneca Army Depot
Sec	Seconds
SIR	Subsurface interface
SO_4	Sulfate
SOW	Statement of Work
ST	Soil moisture
Std.	Test methods

LIST OF ACRONYMS
(Cont'd)

SS	Soil sample
SVO	Semivolatile Organic Compounds
SW	Surface water sample
SWMU	Solid Waste Management Unit
T1,2-DCE	trans-1,2-Dichloroethylene
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target analyte list
TBP	Trial Burn Plan
TCE	Trichloroethylene
TCL	Target compound list
TDS	Total dissolved solids
TES	Target Environmental Services, Inc.
TKN	Total Kjeldah Nitrogen
TNT	Triinitrotoluene
TOC	Total Organic Carbon
TOX	Total Organic Halogens
TPH	Total Petroleum Hydrocarbon
TRPH	Total Recovered Petroleum Hydrocarbons
TS	Total Solids
TP	Test Pit
UCL	Upper Confidence Level
ug/g	Micrograms per gram
ug/wp	Micrograms per wipe
ug/kg	Micrograms per kilogram
ug/mg	Micrograms per milligram
ug/L	Micrograms per liter
USACE	United States Army Corps of Engineers
USAEHA	United States Army Environmental Hygiene Agency
USATHAMA	United States Army Toxic and Hazardous Materials Agency
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UXO	Unexploded Ordnance
VC	Vinyl Chloride
VLF-EM	Very Low Frequency Electromagnetic
VOA	Volatile Organic Analysis

LIST OF ACRONYMS
(Cont'd)

VOC	Volatile Organic Compound
Vs	Volt Second
Zn	Zinc
2,4-D	Dichlorophenoxyacetic acid
2,4-DB	Dichlorophenoxyacetic acid, butyl ester
2,4-DNT	Dinitrotoluene
2,4,5-T	2,4,5-Trichlorophenoxyacetic acid
2.4.5-TP	2,4,5-Trichlorophenoxypropionic acid or Silvex

1.0 INTRODUCTION

Engineering-Science, Inc. (ES) has been retained by the U.S. Army Corps of Engineers (USACOE) to conduct Expanded Site Inspections (ESI) at Solid Waste Management Units (SWMUs) that have been designated as Areas of Concern (AOC) within the Seneca Army Depot (SEDA). This report describes the ESI activities at the following seven high priority AOCs:

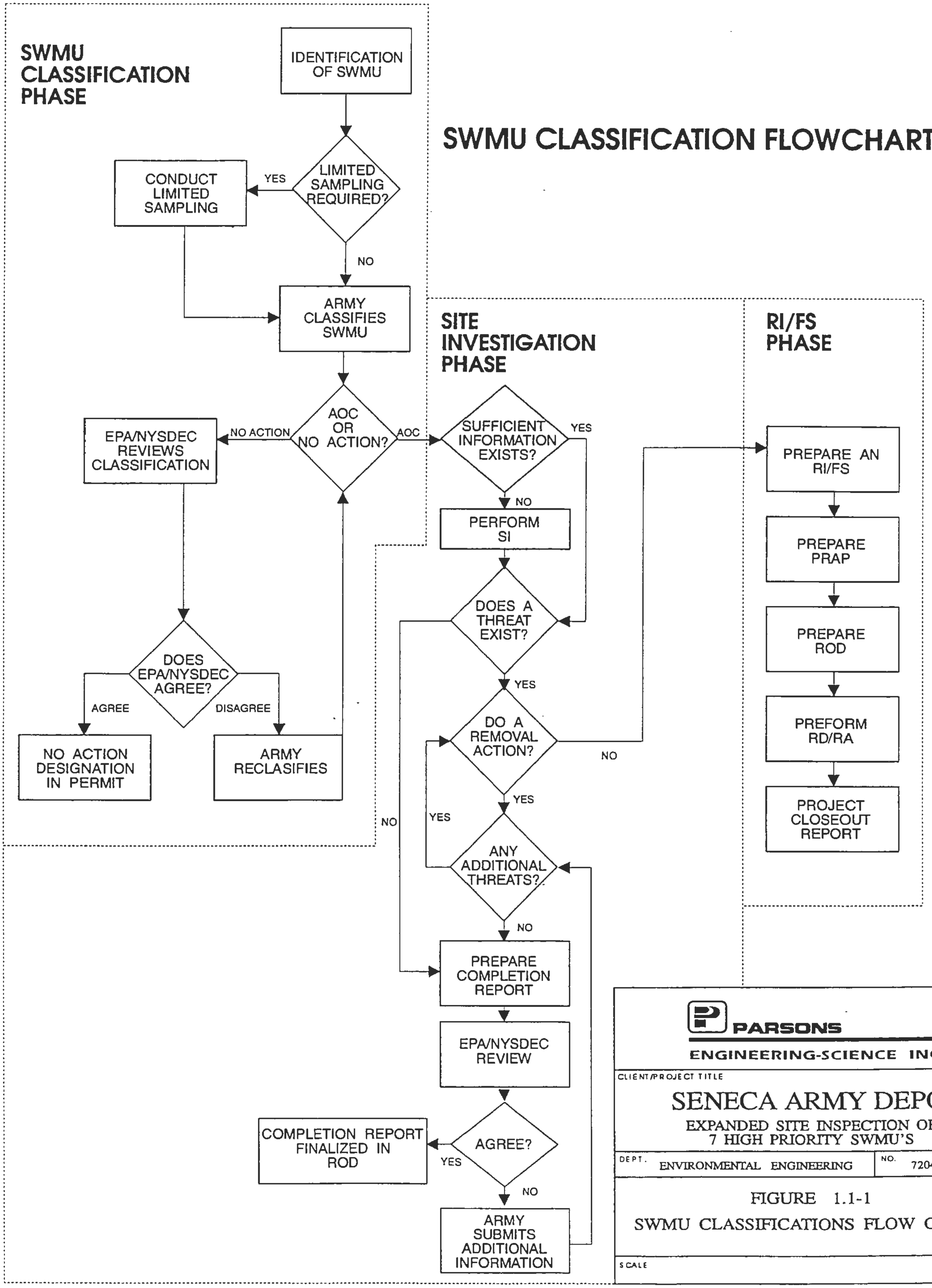
- SEAD-4 - Munitions Washout Facility Leachfield
- SEAD-16 - Abandoned Deactivation Furnace (Building S-311)
- SEAD-17 - Existing Deactivation Furnace (Building 367)
- SEAD-24 - Abandoned Powder Burning Pit
- SEAD-25 - Fire Training and Demonstration Pad
- SEAD-26 - Fire Training Pit and Area
- SEAD-45 - Open Detonation Facility

The purpose of this report is to discuss the physical characteristics of the sites, interpret the analytical results from the investigation programs, and identify any hazardous constituents or wastes that have been released to the environment at each of the seven SWMUs.

In accordance with the decision process outlined in the Interagency Agreement (IAG), ESIs were performed at SWMUs that were classified as AOCs. If the conclusion of this report is that an AOC poses a threat to human health, welfare, or the environment, the Army can perform a removal action to eliminate the threat or can conduct a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Remedial Investigation (RI).

This work has been performed according to the requirements of the New York State Department of Environmental Conservation (NYSDEC), the U.S. Environmental Protection Agency, Region II (EPA), and the IAG. The steps in this agreement are depicted in Figure 1.1-1. The IAG sets forth an incremental agenda which begins with the initial identification of each SWMU and culminates with a Record of Decision (ROD) for each SWMU requiring a remedial action. In some instances, it may be clear that after conducting a preliminary investigation, a SWMU poses little threat to human health and the environment and enough evidence exists to eliminate this SWMU from further consideration by classifying this SWMU as a No-Action SWMU. In other cases, the SWMU will be investigated as an AOC.

SWMU CLASSIFICATION FLOWCHART



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CLIENT/PROJECT TITLE: SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | NO. 720478-02000

FIGURE 1.1-1
SWMU CLASSIFICATIONS FLOW CHART

SCALE

Following this, a Remedial Investigation/Feasibility Study (RI/FS) may be required to gain enough data to prepare a ROD.

In accordance with Section 10.6 of the IAG, the Army is required to prepare a completion report for AOCs that pose no threat to public health or welfare or to the environment. The completion report provides certification and documentation that the AOC in question does not constitute a threat to public health, welfare or to the environment. If, following an ESI, an AOC was determined to pose no threat then the ESI report will constitute the completion report.

The determination of whether a threat exists at an AOC will be based upon comparisons with State and Federal standards, guidelines and criteria that are available. Exceedances of an appropriate standard, guideline, or criteria will be used as the indication that a threat may exist. A risk analysis will not be performed to quantify the threat. For these cases, the professional opinions and recommendations contained in the final report will constitute the completion report. For those AOCs that are determined to potentially pose a threat to public health or welfare or to the environment, an RI/FS will be performed if the threat cannot be eliminated via a removal action in accordance with the mandate of the IAG paragraph 10.9.

1.1 SITE BACKGROUND

SEDA is a 10,587-acre facility in Seneca County, Romulus, New York, that has been owned by the United States Government and operated by the Department of the Army since 1941. Figure 1.1-2 identifies the location of SEDA. Since its inception in 1941, SEDA's primary mission has been the receipt, storage, maintenance, and supply of military items. This function includes the safe and efficient demilitarization of military ammunition and explosives by burning and detonation.

In May 1979, the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) began an environmental evaluation of SEDA. This evaluation was undertaken "to assess the environmental quality of SEDA with regard to the use, storage, treatment, and disposal of toxic and hazardous materials" and "define any conditions which may adversely affect the health and welfare or result in environmental degradation" (USATHAMA 1980). The report concluded that geological conditions are such that contaminants, if present, could migrate in surface or subsurface waters.

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FIGURE 1.1-2

Location Map

SCALE

In November 1986, SEDA applied for a Part B Resource Conservation and Recovery Act (RCRA) Permit to operate a hazardous waste storage facility (SWMU designation SEAD-1), a Polychlorinated Biphenyl (PCB) storage facility (SEAD-2) and a deactivation furnace (SEAD-17). The Open Burning (OB) facility and the Open Detonation (OD) facility (SEAD-23 and SEAD-45, respectively) are also currently under interim status. Under the RCRA Hazardous and Solid Waste Amendments of 1984 (HSWA), Part B Permits issued after November 8, 1984, require identification and corrective action at any SWMU located on the installation that is releasing hazardous constituents or hazardous wastes to the environment. This requirement applies to all SWMUs regardless of when the wastes were placed therein.

Closure under RCRA guidelines was deferred when SEDA was proposed for the National Priority List (NPL) in July 1989. In August 1990, SEDA was finalized and listed in Group 14 on the Federal Section of the National Priority List (NPL). Following finalization on the NPL, it was agreed that subsequent remediation of targeted problem sites would become regulated under CERCLA guidelines. The IAG was developed with the EPA Region II and NYSDEC to integrate the Army's RCRA corrective action obligations with CERCLA response obligations in order to facilitate overall coordination of investigations mandated at SEDA. Therefore, any required future investigations will be based on CERCLA guidelines and RCRA shall be considered an Applicable or Relevant and Appropriate Requirement (ARAR) pursuant to Section 121 of CERCLA.

As mandated by the EPA Region II and by NYSDEC, the U.S. Army Corps of Engineers commissioned the "Solid Waste Management Unit Classification Report" at SEDA (ERCE 1991). This report was finalized by ES on June 10, 1994. This work was performed to evaluate the effects of past solid waste management practices at identified SWMUs on the facility and to classify each SWMU as an area where "No Action is Required" or as an "Area of Concern." Areas of Concern include both (a) SWMUs where releases of hazardous substances may have occurred and (b) locations where there has been a threat of a release into the environment of a hazardous substance or constituent (including radionuclides). AOCs may include, but need not be limited to, former spill areas, landfills, surface impoundments, waste piles, land treatment units, transfer stations, wastewater treatment units, incinerators, container storage areas, scrap yards, cesspools and tanks with associated piping that are known to have caused a release into the environment or whose integrity has not been verified.

Of the 69 SWMUs and AOCs originally identified in the ERCE study, the seven highest priority SWMUs and three moderate priority AOCs have been selected by the Army for further investigation. Following completion of the ERCE report, three additional SWMU's have been added by the Army, bringing the total number of SWMUs at SEDA to 72. The seven AOCs that were investigated as high priority sites are presented on Table 1.1-1. The final number of SWMUs and AOCs to be investigated has been finalized between the Army and NYSDEC/EPA. Twenty-four sites were declared No Action SWMUs and 58 sites were declared AOCs.

In addition to the AOC investigations to be performed, additional investigations have been undertaken and include an RI/FS at the Incinerator Ash Landfill (SEAD-3, 6, 8, 14, and SEAD-15) and an RI/FS at the former Open Burning Facility (SEAD-23). The Army is proceeding with the CERCLA investigations of those AOCs which the Army and the regulatory agencies concur that an RI/FS investigation is needed.

The Army and the regulatory agencies are in agreement with respect to the classification of all seven high priority AOCs and are the focus of this report. The classification of all remaining SWMUs have been presented in the final SWMU Classification Report. The Army is investigating SWMUs that have been determined to be AOCs which pose the greatest potential risk to human health and the environment as determined by the findings of the SWMU Classification Report (ERCE 1991, ES 1994). The Army is proceeding on a worst first basis. This report presents the findings of the investigations performed at the seven SWMUs that have been classified as high priority units.

1.1.1 General Description

SEDA is an active military facility constructed in 1941. The site is located approximately 40 miles south of Lake Ontario, near Romulus, New York (Figure 1.1-2). The facility is located in an uplands area, at an elevation of approximately 600 feet Mean Sea Level (MSL), that forms a divide separating two of the New York Finger Lakes, Cayuga Lake on the east

TABLE 1.1-1

SEVEN AREAS OF CONCERN TO BE INVESTIGATED

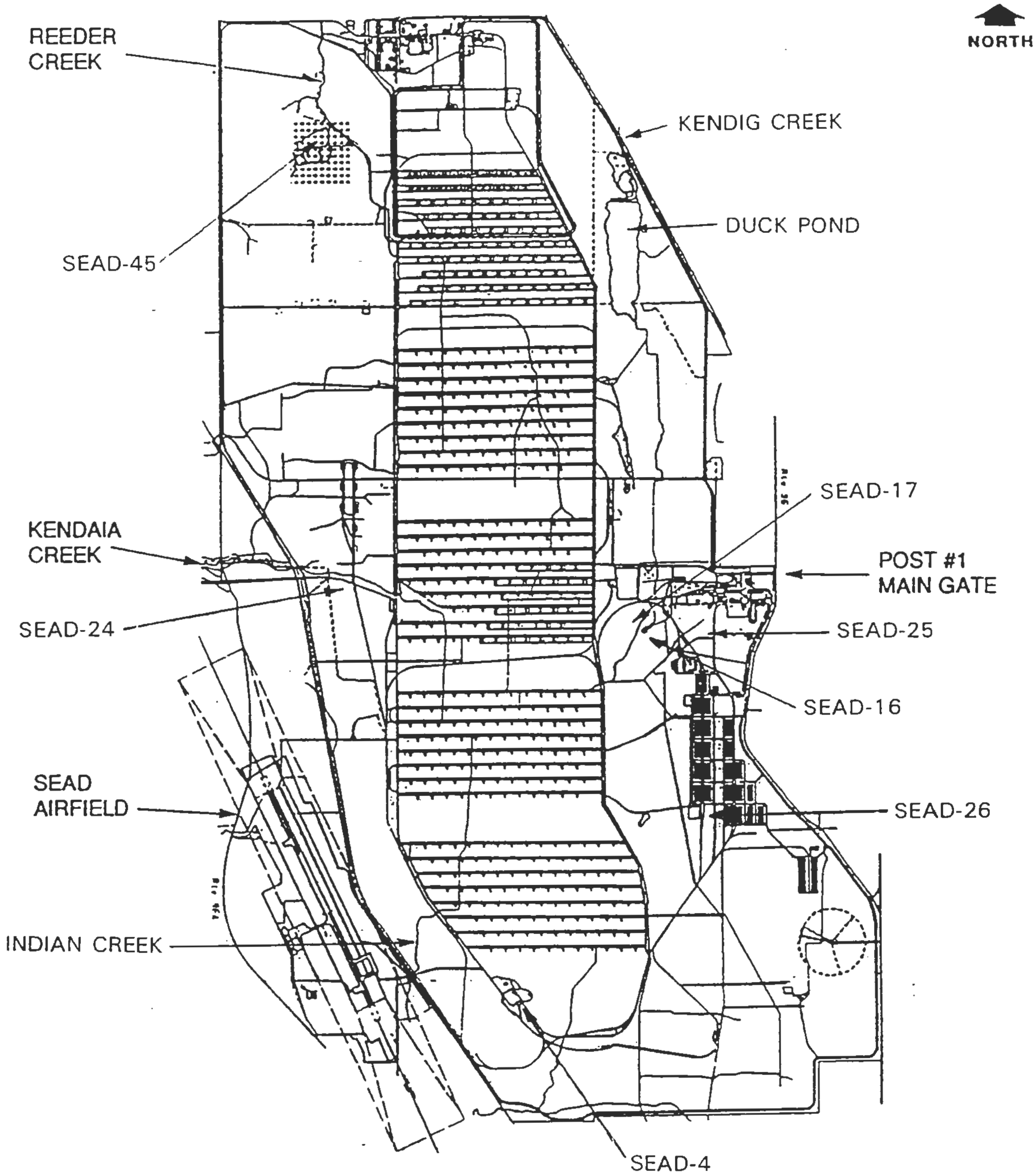
Site/SWMU Identification	Description of Site
SEAD-4	Munitions Washout Facility Leach Field
SEAD-16	Abandoned Deactivation Furnace (Bldg. S-311)
SEAD-17	Existing Deactivation Furnace (Bldg. 367)
SEAD-24	Abandoned Powder Burning Pit
SEAD-25	Fire Training and Demonstration Pad
SEAD-26	Fire Training Pit and Area
SEAD-45	Open Detonation Facility

and Seneca Lake on the west. Sparsely populated farmland covers most of the surrounding area. New York State Highways 96 and 96A adjoin SEDA on the east and west boundaries, respectively. Since its inception in 1941, SEDA's primary mission has been the receipt, storage, maintenance, and supply of military items. The Army plans to continue using SEDA in this capacity in the forseeable future. Figure 1.1-3 presents a plan view of SEDA.

1.1.1.1 Regional Geologic Setting

The Finger Lakes uplands area is underlain by a broad north-to-south trending series of rock terraces mantled by glacial till. As part of the Appalachian Plateau, the region is underlain by a tectonically undisturbed sequence of Paleozoic rocks consisting of shales, sandstones, conglomerates, limestones and dolostones. Figure 1.1-4 shows the regional geology of Seneca County. In the vicinity of SEDA, Devonian age (385 million years bp) rocks of the Hamilton group are monoclinally folded and dip gently to the south. No evidence of faulting or folding is present. The Hamilton Group is a sequence of limestones, calcareous shales, siltstones, and sandstones. These rocks were deposited in a shallow inland sea at the north end of the Appalachian Basin (Gray, 1991). Terrigenous sediments from topographic highs associated with the Acadian landmass of Western New England, eastern New York and Pennsylvania were transported to the west across a marine shelf (Gray, 1991). These sediments were deposited in a northeast-southwest trending trough whose central axis was near what is now the Finger Lakes (Gray, 1991).

The Hamilton Group, 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEDA is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales and mudstones and thin limestones with numerous zones of abundant invertebrate fossils that form geographically widespread encrinites, coral-rich layers, and complex shell beds. The Ludlowville Formation is known to contain brachiopods, bivalves, trilobites, corals and bryozoans (Gray, 1991). In contrast, the lower two formations (Skaneateles and Marcellus) consist largely of black and dark gray sparsely fossiliferous shales (Brett et al., 1991). Locally, the shale is soft, gray, and fissile. Figure 1.1-5 displays the stratigraphic section of Paleozoic rocks of Central New York. The shale is extensively jointed and weathered at the contact with overlying tills. Joint spacings are 1 inch to 4 feet in surface exposures. Prominent joint directions are N 60° E, N 30° W, and N 20° E, with the joints being primarily vertical. Corings performed on the upper 5 to



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CLIENT/PROJECT TITLE

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EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

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FIGURE 1.1-3

Seneca Army Depot Map

SCALE

SOURCE: Seneca Army Depot

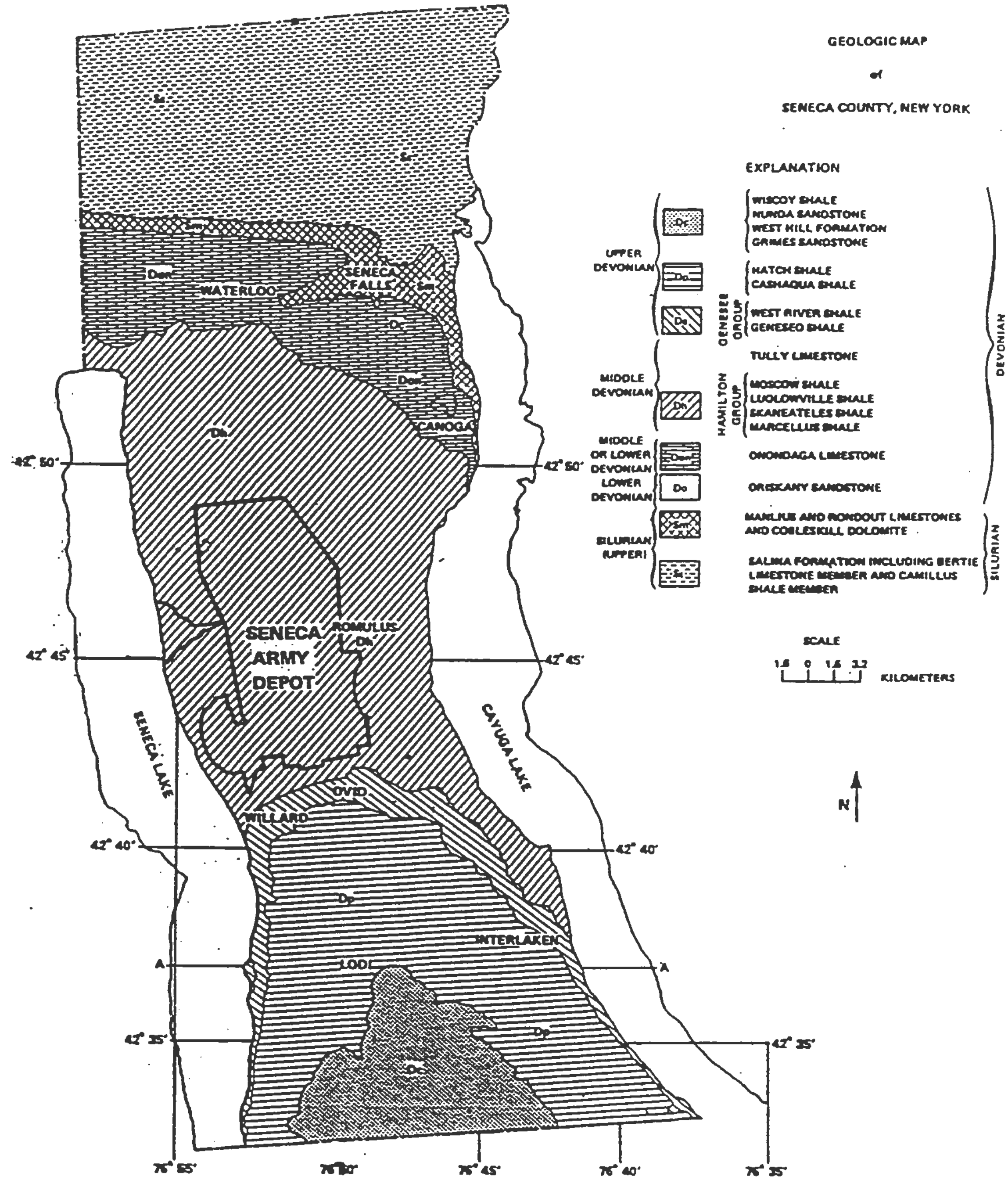

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FIGURE 1.1-4
Geologic Map of Seneca County

SCALE

PALEOZOIC

Upper Devonian

JAVA GROUP
300-700 ft. (90-210 m.)

Wiscoy Formation—sandstone, shale; Hanover and Pipe Creek Shales.

WEST FALLS GROUP
1100-1600 ft. (340-490 m.)

Nunda Formation—sandstone, shale.

West Hill and Gardeau Formations—shale, siltstone; Roricks Glen Shale; upper Beers Hill Shale; Grimes Siltstone.

lower Beers Hill Shale; Dunn Hill, Millport, and Moreland Shales.

Nunda Formation—sandstone, shale; West Hill Formation—shale, siltstone; Corning Shale.

"New Milford" Formation—sandstone, shale.

Gardeau Formation—shale, siltstone; Roricks Glen Shale.

Slide Mountain Formation—sandstone, shale, conglomerate.

Beers Hill Shale; Grimes Siltstone; Dunn Hill, Millport, and Moreland Shales

SONYEA GROUP
200-1000 ft. (60-300 m.)

In west: Cashaqua and Middlesex Shales.

In east: Rye Point Shale; Rock Stream ("Enfield") Siltstone; Pulteney, Sawmill Creek, Johns Creek, and Montour Shales.

GENESEE GROUP AND TULLY LIMESTONE
200-1000 ft. (60-300 m.)

West River Shale; Genundewa Limestone; Penn Yan and Geneseo Shales; all except Geneseo replaced eastwardly by Ithaca Formation—shale, siltstone and Sherburne Siltstone.

Oneonta Formation—shale, sandstone.

Unadilla Formation—shale, siltstone.

Tully Limestone.

Middle Devonian

HAMILTON GROUP
600-1500 ft. (180-460 m.)

Moscow Formation—In west: Windom and Kashong Shales, Menteth Limestone Members; In east: Cooperstown Shale Member, Portland Point Limestone Member.

Ludlowville Formation—In west: Deep Run Shale, Tichenor Limestone, Wanakah and Ledyard Shale Members, Centerfield Limestone Member. In east: King Ferry Shale and other members, Stone Mill Sandstone Member.

Skaneateles Formation—In west: Levanna Shale and Stafford Limestone Members; In east: Butternut, Pompey, and Delphi Station Shale Members, Mottville Sandstone Member.

Marcellus Formation—In west: Oakta Creek Shale Member; In east: Cardiff and Chittenango Shale Members, Cherry Valley Limestone and Union Springs Shale Members.

Panther Mountain Formation—shale, siltstone, sandstone.

ONONDAGA LIMESTONE AND ORISKANY SANDSTONE
75-150 ft. (23-45 m.)

Onondaga Limestone—Seneca, Morehouse (cherty) and Nedrow Limestone Members, Edgecliff cherty Limestone Member, local bioherms.

Oriskany Sandstone.

Lower Devonian

HELDERBERG GROUP
0-200 ft. (0-60 m.)

Coeymans and Manlius Limestones; Rondout Dolostone.

Upper Silurian

AKRON DOLOSTONE, COBLESKILL LIMESTONE, AND SALINA GROUP
700-1000 ft. (210-300 m.)

Akron Dolostone; Bertie Formation—dolostone, shale.

Camillus and Syracuse Formations—shale, dolostone, gypsum, salt.

Cobleskill Limestone; Bertie and Camillus Formations—dolostone, shale.

Syracuse Formation—dolostone, shale, gypsum, salt.

Vernon Formation—shale, dolostone.

LOCKPORT GROUP
80-175 ft. (25-55 m.)

Oak Orchard and Penfield Dolostones, both replaced eastwardly by Sconondoa Formation—limestone, dolostone.

CLINTON GROUP
150-325 ft. ~~(40-100 m.)~~

Decew Dolostone; Rochester Shale.

...lurian

Irondequoit Limestone; Williamson Shale; Wolcott Furnace Hematite; Wolcott Limestone; Sodus Shale; Bear Creek Shale; Wallington Limestone; Furnaceville Hematite; Maplewood Shale; Kodak Sandstone.

Herkimer Sandstone; Kirkland Hematite; Willowvale Shale; Westmoreland Hematite; Sauquoit Formation

Hamilton group

Moscow shale	43±	Lower two-thirds of section is a fossiliferous, soft gray calcareous shale; upper third highly friable but less calcareous and fossiliferous. Staining by iron oxide very common. Concretions present in greater abundance in lower beds, but irregular calcareous masses occur throughout section. Joints parallel, tightly sealed, trending N.65°E. and N.25°-30°W.
Ludlowville shale	43±	Lower beds are thinly laminated, light-colored, fossiliferous, shaly passage beds; overlain by hard calcareous black shales 13 to 30 centimeters thick and rich in corals and brachiopods; hard layers responsible for falls and cascades. Middle beds are less fossiliferous, soft gray arenaceous shales, rich in concretions, calcareous lenses, and occasional thin sandstone layers. Upper beds (Tichenor limestone member) are thin, irregularly bedded gray shales becoming light blue gray upon exposure, calcareous, coarsely textured, and fossiliferous. Joints parallel 5 to 60 centimeters apart, well developed but tight.
Skaneateles shale	56±	Basal beds composed of dark fissile shale. Upper shale more calcareous, grayish to bluish impure limestone layers. Joint pattern N.75°E. and N.30°W.; diagonal joints N.50°E. Joints sealed, parallel and spaced 15 centimeters to 1.2 meters apart.
Marcellus shale	15	Black, slatelike, bituminous shale with occasional limestone layers in sequence, and containing zones rich in iron sulfides or calcareous concretions, often with septarian structures; very fissile, iron-stained and gray when weathered. Joint pattern N.25°W., N.65°E., 2.5 centimeters to 1.2 meters apart.

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8 feet of the bedrock revealed low Rock Quality Designations (RQD's), i.e., less than 5 percent with almost 100 percent recovery (Metcalf & Eddy, 1989), suggesting a high degree of weathering.

Pleistocene age (Wisconsin event, 20,000 bp) glacial till deposits overlie the shales. Figure 1.1-6, the physiography of Seneca County, presents an overview of the subsurface sediments present in the area. The site is shown on Figure 1.1-6 as lying on the western edge of a large glacial till plain between Seneca Lake and Cayuga Lake. The till matrix, the result of glaciation, varies locally but generally consists of horizons of unsorted silt, clay, sand, and gravel. The soils at the site contain varying amounts of inorganic clays, inorganic silts, and silty sands. In the central and eastern portions of SEDA, the till is thin and bedrock is exposed or within 3 feet of the surface in some locations. Thickness of the glacial till deposits at SEDA generally ranges from 1 to 15 feet.

Darien silt-loam soils, 0 to 18 inches thick, have developed over Wisconsonian age glacial tills. These soils are developed on glacial till where they overlie the shale. In general, the topographic relief associated with these soils is 3 to 8 percent. Figure 1.1-7 presents the U.S. Department of Agriculture (USDA) General Soil map for Seneca County.

Regional background elemental concentrations for soils from the Finger Lakes area of New York State are not available. However, elemental concentrations for soils from the eastern United States and in particular, New York State are available. Table 1.1-2 cites data on the eastern United States from a United States Geological Survey (USGS) professional paper (Shacklette and Boerngen, 1984) and data on the New York State soils from a NYSDEC report.

1.1.1.2 Regional Hydrogeologic Setting

Regionally, four distinct hydrologic units have been identified within Seneca County (Mozola A.J., 1951). These include two distinct shale formations, a series of limestone units, and unconsolidated beds of Pleistocene glacial drift. Overall, the groundwater in the county is very hard, and therefore, the quality is minimally acceptable for use as potable water.

Approximately 95 percent of the wells in the county are used for domestic or farm supply and the average daily withdrawal is approximately 500 gallons, an average rate of 0.35 gallons per minute (gpm). About five percent of the wells in the county are used for commercial, industrial, or municipal purposes. Seneca Falls and Waterloo, the two largest communities

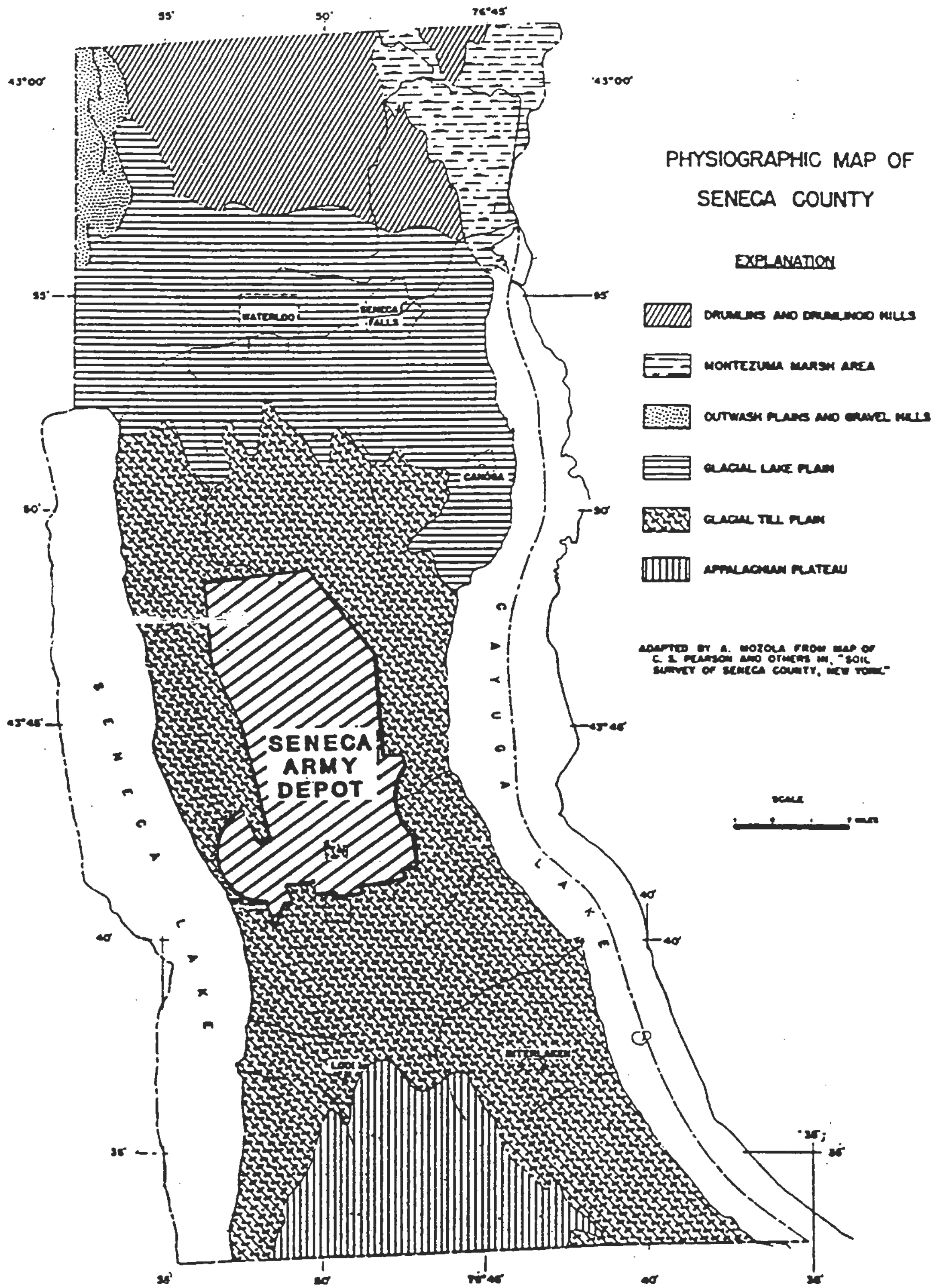

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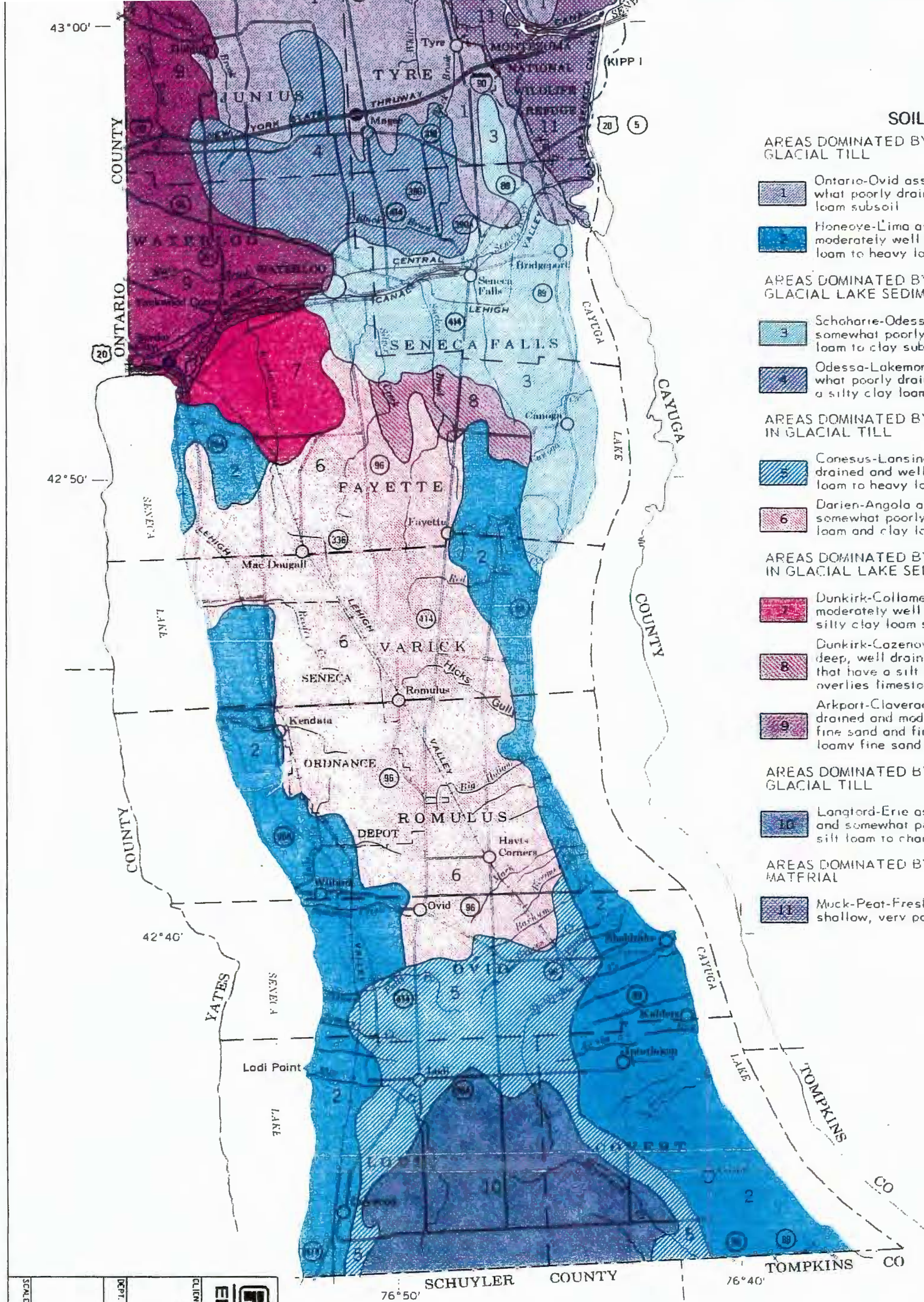
FIGURE 1.1-6
Physiographic Map of
Seneca County

SCALE

SOURCE: The Groundwater Resources of Seneca County, New York; Mozola, A.J., Bulletin GW-26, Albany, NY, 1951



SOIL ASSOCIATIONS

AREAS DOMINATED BY HIGH-LIME SOILS DEVELOPED IN GLACIAL TILL

1 — Ontario-Ovid association: Deep, well-drained to somewhat poorly drained soils that have a loam to silty clay loam subsoil

2 — Honeoye-Lima association: Deep, well drained and moderately well drained soils that have a heavy silt loam to heavy loam subsoil

AREAS DOMINATED BY HIGH-LIME SOILS DEVELOPED IN GLACIAL LAKE SEDIMENTS

3 — Schoharie-Odessa association: Deep, well-drained to somewhat poorly drained soils that have a silty clay loam to clay subsoil

4 — Odessa-Lakemont association: Deep, dominantly somewhat poorly drained and poorly drained soils that have a silty clay loam to silty clay subsoil

AREAS DOMINATED BY MEDIUM-LIME SOILS DEVELOPED IN GLACIAL TILL

5 — Conesus-Lansing association: Deep, moderately well drained and well drained soils that have a heavy silt loam to heavy loam subsoil

6 — Darien-Angola association: Deep and moderately deep, somewhat poorly drained soils that have a silty clay loam and clay loam subsoil

AREAS DOMINATED BY MEDIUM-LIME SOILS DEVELOPED IN GLACIAL LAKE SEDIMENTS

7 — Dunkirk-Collamer association: Deep, well drained and moderately well drained soils that have a silt loam to silty clay loam subsoil

8 — Dunkirk-Cazenovia association: Moderately deep and deep, well drained and moderately well drained soils that have a silt loam to silty clay loam subsoil that overlies limestone

9 — Arkport-Claverack association: Deep, dominantly well drained and moderately well drained soils that are loamy fine sand and fine sandy loam throughout or that have a loamy fine sand subsoil over silty clay or clay

AREAS DOMINATED BY LOW-LIME SOILS DEVELOPED IN GLACIAL TILL

10 — Langford-Erie association: Deep, moderately well drained and somewhat poorly drained soils that have a channery silt loam to channery loam fragipan

AREAS DOMINATED BY SOILS DEVELOPED IN ORGANIC MATERIAL

11 — Muck-Peat-Fresh Water Marsh association: Deep to shallow, very poorly drained organic soils

February 1971

SCALE	DEPT.	CLIENT/	EN

TABLE 1.1 – 2

BACKGROUND CONCENTRATIONS OF ELEMENTS IN SOILS OF THE EASTERN UNITED STATES WITH SPECIFIC DATA FOR NEW YORK STATE

SENECA ARMY DEPOT

ELEMENT	CONCENTRATION RANGE (ppm)	GEOGRAPHIC LOCATION
Aluminum	7,000 – 100,000 1,000 – 25,000 5,560–21,200	Eastern U.S. (2) Albany Area (1) SEDA (5)
Arsenic	< 0.1 – 73 3 – 12 < 0.1 – 6.5 2.70–21.5	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Barium	10 – 1,500 15 – 600 250 – 350 33.9–159	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Beryllium	1 – 7 0 – 1.75 0 – 0.9 0.32–1.40	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Cadmium	Not Available 0.0001 – 1.0 0.14–2.9	Eastern U.S. (2) No Region Specified (1) SEDA (5)
Calcium	100 – 280,000 130 – 35,000 150 – 5,000 2,900 – 6,500 1,370–293,000	Eastern U.S. (2) New York State (1) Albany Area (1) Albany Area (1) SEDA (5)
Chromium	1 – 1,000 1.5 – 40 1.5 – 25 10.3–35.8	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Cobalt	< 0.3 – 70 2.5 – 60 2.5 – 6 5.9–29.1	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Copper	< 1 – 700 < 1 – 15 9.7–62.8	Eastern U.S. (2) Albany Area (1) SEDA (5)
Iron	100 – 100,000 17,000 – 25,000 8,770–42,500	Eastern U.S. (2) Albany Area (1) SEDA (5)
Lead	> 10 – 300 1 – 12.5 5.4–269	Eastern U.S. (2) Albany Area (1) SEDA (5)
Magnesium	50 – 50,000 2,500 – 6,000 1,700 – 4,000 3,330–34,900	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Manganese	> 2 – 7,000 50 – 5,000 400 – 600 309–2,380	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Mercury	0.01 – 3.4 0.042 – 0.066 0.01–0.20	Eastern U.S. (2) Albany Area (1) SEDA (5)

TABLE 1.1 – 2

BACKGROUND CONCENTRATIONS OF ELEMENTS IN SOILS OF THE EASTERN UNITED STATES WITH SPECIFIC DATA FOR NEW YORK STATE

SENECA ARMY DEPOT

ELEMENT	CONCENTRATION RANGE (ppm)	GEOGRAPHIC LOCATION
Nickel	< 5 – 700 19.5 (mean) 16.3–62.3	Eastern U.S. (2) New York State (1) (no range available) SEDA (5)
Potassium	50 – 37,000 47.5 – 117.5 682–2,490	Eastern U.S. (2) New York State (1) SEDA (5)
Selenium	> 0.1 – 3.9 Not Available 0.05–0.97	Eastern U.S. (2) No New York State Data Given (1) SEDA (5)
Sodium	500 – 50,000 Not Available 21.9–269	Eastern U.S. (2) No New York State Data Given (1) SEDA (5)
Vanadium	> 7 – 300 Not Available 12.0–36.9	Eastern U.S. (2) No New York State Data Given (1) SEDA (5)
Zinc	> 5 – 2,900 37 – 60 40.6–219	Eastern U.S. (2) Albany Area (1) SEDA (5)

Notes:

1. (1) Source: McGovern, Carol E., Background Concentrations of 20 Elements in Soils with Special Regard for New York State, Wildlife Resources Center, New York Department of Environmental Conservation, Delmar, New York 12054, No Date.
2. (2) Source: Shacklette, H.T. and Boerngen, J.G., 1984, Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, U.S.G.S. Prof Paper 1270, Washington.
3. The data are for areas where surficial materials are thought to be uncontaminated, undisturbed, or areas far from pollution sources.
4. ppm = parts per million.
5. Data represents the 95th Upper Confidence Limit (UCL) of the mean from soil data obtained during the Ash Landfill and Open Burning Grounds remedial investigation.

in the county, are in the hydrogeologic region which is most favorable for the development of a groundwater supply. However, because the hardness of the groundwater is objectionable to the industrial and commercial establishments operating within the villages, both villages utilize surface water (Cayuga Lake and Seneca River, respectively) as their municipal supplies. The villages of Ovid and Interlaken, both of which are without substantial industrial establishments, utilize groundwater as their public water supplies. Ovid obtains its supply from two shallow gravel-packed wells, and Interlaken is served by a developed seepage-spring area.

Regionally, the water table aquifer of the unconsolidated surficial glacial deposits of the region would be expected to flow in a direction consistent with the ground surface elevations. Geologic cross-sections from Seneca Lake and Cayuga Lake have been constructed by the State of New York, (Mozola, 1951, and Crain, 1974). This information suggests that a groundwater divide exists approximately half way between the two finger lakes. SEDA is located on the western slope of this divide and therefore regional groundwater flow is expected to be westward toward Seneca Lake.

A substantial amount of information concerning the hydrogeology in the area has been compiled by the State of New York, (Mozola, 1951). No other recent state sponsored hydrogeological report is available for review. This report has been reviewed in order to better understand the hydrogeology of the area surrounding SEDA. The data indicates that within a four (4) mile radius of the site a number of wells exist from which geologic and hydrogeologic information has been obtained. This information includes: 1) the depth; 2) the yield; and 3) the geological strata the wells were drilled through. Although the information was compiled in the 1950s, these data are useful in providing an understanding and characterization of the aquifers present within the area surrounding SEDA. A review of this information suggests that three geologic units have been used to produce water for both domestic and agricultural purposes. These units include: 1) a bedrock aquifer, which in this area is predominantly shale; 2) a till aquifer, which includes Pleistocene deposits (glacial till); and 3) a deep aquifer present within beds of limestone in the underlying shale. The occurrence of water derived from limestone is considered to be unusual for this area and is more commonplace to the north of this area. The limestone aquifer in this area is between 100 and 700 feet deep. As of 1957, twenty-five wells utilized water from the shale aquifer, six wells tapped the till aquifer, and one used the deep limestone as a source of water.

For the six wells that utilized groundwater extracted from the till, the average yield was approximately 7.5 gpm. The average depth of these wells were 36 feet. The geologic material which comprises this aquifer is generally Pleistocene till, with the exception of one well located northeast of the site. This well penetrates an outwash sand and gravel deposit. The yields from the five till wells ranged from 4 to 15 gpm. The well located in the outwash sand and gravel deposit, drilled to 60 feet, yielded only 5 gpm. A 20-foot hand dug well, located southeasterly of the outwash well, yielded 10 gpm.

The geologic information reviewed indicates that the upper portions of the shale formation would be expected to yield small, yet adequate, supplies of water, for domestic use. For mid-Devonian shales such as those of Hamilton group, the average yields, (which are less than 15 gpm), are consistent with what would be expected for shales (LaSala, 1968). The deeper portions of the bedrock, (at depths greater than 235 feet) have provided yields up to 150 gpm. At these depths the high well yields may be attributed to the effect of solution on the Onondaga limestone, which is at the base of the Hamilton Group. Based on well yield data, the degree of solution is affected by the type and thickness of overlying material (Mozola, 1951). Solution effects on limestones (and on shales which contain gypsum) in the Erie-Niagara have been reported by LaSala (1968). This source of water is considered to comprise a separate source of groundwater for the area. Very few wells in the region adjacent to SEDA utilize the limestone as a source of water, which may be due to the drilling depths required to intercept this water.

1.1.1.3 Local Geology

The site geology is characterized by gray Devonian shale with a thin weathered zone where it contacts the overlying mantle of Pleistocene glacial till. This stratigraphy is consistent over the entire site and in the site vicinity.

The predominant surficial geologic unit present at the site is dense glacial till. The till is distributed across the entire site and ranges in thickness from less than 2 feet to as much as 15 feet although it is generally only a few feet thick. The till is generally characterized by brown to gray-brown silt, clay and fine sand with few fine to coarse gravel-sized inclusions of weathered shale. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably ripped-up clasts removed by the active glacier. The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML). Grain size analyses performed by Metcalf & Eddy (1989) on glacial till samples collected during the installation of monitoring wells on another portion of SEDA show a wide distribution of sediments sizes. These tills have a high percentage of silt and clay with trace amounts of fine gravel. Another study, conducted at the same site by the United States Army Environmental Hygiene Agency (USAEHA) determined the porosities of 5 gray-brown silty clay (i.e., till) samples which ranged from 34.0 percent to 44.2 percent with an average of 37.3 percent (USAEHA Hazardous Waste Study No. 37-26-0479-85).

Darian silt-loam soils, 0 to 18 inches thick, have developed over the till, however, in some locations, the agricultural soils have been eroded away and the till is exposed at the surface. The surficial soils are poorly drained and have a silt clay loam and clay subsoil. In general, the topographic relief associated with these soils is 3 to 8%.

A zone of gray weathered shale of variable thickness was encountered below the till in almost all locations drilled at SEDA. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay.

The bedrock underlying the site is composed of the Ludlowville Formation of the Devonian age Hamilton Group. Merin (1992) also cites three prominent vertical joint directions of northeast, north-northwest, and east-northeast in outcrops of the Genesse Formation 30 miles southeast of SEDA near Ithaca, New York. Three predominant joint directions, N60°E, N30°W, and N20°E are present within this unit (Mozola, 1952). These joints are primarily vertical. The Hamilton Group is a gray-black, calcareous shale that is fissile and exhibits parting (or separation) along bedding planes.

The minimum, maximum, average, standard deviation and the 95th Upper Confidence Level (UCL) of the mean for background concentrations of selected inorganic constituents in the soil located at the SEDA are shown in Table 1.1-3. In addition to the statistical summary information, the actual data points have also been included in this table. Non-detect values have been adjusted to one-half the detection limit. The soil sample locations and the sample depths are also presented in the table. The data presented has been compiled from the samples collected at the Ash Landfill site, the OB grounds site, and the AOCs investigated during this effort.

table 1.1-3

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 AOCs

INORGANICS	MINIMUM SOILS	MAXIMUM SOILS	AVERAGE SOILS	STANDARD DEVIATION SOILS	95TH UCL SOILS	B8-91 0-2 SOIL	B8-91 2-4 SOIL	B8-91 2-4 SOIL	B8-91 6-8 SOIL
Metals						(ASH)	(ASH)	(ASH)	(ASH)
Aluminum	5560.00	21200.00	14275.38	4619.49	15522.54	19200	20500	17700	12700
Antimony	1.40	17.10	4.25	2.59	4.95	5.15	4.4	4.1	4.2
Arsenic	2.70	21.50	5.76	3.18	6.65	5.1	6.1	6	4.2
Barium	33.90	159.00	81.98	29.41	89.92	136	98.9	86.7	56.2
Beryllium	0.32	1.40	0.74	0.26	0.81	1.4	1.2	1	0.78
Cadmium	0.14	2.90	0.65	0.84	0.85	2.6	2.9	2.4	1.9
Calcium	1370.00	293000.00	46482.05	55752.67	120725.07	5390	4870	3560	85900
Chromium	10.30	35.80	22.25	6.70	24.06	27.4	30.1	26.9	19.8
Cobalt	5.90	29.10	12.05	4.44	13.25	13.8	18.4	14	14.2
Copper	9.70	62.80	22.51	9.89	25.18	22.3	27.6	26	16.2
Iron	8770.00	42500.00	26865.90	7855.54	28986.71	37200	36100	32500	27400
Lead	5.40	269.00	26.80	58.81	25.98	14.5	11.4	13.6	10.1
Magnesium	3330.00	34900.00	10432.05	6949.55	12308.26	5850	7300	6490	6720
Manganese	309.00	2380.00	655.34	365.17	759.41	1130	956	832	926
Mercury	0.01	0.20	0.05	0.04	0.06	0.09	0.06	0.06	0.05
Nickel	16.30	62.30	33.49	11.20	36.52	42.3	48.7	44.4	30.4
Potassium	628.00	2490.00	1435.82	416.15	1548.17	1910	2110	1760	1430
Selenium	0.05	0.97	0.24	0.24	0.31	0.085	0.105	0.1	0.305
Silver	0.16	0.87	0.48	0.21	0.53	0.8	0.65	0.6	0.65
Sodium	21.90	269.00	98.62	57.09	114.03	39.6	33.75	31.3	75.3
Thallium	0.08	0.80	0.23	0.17	0.28	0.235	0.29	0.285	0.17
Vanadium	12.00	36.90	22.95	7.00	24.84	32.2	25.4	26.4	15.7
Zinc	40.60	219.00	81.33	29.82	89.70	85.1	94.2	85	75
Cyanide	0.24	0.41	0.30	0.04	0.31	0.3	0.315	0.335	0.29

Notes:
1) All soil results are expressed in mg/kg.
All groundwater results are expressed in ug/L.
2) All detects (no qualifier or J qualifier) were taken at full value.
All non-detects (U or UJ qualifier) were taken at half value.
3) 15 Background soil samples colleced from Phase I and II RI/FS investigations at the Ash Landfill (9 samples) and the Open Burning Grounds (6 samples).
4) The "H" statistic was used to calculate the 95th UCL of lognormally distributed data (see Section 6).
5) "R" qualifier indicates datum rejected during data validation.

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TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 AOCs

INORGANICS	B9-91 0-2 SOIL	B9-91 2-4 SOIL	B9-91 6-8 SOIL	BK-1 0-2 SOIL	BK-2 0-2 SOIL	MW-34 0-2 SOIL	GB35-1 0-2 SOIL	GB35-2 2-4 SOIL	GB35-6 0-2 SOIL	GB36-1 0-2 SOIL	GB36-2 2-4 SOIL	SB4-1.1 0-2 SOIL
Metals	(ASH)	(ASH)	(ASH)	(ASH)	(ASH)	(OB)	(OB)	(OB)	(OB)	(OB)	(OB)	
Aluminum	14800	8880	7160	19400	14400	16100	18000	17600	16200	18100	16200	14800
Antimony	4.95	4.95	3.5	3.95	3.6	5.7	2.9	6.8	6.3	5.9	2.9	2.4
Arsenic	4.3	3.8	4.4	3	2.7	3.15	6.2	7.7	5.3	4.6	9.7	6.2
Barium	101	110	39.9	159	106	67.5	93.6	61.7	61.7	74.8	50.8	72
Beryllium	1.1	0.76	0.52	1.1	0.81	0.86	0.85	0.74	0.77	0.77	0.65	0.73
Cadmium	2.3	1.7	1.5	0.225	0.205	2.3	0.165	0.155	0.175	0.15	0.165	0.235
Calcium	45600	104000	101000	4590	22500	28600	1590	17700	1370	1660	22900	4280
Chromium	22.5	13.8	11.2	30	22.3	26.6	23.5	29.3	25.1	24.8	27.4	23.2
Cobalt	13.7	10.7	8.1	14.4	12.3	17	9.4	16.3	10.3	20.4	13.2	11.3
Copper	22.6	21.6	19.3	26.9	18.8	32.7	17.5	24.5	17.2	17.7	17.5	14.1
Iron	31000	19600	17300	38600	26600	35000	25200	34200	30800	26100	30700	27500
Lead	10.8	10.1	7.8	15.8	18.9	11.9	14.4	5.4	19.1	12.7	6.2	17.7
Magnesium	8860	17000	12600	5980	7910	6850	3850	7790	4490	4490	7150	4270
Manganese	903	532	514	2380	800	803	701	646	775	426	507	R
Mercury	0.08	0.04	0.05	0.13	0.11	R	0.06	0.015	0.07	0.02	0.02	0.05
Nickel	38.4	23.8	19	47.7	31	49.3	26.3	48.7	28.3	28.3	42.8	27.8
Potassium	1320	1080	1050	1720	1210	1290	1110	1110	975	1400	1100	1250
Selenium	0.105	0.325	0.105	0.73	0.94	0.09	0.115	0.115	0.105	0.1	0.09	0.4
Silver	0.75	0.75	0.55	0.235	0.215	0.87	0.17	0.16	0.18	0.155	0.17	0.465
Sodium	84.2	112	116	49.1	61.1	55.2	35.6	77.5	34.6	46.6	97.6	21.9
Thallium	0.295	0.18	0.3	0.21	0.19	0.255	0.275	0.27	0.25	0.23	0.215	0.115
Vanadium	19.7	19.5	12.9	28	22.4	22.3	27.1	22.3	26.1	27.8	19.7	28.6
Zinc	126	84.3	74.8	98.6	63.7	95.7	55	83.4	53.1	59.2	74.1	79.6
Cyanide	0.35	0.315	0.31	0.285	0.305	0.27	0.39	0.355	0.41	0.35	0.34	0.26

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 AOCs

INORGANICS	SB4-1.1 DUP SOIL	SB4-1.3 4-6 SOIL	SB4-1.6 8-10 SOIL	SB11-3.1 0-2 SOIL	SB11-3.2 4-6 SOIL	SB11-3.6 10-12 SOIL	SB13-1.1 0-2 SOIL	SB13-1.3 6-8 SOIL	SB13-1.4 8-10 SOIL	SB13-4.1 0-2 SOIL	SB13-4.2 2-4 SOIL
Metals											
Aluminum	21000	15300	19200	17600	6330	10900	18300	8250	11700	21200	15500
Antimony	1.9	2.5	1.4	5.4	4	3.8	5.1	1.85	1.4	2	4.5
Arsenic	4.2	3.9	21.5	R	R	R	7	6.2	5.7	8.1	6.8
Barium	97.7	40.4	81.2	113	57.4	62.7	106	88.1	33.9	129	96.9
Beryllium	0.64	0.74	1	0.85	0.34	0.47	0.92	0.42	0.54	1.1	0.78
Cadmium	0.185	0.245	0.135	0.335	0.25	0	0.225	0.18	0.135	0.19	0.17
Calcium	2460	30900	14400	4950	91300	48600	3570	87700	50300	28800	68000
Chromium	27.9	27.6	32.7	24	11.1	18.6	29.4	13.3	19.6	30.2	25.8
Cobalt	5.9	16.5	29.1	11.3	6.5	10.1	12	7.2	11.1	10.6	12.4
Copper	15.1	62.8	21.6	20	12.2	21.7	11.6	18.4	17.6	21.6	21.1
Iron	19500	34300	37900	27200	13200	28300	32500	17400	24700	31600	30100
Lead	9.8	7.5	9.1	27.9	11.4	10.1	R	R	R	13.6	13.6
Magnesium	4460	7130	8040	4160	12900	10100	5890	20800	12600	8780	10600
Manganese	R	R	R	674	356	434	451	517	404	363	607
Mercury	0.04	0.04	0.04	0.05	0.02	0.02	0.03	0.07	0.01	0.05	0.01
Nickel	25.1	47.6	62.3	28.3	16.7	29.5	34.9	24	33.1	38.1	43.2
Potassium	2490	1300	2030	2110	1110	1230	2190	1390	1270	2130	1570
Selenium	0.23	0.045	0.07	0.24	0.065	0.105	0.26	0.56	0.51	0.53	0.2
Silver	0.37	0.495	0.64	0.7	0.5	0.485	0.45	0.305	0.27	0.385	0.345
Sodium	39.2	105	91.6	66.3	136	146	80.6	155	134	81.5	183
Thallium	0.12	0.08	0.12	0.095	0.75	0.115	0.43	0.43	0.64	0.11	0.1
Vanadium	31	22.2	29.3	31.8	13.3	17	32.7	13.3	16.3	35.8	23.1
Zinc	72.1	102	115	R	R	R	81.9	56.2	45.3	89.4	65.8
Cyanide	0.265	0.265	0.235	0.285	0.235	0.265	0.305	0.25	0.265	0.27	0.255

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TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 AOCs

INORGANICS	SB13-4.3 4-6 SOIL	SS16-1 0-0.2 SOIL	SB17-1.1 0-2 SOIL	SB17-1.2 2-4 SOIL	SB17-1.3 4-6 SOIL	SB24-5.1 0-2 SOIL	SB24-5.3 4-6 SOIL	SB24-5.5 8-10 SOIL	SB25-6.1 0-2 SOIL	SB25-6.2 2-4 SOIL	SB26-1.1 0-2 SOIL	SB26-1.2 2-4 SOIL
Metals												
Aluminum	20400	6550	13700	18100	8700	16200	10100	13700	10600	7070	5560	9040
Antimony	1.6	17.1	5.85	5.9	4.5	6.25	2.9	5.65	2.1	1.5	3.65	3.35
Arsenic	9.6	4.9	4.3	5.2	3.4	4.2	3.3	5	8.3	4.8	3.2	5.3
Barium	79.1	102	107	114	59.4	117	58.3	67.2	59.1	35	73.2	43.7
Beryllium	1	0.32	0.7	0.9	0.42	0.98	0.48	0.65	0.48	0.35	0.35	0.41
Cadmium	0.155	0.22	0.365	0.37	0.28	0.39	0.18	0.35	R	R	0.23	0.21
Calcium	10200	147000	2870	20900	72800	4540	74200	49000	82500	122000	293000	473000
Chromium	35.8	12.6	17.6	25.1	13.9	24.5	16.9	23.1	16.9	11.3	10.3	15.7
Cobalt	12.1	6.2	9.9	13.3	8.8	16	8.2	12	11.2	6.6	5.9	9.5
Copper	26.5	44	46.4	26.9	20	28.4	20.9	22.2	20.2	12	9.7	14.3
Iron	42500	12300	25100	29900	18800	33600	21300	26700	21400	15800	8770	19100
Lead	7.1	269	266	11.4	7.5	45.5	8.7	7.9	9.5	13.8	6.33	8.5
Magnesium	9660	34900	3330	8490	18100	5150	12100	11400	19600	22800	29100	9160
Manganese	398	355	547	487	391	1080	400	450	722	610	309	551
Mercury	0.02	0.2	0.05	0.06	0.015	R	R	R	0.03	0.02	0.01	0.01
Nickel	53	23	19.1	42	25.2	37.3	26.4	35.2	26.8	18	16.3	23.9
Potassium	1810	1290	628	1560	1090	1170	993	1660	1480	1060	1710	901
Selenium	0.28	0.075	0.125	0.12	0.07	0.075	0.115	0.11	0.97	0.63	0.065	0.26
Silver	0.315	0.45	0.75	0.75	0.55	0.8	0.365	0.7	0.41	0.295	0.46	0.425
Sodium	87.8	213	46.2	74.6	137	50.9	153	139	269	186	192	108
Thallium	0.09	0.8	0.14	0.13	0.075	0.08	0.125	0.12	0.12	0.105	0.365	0.085
Vanadium	30.7	36.9	23.1	27	13.9	29.9	14.4	19.5	18.5	12	12.7	14.4
Zinc	93	219	93.4	80.2	57.1	85.7	62.8	63.2	71.6	40.6	56	90.6
Cyanide	0.27	0.32	NA	NA	NA	0.3	0.255	0.285	0.29	0.32	0.24	0.285

1.1.1.4 Local Hydrology/Hydrogeology

Surface drainage from SEDA flows to four creeks as shown in Figure 1.1-8. In the southern portion of the depot, the surface drainage flows through ditches and streams into Indian and Silver Creeks. These creeks then flow into Seneca Lake just south of the SEDA airfield. The central part and administration area of SEDA drain into Kendaia Creek. Kendaia Creek discharges into Seneca Lake near the Lake Housing Area. The majority of the northwestern and north-central portion of SEDA drain into Reeder Creek. The northeastern portion of the depot, which includes a marshy area called the Duck Ponds, drains into Kendig Creek and then flows north into the Cayuga-Seneca Canal and to Cayuga Lake.

Characterization of the local hydrogeology is based upon hydrogeological information obtained from previous site investigations. USATHAMA (1989) conducted single-well aquifer tests (slug tests) in the Ash Landfill area to estimate the hydraulic conductivity of the water-bearing materials underlying the site. The slug tests were performed on five shallow groundwater monitor wells (PT-11, PT-12, PT-15, PT-21 and PT-23) screened in the till and upper (weathered) portion of the bedrock. Slug test data were analyzed according to the method developed by Bouwer and Rice (1976). The hydraulic conductivity values generated from the slug test analysis were used in conjunction with an estimate of soil porosity and the calculated groundwater flow gradient to develop an estimate for the average groundwater flow rate at the Ash Landfill site. Excluding PT-21, which had an unusually low hydraulic conductivity value of 5.87×10^{-11} centimeters per second (cm/sec) (1.66×10^{-7} ft/day), the average hydraulic conductivity, as determined by the slug test analysis, was 2.06×10^{-4} cm/sec (0.587 ft/day). Typical tight clay soils have hydraulic conductivity values that range from 3.53 $\times 10^{-5}$ to 3.53×10^{-8} cm/sec (Davis, 1969).

The effective porosity of the aquifer at the Ash Landfill site was estimated by ICF to be 11 percent. The average linear velocity of groundwater flow, calculated by ICF, Inc. using Darcy's law, between PT-17 and PT-18 is 2.2×10^{-7} ft/sec, 1.19×10^{-2} ft/day or, 6.9 feet per year (ft/yr) based on a hydraulic conductivity of 3.3×10^{-5} cm/sec (9.33×10^{-2} ft/day).

Data from the Ash Landfill site quarterly groundwater monitoring program and previous field investigations indicate that the saturated thickness of the till/weathered shale overburden aquifer is variable, generally ranging between 1 and 8.5 feet. However, the aquifer thickness appears to be influenced by the hydrologic cycle and some monitoring wells dry up completely. From two years of data, the effect on the water table elevations is likely a

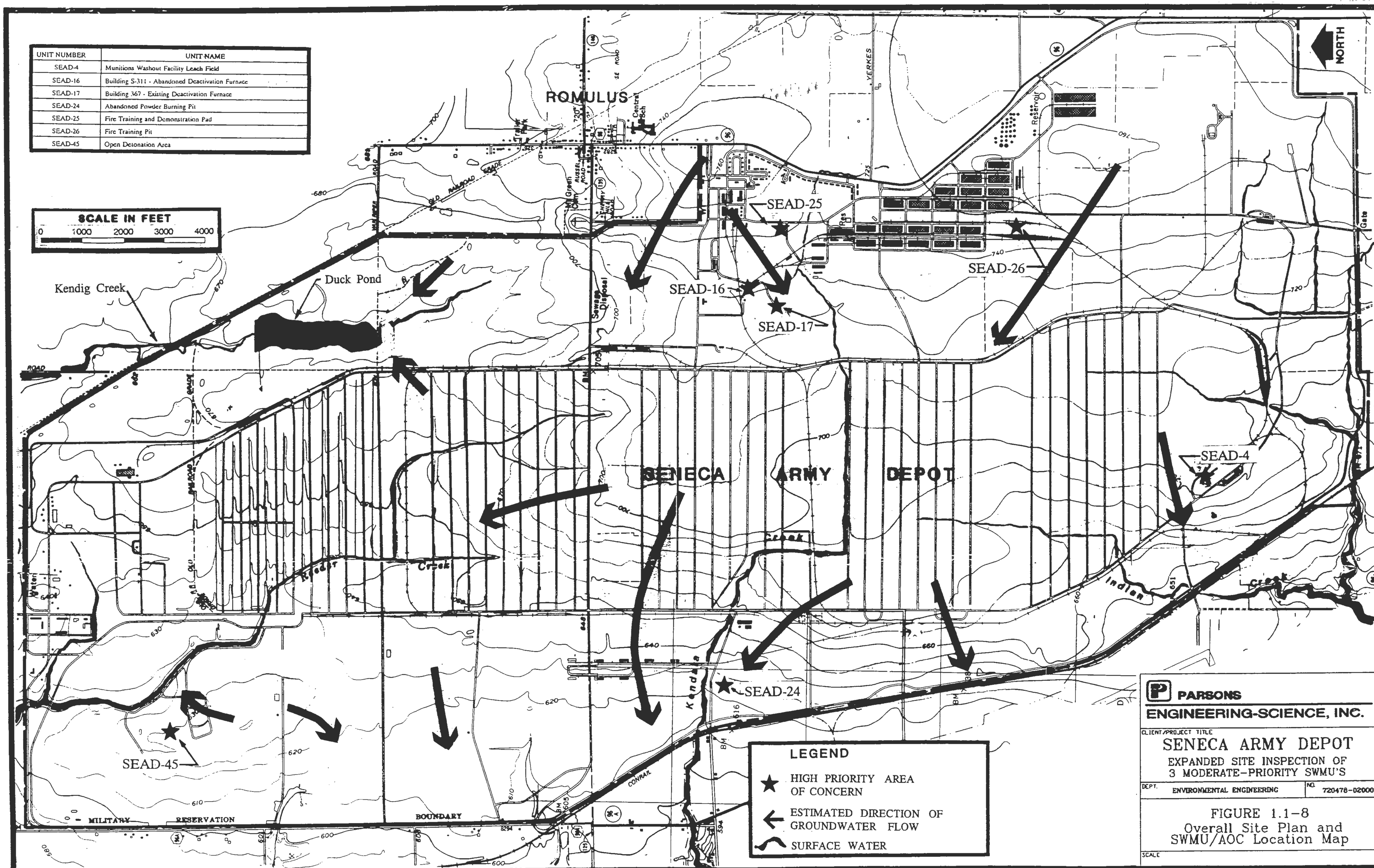


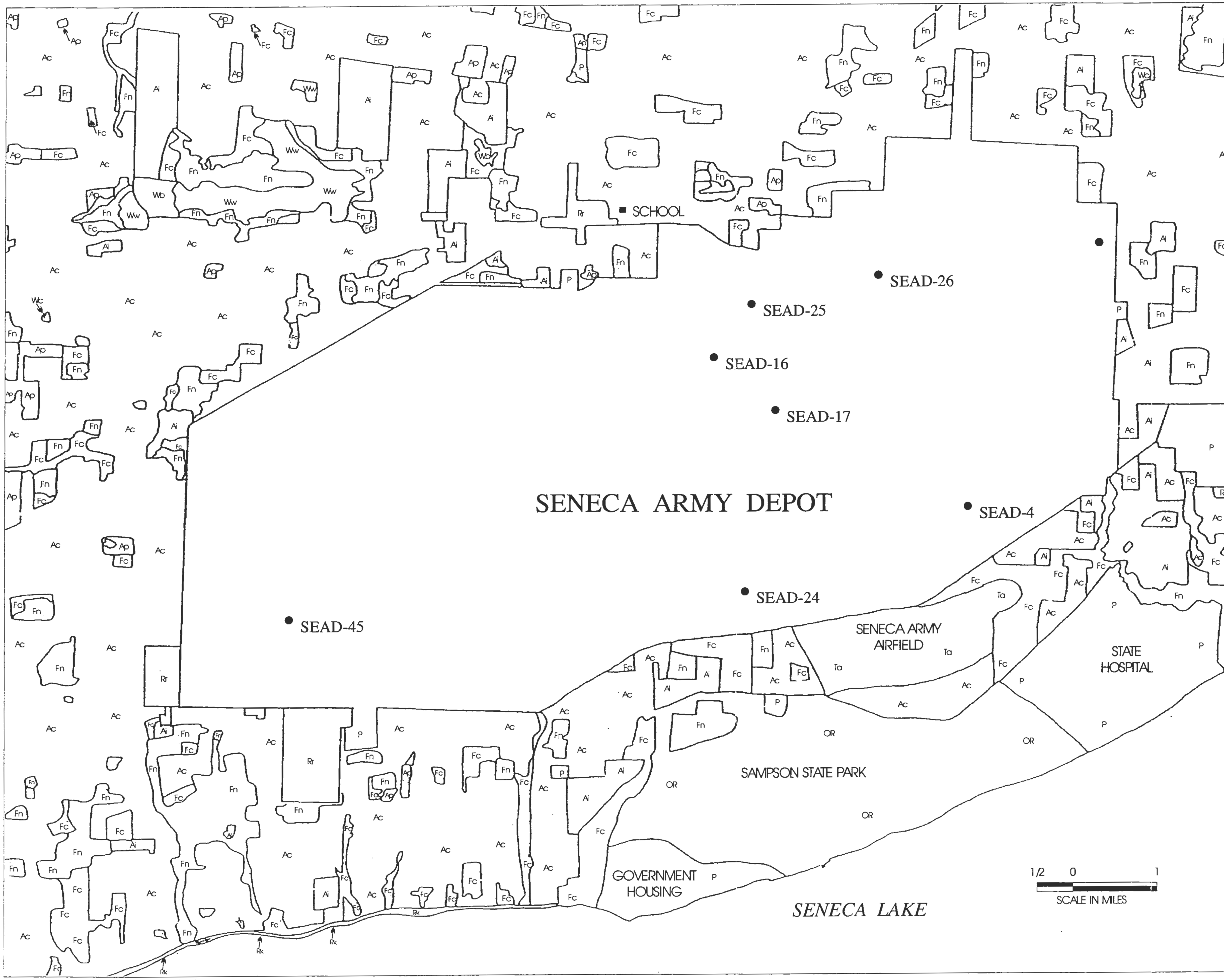
FIGURE 1.1-8
Overall Site Plan and SWMU/AOC Location Map

waiting to be developed, or land presently under construction. Active agricultural land surrounding SEDA consists largely of cropland and cropland pasture.

SEDA is a government-owned installation under the jurisdiction of the U.S. Army Material Command (AMC). SEDA lies immediately west of the village of Romulus, NY, 12 miles south of the villages of Waterloo and Seneca Falls, and 2.5 miles north of the village of Ovid, NY (Figure 1.1-9). The nearest major cities are Rochester, NY and Syracuse, NY located 60 miles northwest and northeast, respectively. The total area of SEDA is 10,587 acres, of which 8,382 are designated storage areas for ammunition, storage and warehouse, and open storage and warehouse. On-post family housing is in two parcels, a 54-acre development adjacent to Route 96 and another 69 acres situated along Seneca Lake. Additionally, troop housing is available for 270 enlisted men (Buildings 703, 704, and 708). Bachelor officer quarters are located in Building 702, which is designated for 18 men. Other land uses include Administration, Community Services and an airfield. SEDA has a swimming pool at the north end of the facility, along with tennis courts, a gymnasium, and a sports field complex. Picnic and playground areas are found on the installation at Hancock Park, the Lake Area and the Family Housing Area. There is also a skeet and trap range at the field.

EPA guidance for determining future land uses recommends that, if available, master plans, which include future land uses, Bureau of Census projections and established land use trends in the general area should be utilized to establish future land use trends. The Romulus and Varick Town Clerks were contacted to determine if any master plans exist for this area or if any land use restrictions could apply to the future use of the depot. No zoning maps or master plans were found to exist for the depot or the surrounding areas in the towns of Romulus and Varick. Consequently, the use of this area for light industrial or residential uses is not restricted by local zoning laws and either use could be permitted. The existing land use is generally agricultural with sparse housing. Large tracts of undeveloped land are widely available for future development. The area is not experiencing a high degree of growth nor is it expected to. There is no pressure to develop land in this area, nor will there likely be the need to develop the depot for residential purposes. Section 6.2.2 of the EPA Risk Assessment Guidance for Superfund (RAGS) discusses future land uses and states: "If the site is industrial and is located in a very rural area with a low population density and projected low growth, future residential use would probably be unlikely. In this case, a more likely alternate future land use may be recreational. At some sites, it may be most reasonable to assume that the land use will not change in the future."

The intended future use of the seven sites under consideration is as they currently are. The Army has no plans to change the use of this facility or to transfer the ownership. If the property is to change ownership, CERCLA, Section 120 (h)(1),(2), and (3) requires that the



LEGEND

Active

- Ac Cropland/cropland pasture
- Ap Permanent pasture

Inactive

- Ai Agriculture inactive

Forestland

- Fc Brush cover up to fully stocked poles less than 30 feet
- Fn Forest over 30 feet

Water

- Wn Natural, any size
- Wc Artificial, one acre

Wetlands

- Wb Bogs, shrub wetlands
- Ww Wooded wetlands

Public

- P All Categories

Residential

- Rr Rural hamlet

Shoreline

- Rk Shoreline developed

Outdoor Recreation

- OR All categories

Transportation

- Ta Airport

Source: New York Land Use and Natural Resource Inventory

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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING	DWG NO 720477-01002

FIGURE 1.1-9

REGIONAL/LOCAL LAND USE MAP

SCALE 1" = 2000'	DATE MAY 1995

r:\graphics\seneca\basemap\zoning\lanuse.cdr(cvm) seasonal phenomenon. The till aquifer is thickest during the spring recharge months and thinnest during the summer and early fall. During late fall and early winter, the saturated thickness increases. This cycle of aquifer thickness appears to be consistent with what would be expected from an understanding of the hydrologic cycle. Although rainfall is fairly consistent at SEDA, averaging approximately 3 inches per month, evapotranspiration is a likely reason for the large fluctuations observed in the saturated thickness of the over-burden aquifer.

On-site hydraulic conductivity determinations were performed by M&E (1989) on monitoring wells MW-8 through MW-17 at the Open Burning Grounds. These wells are all screened within the glacial till unit. The data were analyzed according to a procedure described by Hvorslev (1951). The average hydraulic conductivity measured for the ten monitoring wells was 5.0×10^{-1} ft/day (1.8×10^{-4} cm/sec). The hydraulic conductivities ranged from 2.02×10^{-2} ft/day (7.06×10^{-6} cm/sec) to 1.47 ft/day (5.19×10^{-4} cm/sec). These hydraulic conductivity measurements were within an order of magnitude agreement with previous results reported by O'Brien and Gere (1984). O'Brien and Gere determined the average hydraulic conductivity of the till material to be approximately 2.8×10^{-1} ft/day (9.9×10^{-5}cm/sec). A comparison of the measured values with the typical range of hydraulic conductivities for glacial tills indicates that the glacial till at the site is at the more permeable end of typical glacial till values.

Soils samples were collected during the 1984 U.S. Army Environmental Hygiene Agency (USAEHA) Phase IV investigation of the burning ground to characterize the permeability of the burning pad soils. Soil permeabilities were measured by recompacting the soil in a mold to 95% standard proctor density. The average permeability for 5 measurements was 1.01×10^{-3} ft/day (3.56×10^{-7} cm/sec). The typical range for glacial tills, described by Freeze and Cherry (1979), is between 3×10^{-1} ft/day (1×10^{-4} cm/sec) and 3×10^{-7} ft/day (1×10^{-10} cm/sec).

1.1.1.5 Land Use

The SEDA is situated between Seneca Lake and Cayuga Lake and encompasses portions of Romulus and Varick Townships. Land use in this region of New York is largely agricultural, with some forestry and public land (school, recreational and state parks). Figure 1.1-9 summarizes the regional and local land use. The most recent land use report is that issued by Cornell University. This report classifies in further detail land uses and environments of this region (Cornell 1967). Agricultural land use is categorized as inactive and active use. Inactive agricultural land consists of land committed to eventual forest regeneration, land prospective owner must be notified that hazardous substances were possibly stored on the parcel. This will include the quantity and type of the substances that were stored. The content of the deed must also include a covenant warranting that all remedial actions necessary to protect human health and the environment with respect to any such hazardous substances remaining on the property have been taken before the date of the transfer. If a property transfer is contemplated by the Army, this information, under penalty of the law, must be supplied to the prospective owner. Should the actual future use of the parcel be residential, then the Army will perform any additional remedial activities to ensure that human health and the environment, under the residential scenario, are protected.

The possibility of human exposure actually occurring is remote since the Army intends to continue using these parcels as currently used. At such time that the property is intended to be transferred in accordance with CERCLA, the Army will notify all appropriate regulatory agencies and will perform any additional investigations and remedial actions to assure that the intended change in use is protective of human health and the environment.

Forest land adjacent to SEDA is primarily under regeneration with sporadic occurrence of mature forestry. Public and semi-public land use surrounding and within the vicinity of SEDA is Sampson State Park, Willard Psychiatric Center, and Central School (at the Town of Romulus). Sampson State Park entails approximately 1,853 acres of land and includes a boat ramp on Seneca Lake. Historically, Varick and Romulus Townships within Seneca County developed as an agricultural center supporting a rural population. However, increased population occurred in 1941 due to the opening of SEDA. Population has progressed since then largely due to the increased emphasis on promoting tourism and recreation in this area.

Figure 1.1-9 provides the location of the high priority AOCs investigated for this report. The Munitions Washout Facility (SEAD-4) is situated in the southwestern corner of SEDA near Indian Creek. Land use adjacent to, yet off-site of, the southwestern corner of SEDA is sparse residential areas with some farmland.

The Former Deactivation Facility (SEAD-16), the Existing Deactivation Facility (SEAD-17) and the Fire Demonstration and Training Pad (SEAD-25) are located on the eastern side of SEDA within 2,000 feet of each other and within 1500 feet of the administration buildings, a playground, and on-post housing.

The Abandoned Powder Burning Pit (SEAD-24) is situated on the western boundary of SEDA near Kendaia Creek. Land use adjacent to, yet off-site of, SEDA within 4,000 feet include farmland and some residential areas.

The Fire Training Pit and Area (SEAD-26) is located on the eastern boundary of SEDA near storage buildings. Land use adjacent to, yet off-site, includes farmland and sparse residential areas.

SEAD-45, the Open Detonation (OD) grounds, is situated in the northwest corner of SEDA. The SEDA property boundary is approximately 3,000 feet from the OD grounds. Land use adjacent to, yet off-site of, the northwestern corner of SEDA is sparse residential areas with some farmland. Records provided by the Town of Varick show approximately 15 residences adjacent to the northwestern border of SEDA which are within 4000 feet of the OD grounds. These residences all obtain drinking water from private water wells.

1.1.1.6 Climate

Table 1.1-4 summarizes climatological data for the SEDA area. The nearest source of climatological data is the Aurora Research Farm in Aurora, New York which is approximately ten miles east of SEDA on the east side of Cayuga Lake. This research farm is administered by the Northeast Regional Climate Center located at Cornell University in Ithaca, New York. Only precipitation and temperature measurements are available from this location. The other data reported in Table 1.1-4 were taken either from isopleth drawings from a climatic atlas, or from data collected at Syracuse, New York, which is 40 miles northeast of SEDA. Meteorological data collected from 1965 to 1974 at Hancock International Airport in Syracuse, New York, were used to prepare the wind rose presented in Figure 1.1-10.

A cool climate exists at SEDA with temperatures ranging from an average of 23°F in January to 69°F in July. Marked temperature differences are found between daytime highs and night time lows during the summer and portions of spring and autumn. Precipitation is unusually well-distributed, averaging approximately 3 inches per month. This precipitation is derived principally from cyclonic storms which pass from the interior of the country through the St. Lawrence Valley. Lakes Seneca, Cayuga, and Ontario provide a significant amount of the winter precipitation and moderate the local climate. The annual average snowfall is approximately 100 inches. Wind velocities are moderate, but during the winter months, there are numerous days with sufficient winds to cause blowing and drifting snow. The most frequently occurring wind directions are westerly and west-southwesterly.

Daily precipitation data measured at the Aurora Research Farm in Aurora, New York for the period (1957-1991) were obtained from the Northeast Regional Climate Center at Cornell University. This station is located approximately 10 miles east of the depot. The average monthly precipitation during this 35-year period of record is summarized in Figure 1.1-11. The maximum 24-hour precipitation measured at this station during this period was 3.9 inches

TABLE 1.1-4

CLIMATOLOGICAL DATA FOR SENECA ARMY DEPOT

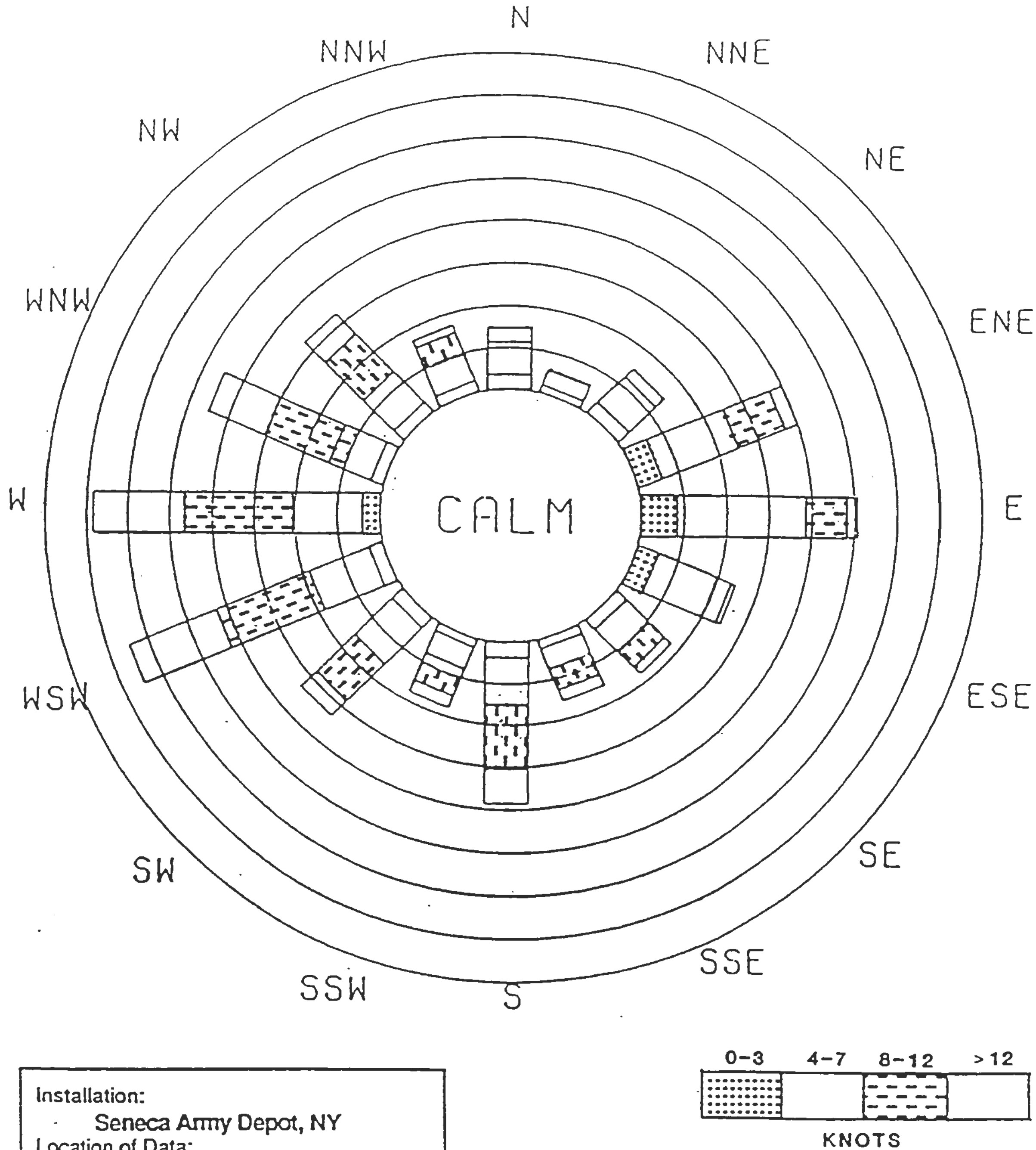
SENECA ARMY DEPOT

MONTH	TEMPERATURE[1] (°F)			PRECIP[1] (in)	RH[3] (%)	SUN-	MEAN NUMBER OF DAYS[4]		
	MAX	MIN	MEAN	MEAN	MEAN	SHINE[3] (%)	CLEAR	PTLY. CLDY.	CLOUDY
JAN	30.9	14.0	22.5	1.88	70	35	3	7	21
FEB	32.4	14.1	23.3	2.16	70	50	3	6	19
MAR	40.6	23.4	32.0	2.45	70	50	4	7	20
APR	54.9	34.7	44.8	2.86	70	50	6	7	17
MAY	66.1	42.9	54.5	3.17	70	50	6	10	15
JUN	76.1	53.1	64.6	3.70	70	60	8	10	12
JUL	80.7	57.2	69.0	3.46	70	60	8	13	10
AUG	78.8	55.2	67.0	3.18	70	60	8	11	12
SEP	72.1	49.1	60.7	2.95	70	60	7	11	12
OCT	61.2	39.5	50.3	2.80	70	50	7	8	16
NOV	47.1	31.4	39.3	3.15	70	30	2	6	22
DEC	35.1	20.4	27.8	2.57	70	30	2	5	24
ANNUAL	56.3	36.3	46.3	34.33	70	50	64	101	200

PERIOD	MIXING HEIGHT[2] (m)	WIND SPEED[2] (m/s)
Morning (Annual)	650	6
Morning (Winter)	900	8
Morning (Spring)	700	6
Morning (Summer)	500	5
Morning (Autumn)	600	5
Afternoon (Annual)	1400	7
Afternoon (Winter)	900	8
Afternoon (Spring)	1600	8
Afternoon (Summer)	1800	7
Afternoon (Autumn)	1300	7

Mean Annual Pan Evaporation[3] (in) : 35
Mean Annual Lake Evaporation[3] (in) : 28
Number of episodes lasting more than 2 days (No. of episode-days)[2] :
Mixing Height < 500 m, wind speed < 2 m/s : 0 (0)
Mixing Height < 1000 m, wind speed < 2 m/s : 0 (0)
Number of episodes lasting more than 5 days (No. of episode-days)[2] :
Mixing Height < 500 m, wind speed < 4 m/s : 0 (0)

Notes:
[1] Climate of New York Climatography of the United States No. 60. National Oceanic and Atmospheric Administration, June 1982. Data for Ithaca Cornell University, NY.
[2] Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States. George C. Holzworth, Jan. 1972.
[3] Climate Atlas of the United States. U.S. Department of Commerce, 1983.
[4] Climate of New York Climatography of the United States No. 60. National Oceanic and Atmospheric Administration, June 1982. Data for Syracuse, NY.



Installation:
Seneca Army Depot, NY
Location of Data:
Syracuse, NY
Source:
US Army Environmental Hygiene Agency

NOTE : EACH DIVISION IS 2% OF TOTAL TIME .

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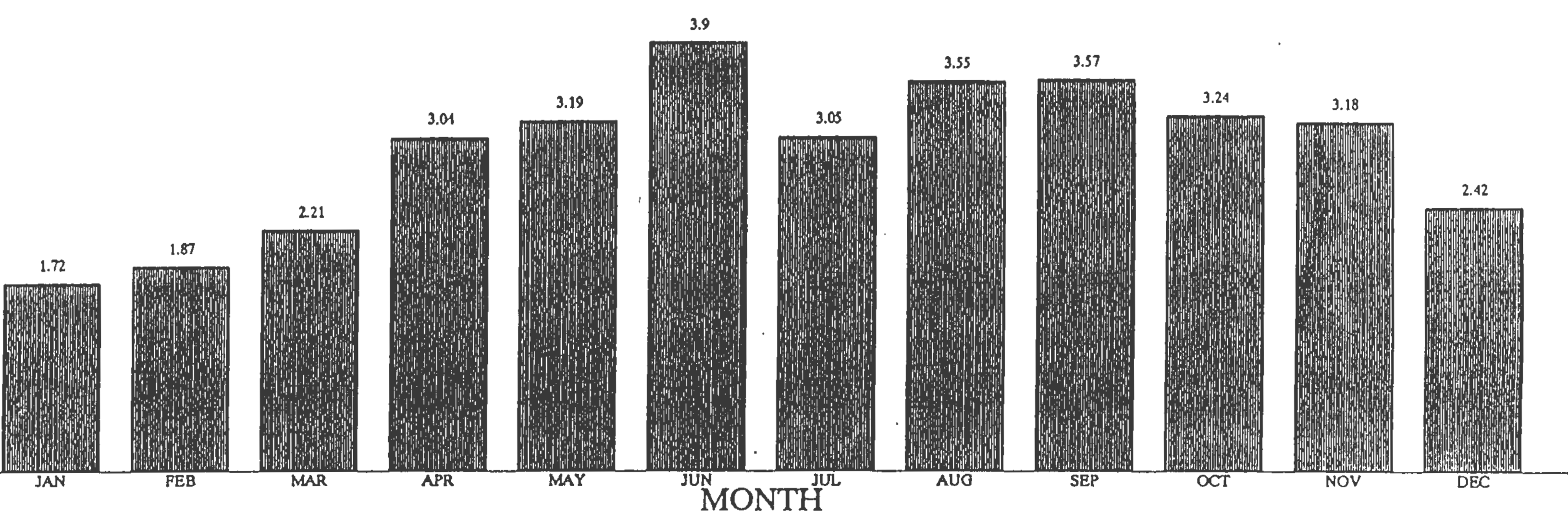
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | NO. 720477-02000

FIGURE 1.1-10
Wind Rose, Syracuse, New York

SCALE



r years from 1958 through 1991.

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EXPANDED SITE INSPECTION O
7 HIGH-PRIORITY SWMU'S

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FIGURE 1.1-11
Average Monthly Precipitatic
Proximity of Seneca Army I

SCALE

on September 26, 1975. Values of 35 inches mean annual pan evaporation and 28 inches for annual lake evaporation were already reported in Table 1.1-4. An independent value of 27 inches for mean annual evaporation from open water surfaces was estimated from an isoplethed figure in "Water Atlas of the United States" (Water Information Center, 1973).

Precipitation and relative humidity tend to be rather high throughout the year. The months with the most amount of sunshine are June through September. Mixing heights tend to be lowest in the summer and during the morning hours. Wind speeds also tend to be lower during the morning, which suggests that dispersion will often be reduced at those times, particularly during the summer. However, no episode-days are expected to occur with low mixing heights (less than 500 meters (m)) and light wind speeds (less than or equal to 2 meters per second (m/s)). Information on the frequency of inversion episodes for a number of National Weather Service stations is summarized in "Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States" (George C. Holzworth, US EPA, 1972). The closest stations at which inversion information is available are Albany, New York and Buffalo, New York. The Buffalo station is nearer to SEDA but almost certainly exhibits influences from Lake Erie. These influences would not be expected to be as noticeable at SEDA.

SEDA is located in the Genesee-Finger Lakes Air Quality Control Region (AQCR). The AQCR is designated as "non-attainment" for ozone and "attainment" or "unclassified" for all other criteria pollutants. Data for existing air quality in the immediate area surrounding the SEDA, however, can not be obtained since the nearest state air quality stations are 40 to 50 miles away from the depot (Rochester of Monroe County or Syracuse of Onondaga County). A review of the data for Rochester, which is in the same AQCR as SEDA, indicates that all monitored pollutants (sulfur dioxide, particulates, carbon monoxide, lead, ozone) are below state and federal limits, with the exception of ozone. In 1987, the maximum ozone concentration observed in Rochester was 0.127 parts per million (ppm). However, this value may not be representative of the SEDA area which is in a more rural area.

1.1.2 Physical Site Setting and History

SEDA was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army since this time. The Army has no plans to change the use of this facility (i.e., storage areas for ammunition, administration, munitions destruction facility) or to transfer ownership. Prior to construction of the depot, the site was used for farming.

1.1.2.1 SEAD-4

1.1.2.1.1 Physical Site Setting

The Munitions Washout Facility and leach field is located in the southwestern portion of SEDA (Figure 1.1-8). It is characterized by developed and undeveloped areas. The developed areas are mostly east of North South Baseline Road and are characterized by steam generation buildings, a berm, a water storage tank, a suspected leach field and a network of paved roads all of which comprise a portion of the munitions washout facility (Figure 1.1-12). The munitions washout building was razed and only a grassy field exists in its former location near the center of the site. In addition, only a concrete floor with drains provides evidence of a former building north of the razed munitions washout building. A broken concrete pad and rusted steel underground storage tank were observed on the west side of the northernmost steam generation building near the water storage tank. North of the suspected leach field a drainage pipe embedded in a concrete berm is believed to have discharged to the drainage swale that surrounds the site; the orientation of the pipe indicates that it most likely originated at the leach field. An open-top 4-inch vertical pipe which contained water is located in the northern portion of the suspected leach field; its function is unknown.

West of North South Baseline Road is the mostly undeveloped portion of the site. It is comprised of grassy fields and low brush which lead to a drainage pond and a dredge area in the western portion of the site. A buried 4-inch clay drainage pipe connects the pond to the location of the former munitions washout building. Approximately 200 feet south of the pipeline is the location of a former building and an associated crushed shale roadway; only grass and disturbed ground provide evidence of its existence.

Most of the site is enclosed by an approximately 3-foot deep drainage swale that begins at North-South Baseline Road north of the suspected leach field and surrounds the facility to the northeast; the drainage swale is interupted for approximately 300 feet by the SEDA railroad tracks and an unpaved access road. The swale continues on the southwestern side of North-South Baseline Road and loops northwest to connect with the settling pond.

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EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 1.1-12
SEAD-4 MUNITIONS WASHOUT FACILITY
SITE MAP

SCALE	DATE	REV
1" = 200'	MAY 1995	C

Topography on-site slopes gently to the west on the developed portion of site, however, it steepens slightly west of North South Baseline Road. The site is surrounded by open grassland and low brush on the north, east, south, and west. The SEDA railroad tracks traverse the site near its western boundary. The site is located within the ammunition storage area and access to the site is restricted. The nearest offsite residence is located approximately 3,500 feet west of the site.

1.1.2.1.2 Site History

The Munitions Washout Facility Leach Field (SEAD-4) was active between 1948 and 1963. At present, the foundation of the washout plant is barely visible (approximately 150 feet long by 80 feet wide), but there is no visual evidence of the suspected leach field. Operations at this facility included dismantling and removing explosives from munitions by steam cleaning. This operation produced recyclable and non-recyclable explosive solids and wastewater. The details of the operation and the wastewater discharge locations are not well understood. Solid wastes containing explosives were most likely open burned at the OB facility (SEAD-23) or the old powder burning pit (SEAD-24). Chemical constituents that are common at washout plants include TNT, RDX, HMX, Tetryl, trinitrobenzene and heavy metals. The actual explosives that were used at this plant and could be in the wastewater are unknown. Interviews with former SEDA employees indicate that the wastewater was processed through sawdust to remove any solid explosive residues prior to being discharged to an area where it leached into the ground or flowed into a nearby ditch. Some wastewater may have been discharged into a pond area near Building 2084, which is approximately 1,000 feet due south of the munition washout facility (USAEHA 1988). An employee recently reported that wastewater was discharged into an area near the Building 2079 boiler plant.

Within the past 8 years, the discharge pond was widened and deepened utilizing a bulldozer. The pond has no outlet and is stagnant. Pond sediment was pushed southwestward to a 400-foot by 150-foot area southwest and adjacent to the pond. This scraped-off sediment has been previously sampled but the presence of explosives were not detected.

1.1.2.1.3 Existing Analytical Data

The Solid Waste Management Unit Classification Study (ERCE 1991) for SEAD-4 states that soil sampling has been conducted in the pond area at SEAD-4. The ERCE report also provided the following information: sample number, some sample depth information, the concentration units, the explosives that were analyzed for and the sampling data.

Seventy soil samples, collected on June 28, 1990 under supervision of ERCE from the pond area were analyzed for three explosive compounds (2,4,6-TNT, 2,4-DNT and 2,6-DNT). None of these explosives were detected.

1.1.2.2 SEAD-16

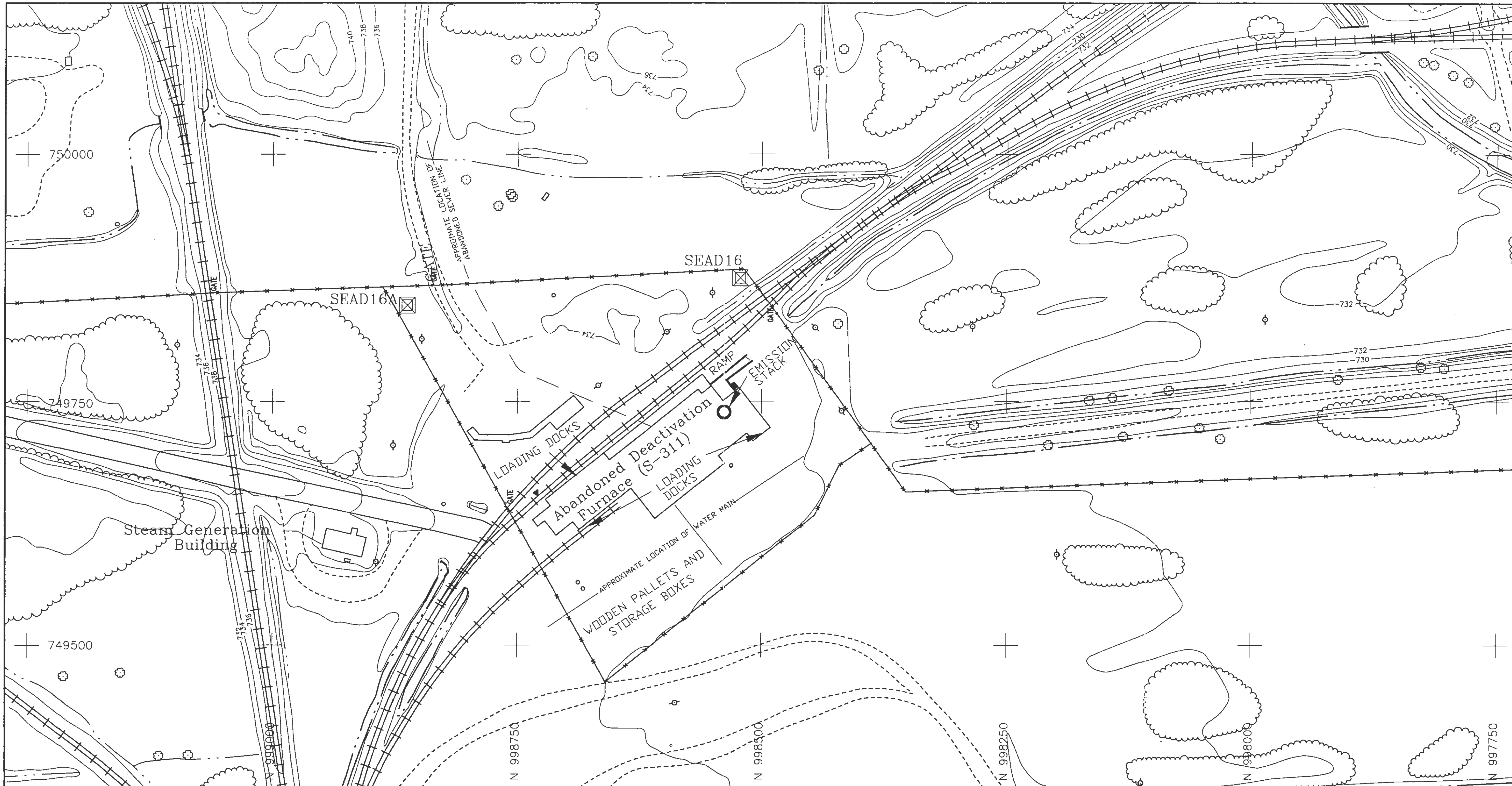
1.1.2.2.1 Physical Site Setting

The Abandoned Deactivation Furnace is located in the east-central portion of SEDA (Figure 1.1-8). It is characterized by two elongated buildings, one small and one large, separated by two sets of SEDA railroad tracks which pass through the site (Figure 1.1-13). The entire site is enclosed by a chain-link fence with a locking gate on the northeastern side. Since this facility is located with the ammunition storage area, access to the site is restricted. The site is surrounded by mostly grasslands to the north, east, and west and by a general storage area for empty boxes and wooden debris and an unpaved roadway to the south.

The large, dilapidated building (the Abandoned Deactivation Furnace) on-site contains an emission stack on the east side and is surrounded by loading docks on the southwestern and northeastern sides. At the eastern end of the building a sloping concrete ramp leads to the base of the building. The interior of the building is characterized mostly by empty rooms. Stacks of empty wooden pallets and storage boxes are located on pavement in the southwestern portion of the site. The smaller steam generation building to the north is also dilapidated.

The site is generally flat but slopes gently to the west. The northeastern portion of the site is vegetated with low grass and, conversely, the southwestern portion of the site is entirely paved with asphalt.

There are several utilities on the site. A water main traverses the southwestern portion of the site with a service line leading to the northwestern side of the large building. An abandoned sewer line enters the site from the northeast, approximately 50 feet south of the access gate, and connects to the central portion of the large building.



ACAD\SENECA\7SWMU\ACADFIG\SD16SI.DWG

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- CORDINATE GRID (250' GRID)
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

50 0 50 100
(feet)

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 1.1-13
SEAD-16 ABANDONED DEACTIVATION FURNACE
SITE PLAN

SCALE	DATE	REV
1" = 100'	MAY 1995	C

The nearest offsite residence is located approximately 5,500 feet east-south-east of the site.

1.1.2.2.2 Site History

The Abandoned Deactivation Furnace, (SEAD-16) located in Building S-311, was used to destroy munitions from approximately 1945 to the mid-1960s. The furnance area floor occasionally has some standing water, possibly from high groundwater seepage in and/or rainwater entering through the lower ramp door.

Small arms munitions, both obsolete and unserviceable, were destroyed by incineration. There were no air pollution or dust control devices installed on the furnace. The pipes located above the building may have conveyed propellants, which may also have been stored in the building.

1.1.2.2.3 Existing Analytical Data

No existing analytical data were discovered for this SWMU.

1.1.2.3 SEAD-17

1.1.2.3.1 Physical Site Setting

The Existing Deactivation Furnace is located in the east-central portion of SEDA (Figure 1.1-8). Acess to this site is restricted since it is located in the ammunition storage area. It is characterized by an elongated deactivation furnace building that is surrounded by a crushed shale road. The actual deactivation furnace is a steel rotary kiln incinerator and is enclosed by an eight foot high reinforced concrete wall. The wall does not contain a roof. The concrete wall is intended to contain the effects of a detonation. Beyond the crushed shale road is grassland. Two small sheds are located in the eastern portion of the site. The site is generally flat but slopes gently to the southwest (Figure 1.1-14).

A small drainage ditch is located approximately 100 feet east of the building and bends west past the southern end of the building, ending near a stand of brush and trees at the western boundary of the site.

The deactivation furnace building on-site contains an emission stack and air pollution control devices including an afterburner, 2 gas coolers, a cyclone and a baghouse on the southwestern side. The building appears to be in good condition.

Vehicular access to the site is from a road to the north; within SEDA, both vehicular and pedestrian access to the site is restricted.

The nearest offsite residence is located approximately 5,500 feet east-south-east of the site.

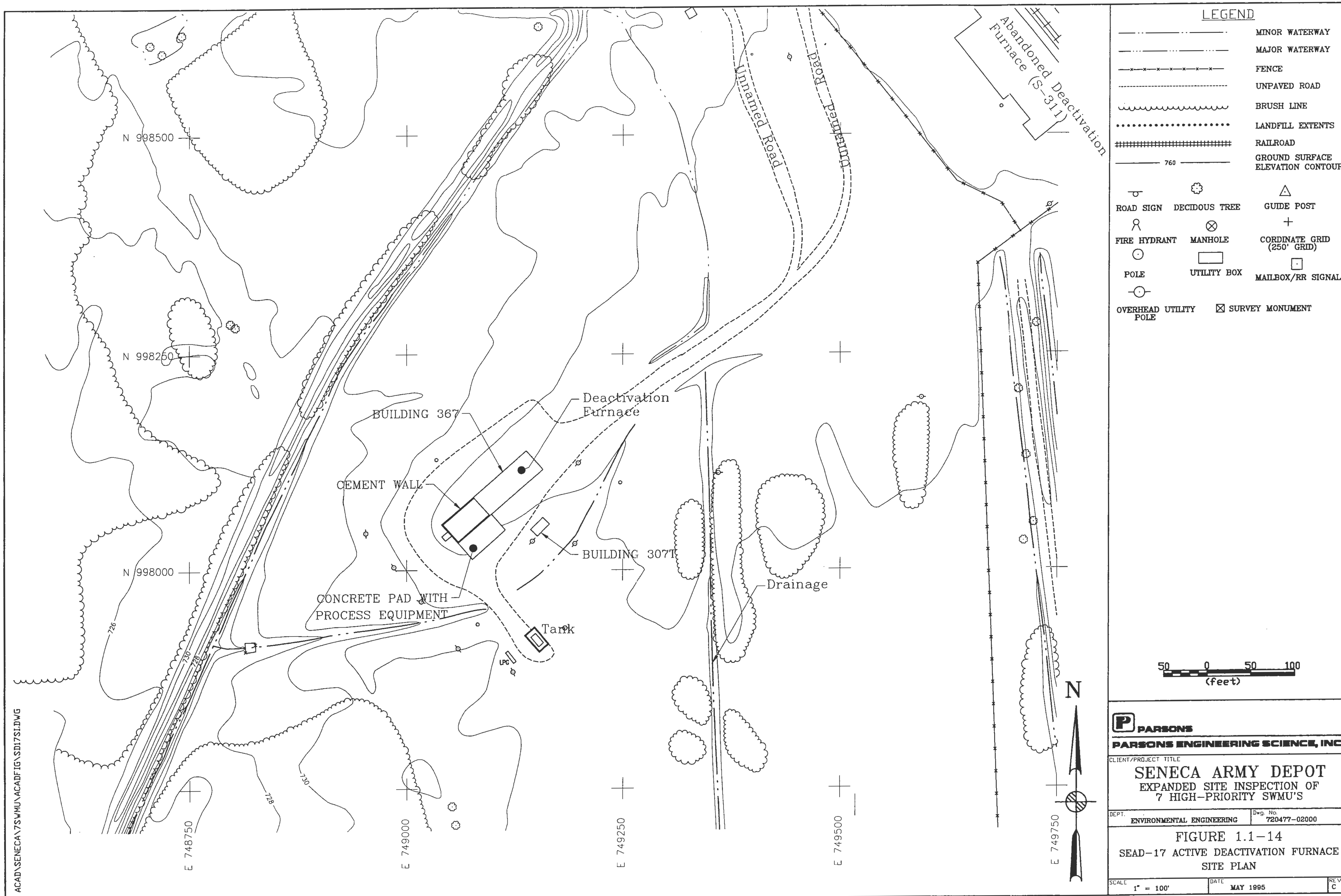
1.1.2.3.2 Site History

The Existing Deactivation Furnace (SEAD-17), located in Building 367, has been active from 1962 to 1989. A dust collection system was added to the unit in 1978, and it was further upgraded in 1989. This facility has not operated since 1989, pending approval of the Part B application, which includes a Trial Burn Plan (TBP).

The deactivation furnace is used to incinerate obsolete and unserviceable small arms munitions (20 mm or less in size), fuses, boosters and firing devices. The furnace consists of a rotary steel kiln retort and feed discharge assemblies. The kiln has a cross-sectional area of 4.6 square feet and is 20 feet long. The kiln is fired by No. 2 fuel oil. The furnace's feed system consists of a waste feed weighing system, a primary waste feed conveyor and a secondary conveyor. The furnace is equipped with an Air Pollution Control System (APCS). The APCS consists of an afterburner, gas coolers, cyclone separator, baghouse, compressor, induced draft fan, stack and associated duct work.

The furnace has been included in the facility's Part B permit application. The unit was upgraded in 1989 to meet the operating requirements for incinerators detailed in 40 CFR Part 264 Subpart O. As part of the RCRA regulations, interim closure of the unit was conducted in 1989. The plan for conducting the trial burn has been prepared. The trial burn will be conducted after review and approval of the TRP by the NYSDEC and the USEPA.

Operating practices include placing unpacked ammunition on a conveyor for transfer to the deactivation furnace at prescribed intervals. The ammunition is burned and exploded by the heat in the furnace. The solid residue from the furnace is transferred by a conveyor to an



LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
Abandoned Deactivation Furnace (S-311)
Unnamed Road
Unnamed Road
N 998500
N 998250
N 998000
BUILDING 367
Deactivation Furnace
CEMENT WALL
BUILDING 307T
CONCRETE PAD WITH PROCESS EQUIPMENT
Tank
LPG
Drainage
726
728
730
728
730
E 748750
E 749000
E 749250
E 749500
E 749750
N
50 0 50 100
(feet)
ACAD\SENECA\7SWMU\ACADFIG\SD17SI.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000
FIGURE 1.1-14
SEAD-17 ACTIVE DEACTIVATION FURNACE SITE PLAN
SCALE 1" = 100'
DATE MAY 1995
REV C

approved hazardous waste container and allowed to cool. When cooled, the scrap metal is disposed of in barrels for transfer to the Defense, Reutilization and Marketing Office (DRMO).

1.1.2.3.3 Existing Analytical Data

As mentioned previously, during the 1989 upgrade 29 surface soil samples from an area surrounding the site and 29 wipe samples from inside the building were collected during the interim closure process. These samples were analyzed for barium and lead. The soil samples were below the EP Toxicity limit for barium. Eighteen of the 29 soil samples exceeded the EP Toxicity limitation for lead. Soils that exceeded the limits for lead were excavated and disposed of in a hazardous waste landfill.

1.1.2.4 SEAD-24

1.1.2.4.1 Physical Site Setting

The Abandoned Powder Burning Pit is located in the west-central portion of SEDA (Figure 1.1-8). It is characterized by a vegetated U-shaped berm area with surrounding grassland and low brush. The approximtely 300 by 200-foot U-shaped berm is open to the north and is approximately 3 to 4 feet high (Figure 1.1-15).

The site is bounded by West Kendaia Road to the north and by open grassland and low brush to the east, south and west. SEDA railroad tracks are located approximately 400 feet east of the U-shaped berm. Kendaia Creek is located approximately 150 feet north of West Kendaia Road. The topography on-site slopes gently to the west; north of West Kendaia Road the land slopes more steeply to the north-northwest toward the creek.

The site can be accessed via West Kendaia Road; within SEDA, vehicular and pedestrian access to the site is restricted, since it is located within the ammunition area.

The neareast off-site residence is located approximately 1,200 feet west of the site.

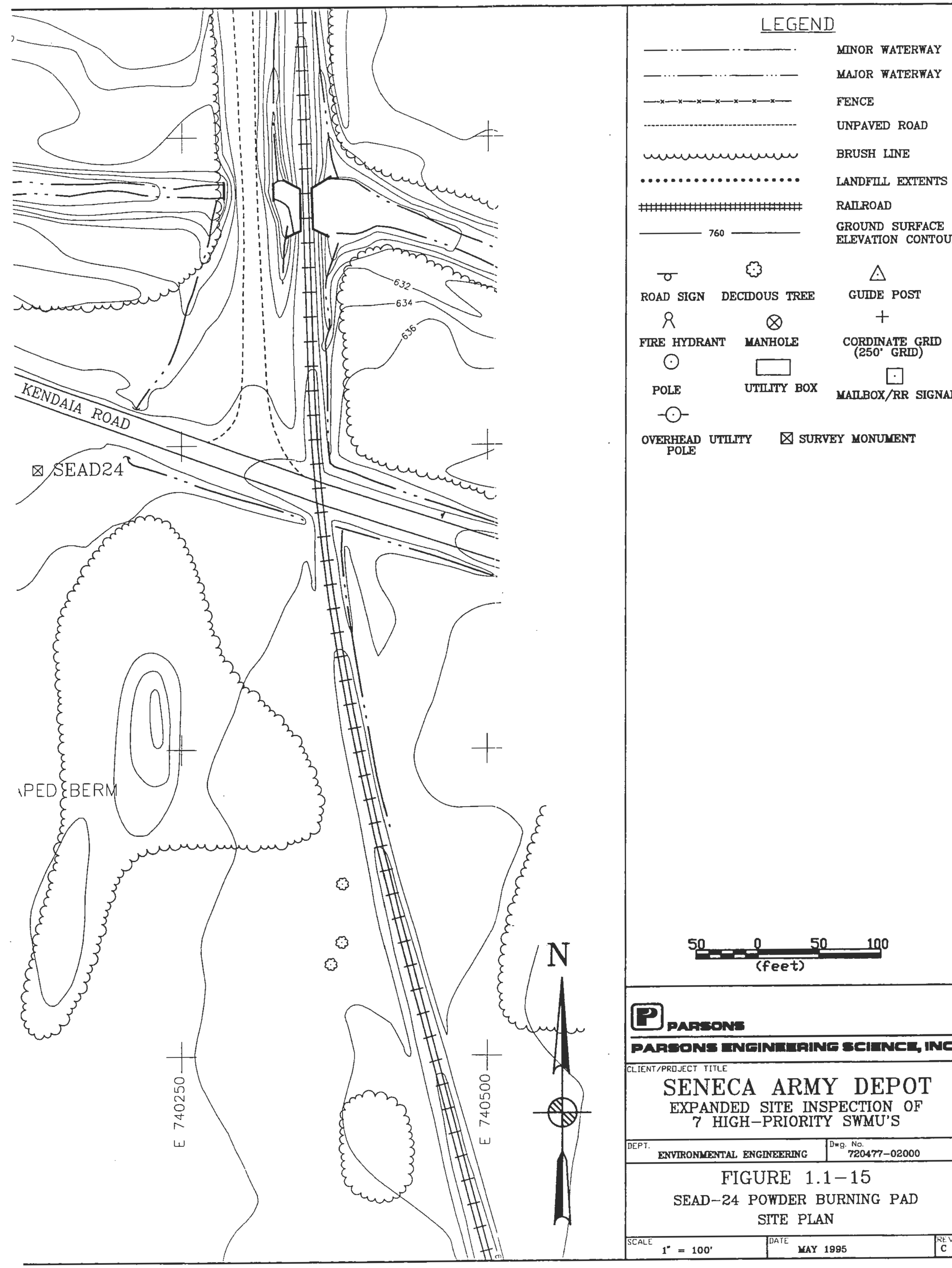


FIGURE 1.1-15
SEAD-24 POWDER BURNING PAD
SITE PLAN

1.1.2.4.2 Site History

The Abandoned Powder Burning Pit (SEAD-24) was active during the 1940s and 1950s. At present, the pit area is surrounded . a U-shaped, 4-foot-high berm which is approximately 150 feet across and 325 feet long. There is an adjacent shale-covered area which may also have been used.

Although the operating practices of this unit are unknown, black powder, M10 and M16 solid propellants and probably explosive trash were disposed of here by burning.

1.1.2.4.3 Existing Analytical Data

No existing analytical data were discovered for this SWMU.

1.1.2.5 SEAD-25

1.1.2.5.1 Physical Site Setting

The Fire Training and Demonstration Pad is located in the east-central portion of SEDA (Figure 1.1-8). It is characterized by a small (50 by 50 feet) sparsely vegetated square pad, the surface of which is mostly composed of crushed shale; most of the vegetation on the pad appeared to be stressed (Figure 1.1-16).

The site is bound to the east by Administration Avenue beyond which is undeveloped land covered by deciduous trees, to the south by Ordnance Drive beyond which is an open grassy field and a stand of coniferous trees, to the west by grassland and conifers, and to the north by grassland and a baseball field.

Locally, the topography on-site slopes gently in all directions away from the center of the mound. Regionally, the topography slopes to the south-southwest. However, in the immediate vicinity of the site, the pad represents a small topographic high and the topography slopes to the west, south and east around it. East of the site across Administration Drive, the topography slopes gently toward a small ditch which drains to the south. West of the site the topogaphy slopes to the west toward a small drainage ditch located approximately 300 feet from the site. A drainage swale parallels Administration Drive and divides in the

LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT

50 0 50 100
(feet)

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 1.1-15
SEAD-24 POWDER BURNING PAD
SITE PLAN

SCALE	DATE	REV
1" = 100'	MAY 1995	C

approved hazardous waste container and allowed to cool. When cooled, the scrap metal is disposed of in barrels for transfer to the Defense, Reutilization and Marketing Office (DRMO).

1.1.2.3.3 Existing Analytical Data

As mentioned previously, during the 1989 upgrade 29 surface soil samples from an area surrounding the site and 29 wipe samples from inside the building were collected during the interim closure process. These samples were analyzed for barium and lead. The soil samples were below the EP Toxicity limit for barium. Eighteen of the 29 soil samples exceeded the EP Toxicity limitation for lead. Soils that exceeded the limits for lead were excavated and disposed of in a hazardous waste landfill.

1.1.2.4 SEAD-24

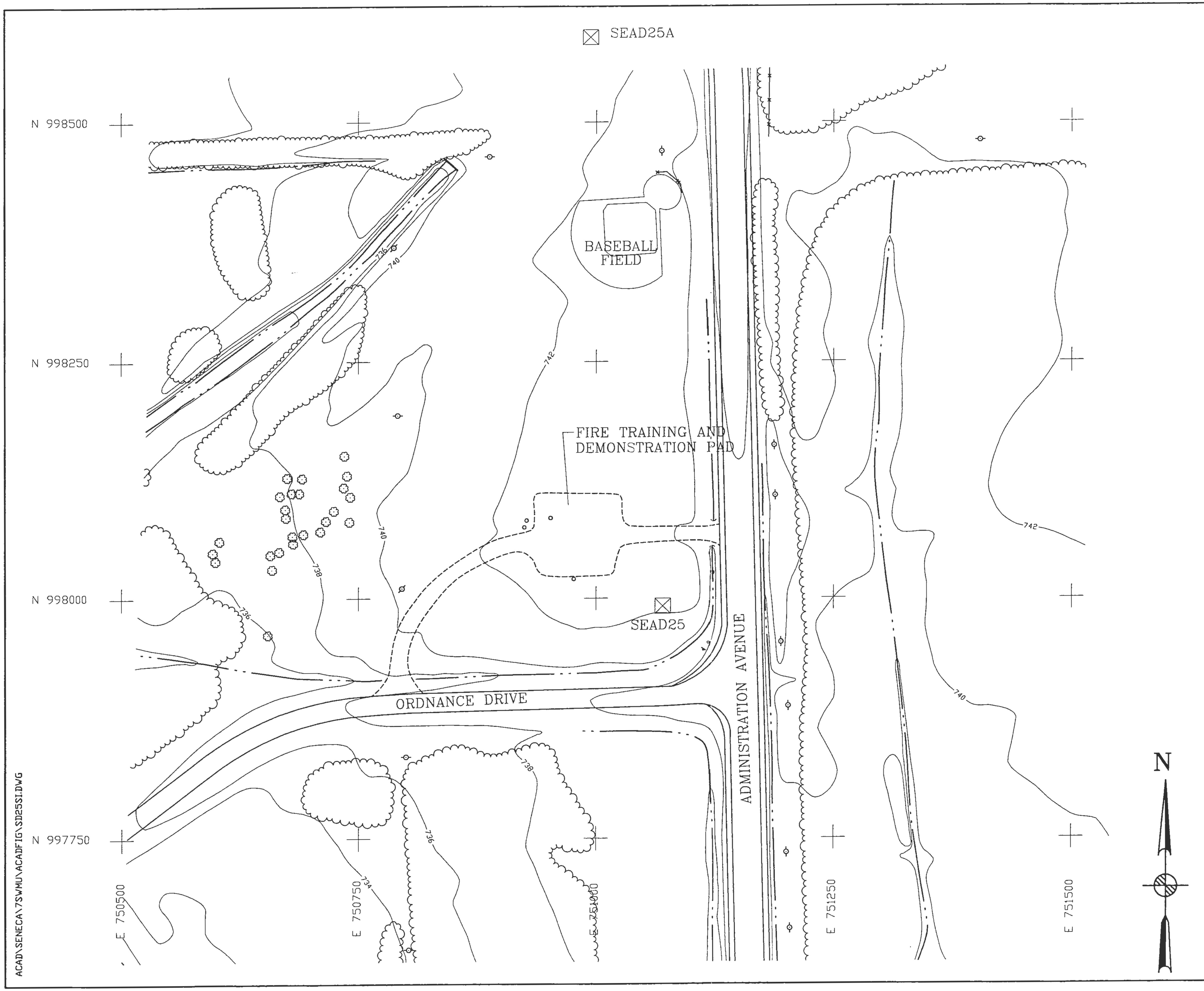
1.1.2.4.1 Physical Site Setting

The Abandoned Powder Burning Pit is located in the west-central portion of SEDA (Figure 1.1-8). It is characterized by a vegetated U-shaped berm area with surrounding grassland and low brush. The approximtely 300 by 200-foot U-shaped berm is open to the north and is approximately 3 to 4 feet high (Figure 1.1-15).

The site is bounded by West Kendaia Road to the north and by open grassland and low brush to the east, south and west. SEDA railroad tracks are located approximately 400 feet east of the U-shaped berm. Kendaia Creek is located approximately 150 feet north of West Kendaia Road. The topography on-site slopes gently to the west; north of West Kendaia Road the land slopes more steeply to the north-northwest toward the creek.

The site can be accessed via West Kendaia Road; within SEDA, vehicular and pedestrian access to the site is restricted, since it is located within the ammunition area.

The neareast off-site residence is located approximately 1,200 feet west of the site.



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT

50 0 50 100
(feet)

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FIGURE 1.1-16
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD SITE PLAN

SCALE 1" = 100' | DATE MAY 1995 | REV C

southeastern portion of the site where part of it continues under Ordnance Drive via a conduit and part is directed west into another drainage ditch.

A crushed shale road provides access to the site from the east on Adminstration Avenue; the road continues west of the pad and loops south to intersect with Ordnance Drive. Within SEDA, vehicular and pedestrian access to the site is not restricted.

The neareast off-site residence is located approximately 3,500 feet east-south-east of the site.

1.1.2.5.2 Site History

The Fire Training and Demonstration Pad (SEAD-25) has been in use since the late 1960s.

In the past, the pad was used for fire control training. Currently, the pad is used once or twice a year for fire fighting demonstrations.

1.1.2.5.3 Existing Analytical Data

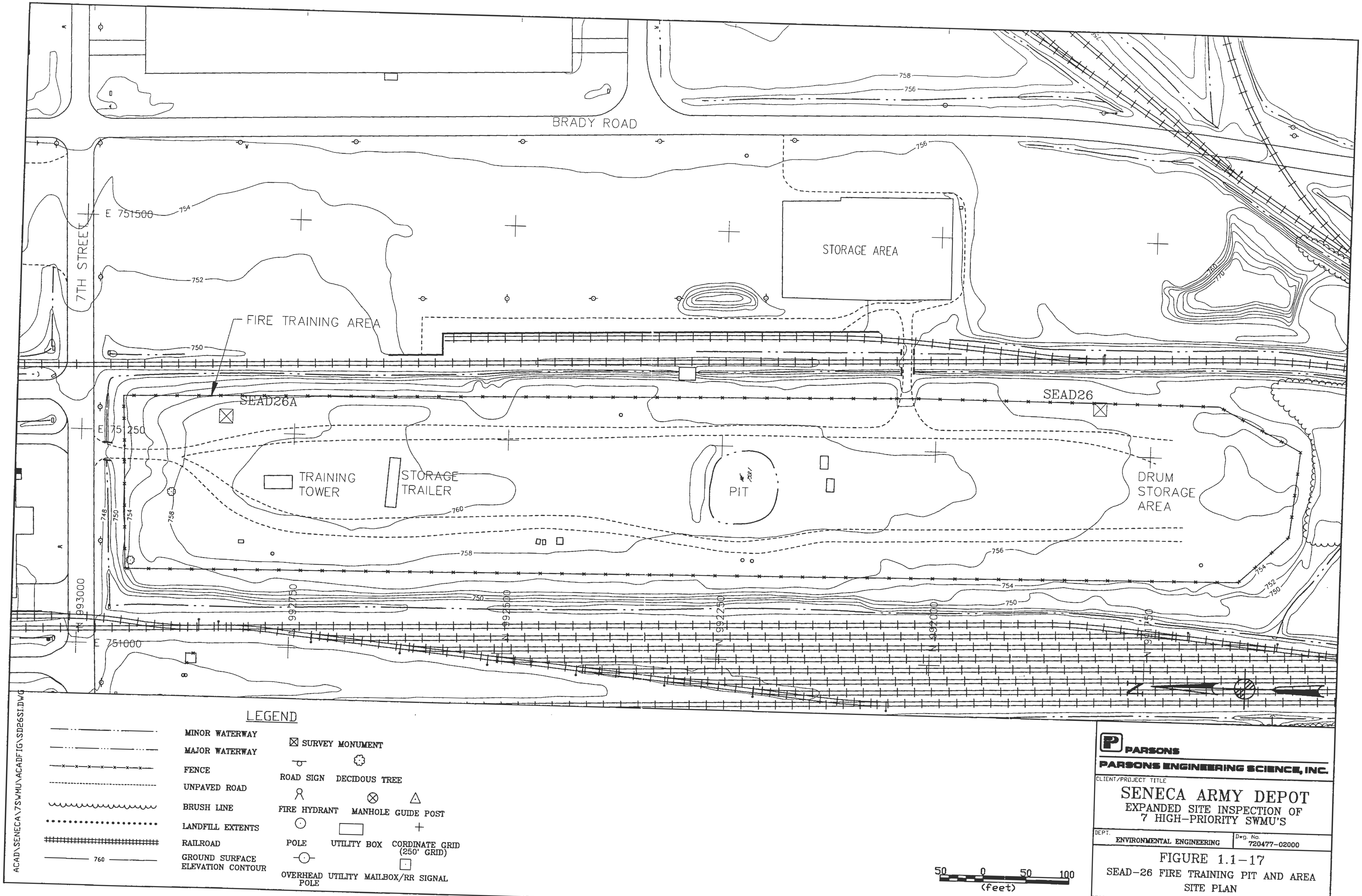
No existing analytical data were discovered for this AOC.

1.1.2.6 SEAD-26

1.1.2.6.1 Physical Site Setting

The Fire Training Pit is located in the southeastern portion of SEDA (Figure 1.1-8). It is characterized by an elevated grass-covered, 1,400-foot rectangular pad that contains a fire training tower, a storage trailer, a circular burning pond, and several disposal areas (Figure 1.1-17).

An oval unpaved road parallels the fenced boundaries within the training area. The fire training tower, storage trailer and seven burned automobiles are located in the northern portion of the site. Small oil-stained areas were noted on the ground surface near the automobiles. The circular burning pit has a diameter of approximately 75 feet and is located in the central portion of the site. The bermed perimeter of the pond is characterized by blackened soil and is void of vegetation. Approximately 30 feet south of the pond are two large cylindrical steel tanks; these are believed to be empty. Approximately 120 feet south



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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 1.1-17
SEAD-26 FIRE TRAINING PIT AND AREA SITE PLAN

SCALE 1" = 100' | DATE MAY 1995 | REV C

of these tanks is the fuselage of a burned helicopter. In the far southern end of the site is a drum storage area where tens of 55-gallon drums were stacked as well as other assorted sized and types of drums. These drums are believed to be empty based on a cursory visual investigation. Several 55-gallon drums were observed to be at the base of the western scarp of the site (outside the fenced portion), although these are believed to be empty.

The site is bound to the east and west by SEDA railroad tracks, on the south by grassland and low brush to the south and on the north by 7th Street. The topography on the rectangular site is flat, however, it slopes steeply down on the east, south, and west sides; thenorthern sides slopes more gently down to 7th Street which provides access via an unpaved road.

Vehicular and pedestrian access to the site is restricted by a chain-link fence which surrounds the entire elevated portion of the fire training pit. Restricted access is provided from the northern end of the site from 7th Street.

The nearest off-site residence is located approximately 5,000 feet north-east of the site.

1.1.2.6.2 Site History

The Fire Training Pit and Area (SEAD-26) has been in use from 1977 to the present. The pit is approximately 75 feet in diameter and approximately 3 feet deep and is located in the fire training area which is 1,300 feet by 200 feet and is a grass field. A bentonite liner was installed in 1982 or 1983. At present, the Fire Training Pit and Area is active. During a site inspection in 1990, the fire pit was full of water. Additionally, metal drums, concrete rubble and other debris were observed on the south end of the fire training area.

The pit is used one to four times a year for fire fighting training during which time various flammable materials are floated on water, ignited and extinguished. Prior to 1977, the fire training area surrounding the pit may have also been used for fire demonstrations.

1.1.2.6.3 Existing Analytical Data

No existing analytical data were discovered for this AOC.

1.1.2.7 SEAD-45

1.1.2.7.1 Physical Site Setting

The Open Detonation Grounds is located in the northwestern portion of SEDA (Figure 1.1-8). It is characterized by an unvegetated, elongate detonation mound that is surrounded by mostly soil to the east and lightly vegetated grassland to the west, north and south. The mound is approximately 500 feet long and 14 feet high and contains many smaller excavated areas on its east side; these are used to house the explosives that are destroyed during detonation events. A small soil-covered bunker, from which the detonation events are controlled, is present in the eastern portion of the site near Reeder Creek. Topography on-site slopes to the east although the gradient on the east side of the mound is more steep than on the west side (Figure 1.1-18).

Approximately 700 feet east of the detonation mound is Reeder Creek, which defines the eastern boundary of the site. Reeder Creek drains to the north-northwest and eventually discharges to Seneca Lake west of the site. At the southern boundary of the site is a crushed shale road which separate the Open Detonation Grounds from the Open Burning Grounds. Grassland and low brush are located to the west and north of the site.

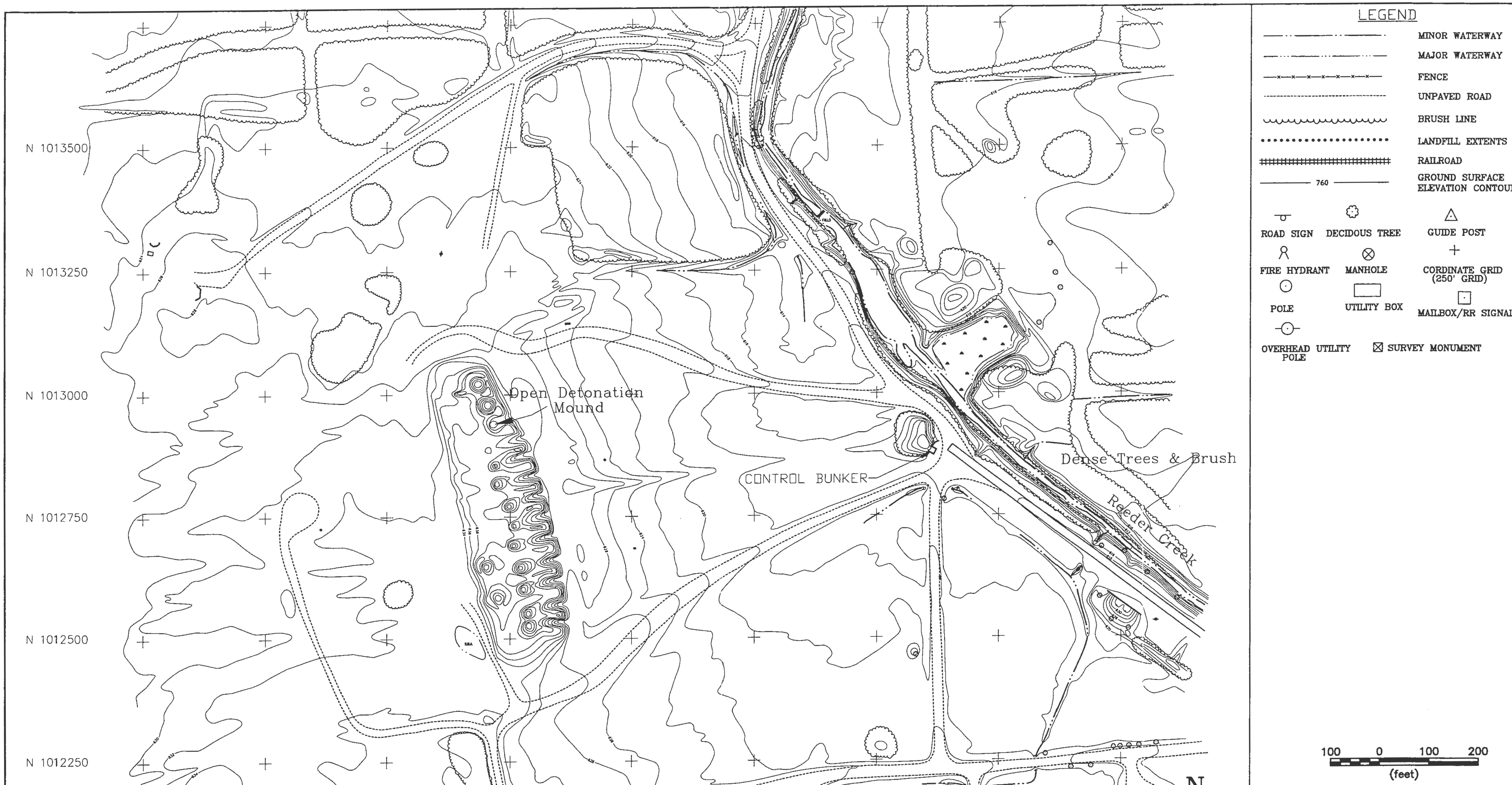
Vehicular access to the site is provided via a paved roadway which leads from North South Baseline Road, however, access to the Open Detonation Grounds is restricted by a locking gate. In the southeastern portion of the site the paved roadway divides into several dirt roads which provide direct access to the detonation mound. The Open Detonation Grounds is not fenced, however, access to the site is restricted since it is located within the ammunition area.

The nearest off-site residence is approximately 2,500 feet west of the site.

1.1.2.7.2 Site History

The OD facility (SEAD-45) consists of a detonation mound which covers approximately 1.0 acre. The hill is glacial material which is moved via bulldozer in support of OD operations. The detonation area has been in use from 1941 to the present and the operation is regulated under RCRA interim status. The operation of the open detonation facility is regulated under Subpart X of RCRA. The permit application is pending NYSDEC approval.

The U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) originally identified this facility as a location of known or suspected waste materials (USATHAMA 1980). In 1987, the facility was deleted from the SWMU submission list by the U.S. Army



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 1.1-18
SEAD-45 OPEN DETONATION GROUNDS
SITE PLAN

SCALE	DATE	REV
1" = 200'	MAY 1995	C

Environmental Hygiene Agency (USAEHA 1988). The reason for deleting the unit was due to the fact that it was combined with the OB facility designated as SEAD-23. The OD facility was again added to the SWMU list in August 1988 by NYSDEC.

Material to be detonated, i.e., waste munitions, is placed in a bulldozed hole in the hill with demolition material to destroy the ammunition or components. Primer cord is attached to the demolition material, blasting caps are attached to the primer cord and the primer cord is attached to circuit wire. The hole is backfilled and a minimum of 8 feet of soil is placed over the material to be detonated. The operator detonates the material after returning to the dugout and taking proper safety precautions.

1.1.2.7.3 Existing Analytical Data

The OD facility has five groundwater monitoring wells associated with it, MW-1 through MW-5. Monitoring well installation data was available in tabular form. Groundwater quality data for conventional pollutants and explosives obtained during 1979 are also available. One explosive compound, 4-amino-2,6-dinitrotoluene, was detected in groundwater from wells MW-1 to MW-4 and from Reeder Creek (both up and downstream of SEAD-45) at concentrations of 1.36 to 1.96 ppb. Reeder Creek is being sampled as part of the Open Burning Grounds Remedial Investigation.

In 1982, the USAEHA analyzed soil samples collected from eight locations around this area (pits 2,4,6,and 8). Analyses were performed for EP Toxicity (As, Ba, Cd, Cr, Hg, Pb, Se, and Ag) and explosives (HMX, RDX, Tetryl, 2,4,6-TNT, 2,4-DNT, 2,6-DNT). The analytical results indicated the presence of Cd in all samples (0.19-0.45 milligrams per liter (mg/l)) which was below 1.0 mg/l criteria. Explosives were also found in each sample (RDX 1.4-1.7 micrograms per kilogram (ug/kg); Tetryl 1.6-16.3ug/kg; 2,4,6-TNT 2.2-61 ug/kg; 2,4-DNT 1.1-19 ug/kg).

1.2 REPORT ORGANIZATION

The remaining sections of this report are organized to describe the investigation programs, the results of the data collected during the ESI and to identify the magnitude and extent of impacts. Section 2.0 (Study Area Investigation) discusses the investigation programs (i.e., geophysical, surface water and sediment, soils, and groundwater) performed during the ESI. Section 3.0 (Geological, Geophysical, and Hydrologic Setting) discusses the results of the investigation programs, specifically, geophysics, surface water hydrology and sediments, geology and hydrogeology. The nature and extent of impacts, on and off-site, is discussed in Section 4.0 (Nature and Extent of Contamination). Section 5.0 (Health and Environmental Concerns) provides a discussion of the potential receptors and environmental impacts of contaminants. Section 6.0 (Quality Assurance/Quality Control) discusses the results of an evaluation of the data quality and quantities. Recommendations regarding future actions at each AOC are presented in Section 7 (Recommendation for Future Action). The Appendices contain the data on which the text and conclusions are based.

2.0 STUDY AREA INVESTIGATION

2.1 INTRODUCTION

The focus of this investigation was to determine whether hazardous constituents or wastes have been released to the environment at each of the seven AOCs and to evaluate potential threats to human health, welfare, and the environment. The potential threats are based on the effects of current use to humans and biota and possible future use by on-site residents. If an AOC is determined to pose a threat to human health, welfare or the environment, a removal action may be performed or a CERCLA RI may be undertaken, otherwise if an AOC is determined to pose little threat, it may be classified as requiring no further action. A completion report is then prepared documenting the end of remedial actions.

Information for each site was acquired through the implementation of numerous focused tasks described in the Ten SWMU Workplan, which was approved by EPA, Region II and NYSDEC, prior to initiation of fieldwork in November 1993. The workplan describes the following tasks:

1. Geophysical Investigations
2. Soil Gas Survey
3. Soil Sampling
4. Groundwater Investigation
5. Surface Water/Sediment Investigations
6. Solid Materials and Asbestos Sampling

The following sections of this report describe, in detail, work completed by ES to characterize the environmental setting of each site.

The chemical constituents of concern for this investigation are summarized on Table 2.1-1. Analytical methods utilized at each AOC and the rationale for selection of analytes for each AOC are presented on Table 2.1-2. Table 2.1-3 presents a summary of samples collected and analyses performed. The initial assessment provided data that was used to determine justification for eliminating the AOC from further consideration.

The site survey program consisted of a field reconnaissance of the site and aerial photography. The reconnaissance was performed to locate general site features and confirm the presence of significant features (i.e., incinerator building, cooling pond, filled areas,

TABLE 2.1-1

SUMMARY OF CHEMICAL CONSTITUENTS OF CONCERN

Material Managed at SEAD	Chemical Group	Analytical Method[1]
1. Propellants, Explosives and Pyrotechnics (PEP)	Heavy metals Semi-voltile organic compounds (SVOs) Explosives Nitrates	TAL Metals TCL SVOs 8330, 353.2
2. Solvents	Volatile organic compounds (VOCs) Semi-volatile organic compounds (SVOs)	TCL VOCs, 524.2 TCL SVOs
3. Oils	Petroleum hydrocarbons (TPH)	418.1
4. Transformer Oil	Polychlorinated biphenyls (PCBs)	TCL Pest./PCB
5. Herbicides	Herbicides	8150
6. Insulation	Asbestos	EPA 600/M4-82-020

1 All analytical deliverables were Level IV with exception of Method 353.2 (NO_3), Method 418.1 (TRPH), and EPA 600/M4-82-020 (Asbestos).

TABLE 2.1-2
SWMU-SPECIFIC EPA ANALYTICAL METHODS AND SELECTION RATIONALE

Asbestos EPA 600/ M4-82-020	8150 Herbicides	8330 Expl.	TCL SVOs	TCL VOCs	TAL Metals	TCL PCB	353.2 NO_3	418.1 TRPH	Selection Rationale
-	X	X	X	X	X	X	X	-	Pyrotechnic, explosive and propellant (PEP) materials managed here (Exp SVOs, and metals) and breakdown products (Nitrate) may be present.
X	X	X	X	X	X	X	X	-	Heavy metals have been released in dust and ash from stack with no air pollution controls. PEP materials have been managed here (Expl., SVOs metals) and breakdown products (Nitrate) may be present.
-	X	X	X	X	X	X	X	-	Although air pollution controls have been used, heavy metals released in and ash from the system. (Similar to SEAD 16)
-	X	X	X	X	X	X	X	X	PEP materials managed here (Expl., SVOs and heavy metals) and breakd products (Nitrate) may be present. Solvents and/or petroleum products m have been utilized to initiate powder burn.
-	X	-	X	X	X	X	X	X	Materials burned include: fuels and used oil: leaded fuel may have been burned.
-	X	-	X	X	X	X	X	X	Materials burned include: fuels and used oil: leaded fuel may have been burned.
-	X	X	X	X	X	X	X	-	PEP materials managed here (Expl., SVOs and heavy metals) and breakd products (Nitrate) may be present.

Table 2.1-3

SUMMARY OF LABORATORY ANALYSES

		Number of Analyses		
	No. of Samples	Suite[2]	TPH	Asbestos
SEAD-4				
B/TP[1] Soils	35	35	NS	NS
Groundwater	5	5	NS	NS
Surface Water	3	3	NS	NS
Sediment	9	9	NS	NS
Surface Soil	7	7	NS	NS
SEAD-16				
Groundwater	3	3	NS	NS
Surface Water	2	2	NS	NS
Surface Soil	16	16	NS	NS
Solid Materials (Soil)	8	8	NS	6
Bldg. Materials	7			7
Scale	2			2
SEAD-17				
B Soils	9	9	NS	NS
Groundwater	4	4	NS	NS
Surface Soil	23	23	NS	NS
SEAD-24				
B Soils	15	15	15	NS
Groundwater	3	3	3	NS
Surface Soil	12	12	12	NS
SEAD-25				
B Soils	17	17	17	NS
Groundwater	3	3	3	NS
SEAD-26				
B/TP Soils	27	27	27	NS
Groundwater	3	3	3	NS
Surface Water	1	1	1	NS
Sediment	1	1	1	NS
Surface Soil	8	8	8	NS

Table 2.1-3
(Con't)

SUMMARY OF LABORATORY ANALYSES

		Number of Analyses		
	No. of Samples	Suite[2]	TPH	Asbestos
SEAD-45				
TP Soils	5	5	NS	NS
Surface Soil	9	9	NS	NS
Groundwater	8	8	NS	NS
Surface Water	4	4	NS	NS
Sediment	4	4	NS	NS
Sample Subtotal	253	244	244	15

Notes:

1. B=Borings, TP=Test pits, NS=Not sampled
2. Suite consists of analyzing each sample for TCL VOCs, SVOs, and Pesticide/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW, explosive compounds, herbicides, and nitrates. At SEAD-25, and SEAD-26, explosive compounds were not analyzed.
3. A matrix spike analysis, performed for every 20 samples, actually consisted of 3 analyses: method spike blank, matrix spike, and matrix spike duplicate.

possible solvent dumping areas, debris pits, monitoring wells, access roads) identified in the workplan. Also, sampling locations were identified and marked during this initial survey. The site and surrounding area were photographed from the air on December 14, 1993 for the purpose of constructing a photogrammetric site plan with 2 foot contour intervals.

The groundwater flow directions were estimated in the workplan based primarily on topography and to some extent on proximity to surface water. The actual locations of some borings and monitoring wells were adjusted based on the results of geophysical surveys and more complete field reconnaissance.

2.2 METHODOLOGY

2.2.1 Geophysical Investigation

Seismic Refraction

Seismic refraction surveys were performed at all AOCs, except SEAD-45, to determine the direction of groundwater flow by measuring either the depth to the water table or the depth to bedrock. These data, along with topographic information, were used to more accurately locate the up and downgradient monitoring wells.

Four 115-foot seismic refraction transects were laid out at each site. They were approximately equidistant from the center of the AOC and each other with each transect pointing toward the center of the AOC. The shot point locations were located along each profile and were used to define each individual seismic spread. The seismic data were collected using an industry standard 12 or 24 channel seismograph. When the geophones were placed on asphalt or concrete, small metal base plates replaced the metal spike on each geophone. The geophones placed on asphalt or concrete was weighted down using small 2 to 3 pound sand bags to improve overall coupling with the ground and to help minimize background noise levels. Geophone spacings were held at 5 foot intervals throughout the survey.

Once the seismograph setup was complete and data collection was ready to commence, the background noise level at each geophone location was monitored. The background noise was displayed on the seismograph CRT as a series of moving bars, the amplitude of which is proportional to the background noise level. This review provided information on ambient noise levels, while also highlighting malfunctioning geophones. Geophones that displayed a high level of noise were moved or have their placement adjusted.

An impact or dropped weight was used as the seismic energy source. Due to the shallow nature of the water table (i.e., generally less than 10 feet in depth) a low energy source was sufficient to accurately image the water table surface. Three shots were fired for each geophysical spread located at the spread ends and spread center. A paper copy of each seismic record was made in the field. Each record was reviewed for quality to insure that adequate signal to noise levels were present for the shot. Upon initial acceptance, a preliminary velocity analysis was performed in the field to define the subsurface structure along each spread. This preliminary review focused on determining if the water table surface had been properly resolved. Upon final acceptance of each shot, the seismic record was annotated to identify the transect number, the spread number, the shot point number, and the shot point location. After each record was reviewed, accepted, and annotated, the data collection procedure was repeated for the remainder of the shot points for each spread.

Subsequent to the seismic data collection, a survey was performed to provide X,Y,Z station information for the seismic shot point locations to $\pm$ 1.0 feet horizontally and $\pm$ 0.1 feet vertically. These data were used during seismic data reduction and seismic modeling.

The seismic refraction method relies upon the analysis of the arrival times of the first seismic energy at each geophone location to provide details about the subsurface geology. The time when the seismic energy arrives at each geophone location is referred to as the first break. Each seismic record was reviewed, both using the seismograph CRT and the paper records, to determine the first breaks at each geophone. This analysis was preliminarily performed in the field with the data checked after the completion of the field program. These first break data values were tabulated and used to create time-distance plots as described below.

For each seismic spread, a graph was made of the first break determinations for all of the spread shot points. These graphs display, in an X-Y plot, the first breaks (time) versus the geophone locations (distance). These time-distance plots form the basis of the geophysical interpretation. The time-distance plots were individually analyzed to assign each first break arrival to an assumed layer within the subsurface. It is estimated that up to four distinct seismic layers exist at the site. These include the unsaturated and saturated surficial deposits, the weathered bedrock, and the competent bedrock. In general, these various layers can be grouped into broad ranges of seismic velocities. As an example, unsaturated deposits will generally have a seismic velocity of less than 2,500 feet per second. By comparison, the saturated deposits should have seismic velocities in the range of 4,500 to 5,500 feet per second. The time-distance plots were interpreted to yield the velocity distribution within the subsurface. Each first break arrival was assigned to one of the above mentioned layers. This velocity analysis and layer assignment formed the basis for the data files to be used during the seismic modeling.

Once the first break analysis and layer assignments were complete, input seismic data files were created for use in the seismic modeling software. The input files included all of the information pertaining to the spread geometry, shot point locations and depths, first break arrivals, and layer assignments. The elevation data was also be input into the computer files. The computer program, SIPT (Scott, 1977) was used to model the seismic data. SIPT is an interactive computer program developed by the United States Geological Survey for the inverse modeling of seismic refraction data. This program uses input seismic refraction data to create two-dimensional cross-sectional models of velocity layering within the subsurface. The program uses the delay time method to produce a first approximation of the subsurface velocity layering. This approximation is then refined through the use of iterative ray tracing and model adjustment to minimize the differences between field measured first arrival times and the forward modeled raypath times. The program also provides various levels of velocity analyses that will be reviewed to provide diagnostic information on the model solutions.

The results of the computer modeling were reviewed with the known geology of the site. The subsurface velocity layering was attributed to known or expected geologic units. A detailed analysis was made of the velocity distribution of the upper, unsaturated materials to ensure that, near surface low velocity materials are not adversely affecting the data quality and interpretation. The velocity distribution within the bedrock was also reviewed to provide information on the presence and degree of weathering and to identify any lithologic or fracture related changes within the bedrock.

Based upon the seismic refraction data and the logs from the various monitoring wells, two seismic cross-sections were generated for each AOC. These cross-sections show the land surface elevation and the elevation of the water table and bedrock surfaces. The locations of bedrock piezometers, along with the stratigraphic information derived from them, are shown on these cross-sections.

EM-31 Survey

Electromagnetic (EM-31) surveys were performed at SEADs 4, 24, and 45. The objectives of the EM-31 surveys were to delineate waste boundaries, identify the location of buried metallic objects, and identify the locations of old disposal pits. The EM-31 method was employed in conjunction with Ground Penetrating Radar (GPR) surveys so as to provide significant redundancy during the geophysical investigations.

The electromagnetic data at each AOC was collected using both grid and profile based surveys. In general, the grid based surveys used either a 10 foot by 10 foot or 20 foot by 20 foot grid spacing. Refer to the individual AOC descriptions in the following sections for the grid spacing details. The corners of the geophysical survey grids were established using a registered New York State land surveyor. The individual EM-31 survey lines and station locations were established using both hip chains and hand held compasses.

At all of the AOCs where EM-31 data were collected, a data logger was used to record the individual electromagnetic readings. Both the in-phase and quadrature components of the electromagnetic field were measured and recorded. These data were in turn stored on a computer and printed out at the end of each field day. For each AOC where EM-31 data was collected, a calibration area, free of cultural interference, was established. The EM-31 response was measured at this area at the start of each day. This check was made to insure that no significant meter drift is occurring during each survey.

Upon completion of each electromagnetic survey, the data was presented in both profile and contour form. Both the in-phase and quadrature components were plotted. This multiple presentation format aids in the interpretation of the data. All of these presentation aids were interpreted to identify the locations of buried metallic objects, disposal pits, waste boundaries, and areas of elevated subsurface soil apparent conductivities. These data were compared to the results of the GPR surveys to provide as complete and accurate interpretation of the subsurface conditions at each AOC as possible.

The EM-31 instrument is calibrated by the manufacturer. This calibration can be rechecked in the field but this requires that access to highly resistive rock outcrops are available. A secondary field calibration was performed on a daily basis to insure repeatability of measurements and to check against daily meter drift. This field calibration is the only performance evaluation that is performed on these instruments. The EM-31 data was collected at each AOC to evaluate only relative variations in subsurface conductivities. The absolute terrain conductivity was required since the individual AOC objectives were to identify relative variations in subsurface conditions associated with waste boundaries, buried metallic objects, etc. During the individual AOC surveys, up to five station repeats were performed on a daily basis so as to qualitatively evaluate the overall data repeatability.

GPR Survey

A GPR survey of selected areas within an AOC was conducted to located buried structures (i.e., buried or filled-in pits, trenches, disposal areas) and obtain more information on anomalies detected during the EM-31 surveys. GPR can also identify the original ground surface beneath berms.

The GPR instrument was hand operated. As the equipment was pulled across the site, the reflected radar pulses were transmitted to the receiver unit where they were converted to analog signals. The analog signal was transmitted to the control unit where the signal was electronically processed and sent to the graphic recorder. The graphic recorder produced a continuous chart display on electro-sensitive paper. This real-time display enabled the operator to interpret the data on site.

2.2.2 Soil Sampling Programs

The objectives of the soils investigation program were to provide data on the background soil quality, to obtain soil samples, and in particular, to investigate anomalies detected during the geophysical survey at SEADs-26 and -45.

The soils investigation program was completed at SEADs-16, 17, 24, 25, 26, and 45 in accordance with the pre-approved workplan. The sampling plan at SEAD-4 was modified from that described in the workplan because of the availability of more information on building locations at that site. Sample locations were located in source areas and in hydrologic upgradient locations to establish background conditions. The groundwater flow directions were estimated for the workplan based on topography and to some extent the proximity of surface water. The locations of borings, monitoring wells and test pits were adjusted from those locations in the workplan based on the results of the geophysical investigations, which better defined the groundwater flow directions and detected anomalies. The individual boring logs and test pit logs are included in Appendix B. Empire Soils

Investigation, Inc. of Groton, New York performed the drilling and UXB performed test pitting.

Soil Borings

Soil borings were performed using an Acker F-800 drilling rig equipped with 4.25-inch I.D. hollow stem augers. All borings were advanced to refusal on competent bedrock. During drilling, soil samples were collected continuously at 2-foot intervals using a decontaminated 2 foot split spoon sampler according to the method described in ASTM D-1586-84. This technique involved driving a decontaminated split spoon sampler 2 feet into undisturbed soil with a rig-mounted 140 lb hammer. Once the sample was collected, the augers were advanced to the top of the next sample interval. Samples were collected until spoon refusal on competent shale was encountered.

Soil samples were screened for volatile organic compounds using an Organic Vapor Meter (OVM) 580B and for radioactivity with a Victoreen Model 190 Radiation Monitor. Three of the samples from each boring were selected for chemical analysis: 1) 0 to 2 feet below grade; 2) immediately above the water table; and 3) midway between samples (1) and (2). The intermediate sample was collected at a depth where one of the following site specific items occurred: (1) a stratigraphic change such as the base of the fill, (2) evidence of perched water table, (3) elevated photoionization detection (PID) readings, or (4) visibly affected soil (e.g., oil stains). If none of these occurred, then the intermediate sample was collected at the halfway point between the samples collected at the surface and at the water table. If intermediate split spoon samples exhibited elevated PID readings, the one with the highest concentration was the one intermediate sample to be analyzed.

Additional monitoring included establishing a designated downwind monitoring station where monitoring for volatile organics with an OVM and dust particulates using a MIE Model PDM-3 Miniature Real-Time Aerosol Meter (Miniram) was performed. A Miniram was also positioned on or near the drilling rig. The OVM was programmed to register real time and maximum readings of volatile organics. These meters were checked before drilling and approximately every 15 minutes during drilling.

Upon completion of sampling, all borings were grouted to the surface or a monitoring well was installed. The soil brought to the surface by the augers was containerized in DOT-approved 55-gallon drums, which were labelled with the date, location, and description of wastes. The drilling rigs, augers and split spoons were steam cleaned between borings at the decontamination pad using potable water from the Depot.

Test Pits (Geophysical Anomaly Excavations)

The objectives of test pitting were to provide a means for visual evaluation of subsurface soils and collection of soil samples, as well as to investigate anomalies discovered during the geophysical surveys.

Test pits were excavated up to 7 feet deep using a backhoe. Upon completion, all excavated material was returned to the pit and covered. Unexploded ordnance (UXO) personnel performed the excavation and obtained the soil samples and ES personnel monitored for VOCs with an OVM 580 and for radiation with a Dosimeter Mini Con Rad. All personnel were outfitted in Level B equipment to avoid possible exposure. Test pit logs are included in Appendix B.

Surface Soils

Grab samples of surface soils were obtained by removing representative sections of soil from 0 to 2 inches below ground surface. Vegetation was removed prior to sample collection.

2.2.3 Monitoring Well Installation

The groundwater investigation program was designed to obtain background water quality data, to determine groundwater flow direction, and to determine if hazardous constituents are migrating in the groundwater from the sites. When required, the locations of monitoring wells were changed from the locations shown in the workplan based on the depth to groundwater and bedrock data obtained from the geophysical surveys.

The wells were installed in borings drilled with a hollow stem auger rig using 4.25-inch hollow stem augers. The borings were advanced to auger refusal, which for the purposes of this investigation defined the contact between weathered shale and competent shale. During drilling, split spoon samples were collected continuously until spoon refusal using the method outlined in ASTM D-1580-84 to observe and characterize the soil conditions and geology at the well location. Monitoring wells were constructed of 2-inch I.D. Schedule 40 polyvinyl chloride (PVC) with a well screen slot size of 0.010. Wells were screened from 3 feet above the water table (if space allowed) to the top of competent bedrock. A sand pack was placed by tremie pipe in the annulus and extended a few feet above the well screen. A bentonite seal was placed on the sand pack. In some instances, the bentonite extended to the surface if there was no vertical space available for a cement/bentonite grout. A 4 inch by 4 inch steel protective casing with a locking cap was installed at the surface and held in place with a 2 foot by 2 foot cement pad. The end of PVC riser was equipped with an expandable well cap. In the instances when bedrock was shallow in depth, i.e,.less than 8 feet, modifications were made. The sand pack was extended to 1 foot above the well screen. Bentonite thickness was decreased to a minimum of 0.5 foot, but preferably at least 1 foot. Table 2.2-1 presents monitoring well construction details. All wastewater used in the drilling process was containerized in 55-gallon drums. Following well installation, the elevations of the well protective casing, PVC riser, and ground surface were surveyed.

The downwind monitoring station continued to be monitored during well installation. Each well location was monitored for volatile organics with an OVM 580B and for particulates using a MIE Model PDM-3 Miniram. A Miniram was also positioned on or near the drilling rig. The OVM 580B was programmed to provide real time and maximum readings of volatile organics.

These meters were calibrated before drilling and checked approximately every 15 minutes during drilling. In addition, all soil samples were screened while in the split spoon with an OVM 580B for volatile organics and a Dosimeter Mini Con Rad for radioactivity.

2.2.4 Monitoring Well Development

Subsequent to the well installations, each monitoring well was developed to insure that a proper hydraulic connection existed between the well and the surrounding aquifer. The well development details are summarized in Table 2.2-2.

The collection of representative groundwater samples is partially dependent upon the turbidity of the sample. Guidance provided by NYSDEC indicates that a valid sample is considered to be one that has a turbidity of less than 50 Nephelometric Turbidity Units (NTUs).

The development procedure which was used for these wells reduced the turbidity of the water in the wells. For development of these wells, only light surging with a bailer for a 2 to 5

TABLE 2.2 – 1

MONITORING WELL CONSTRUCTION DETAILS

SENECA ARMY DEPOT
7 AOCs

	Well Number	Depth of Well Relative to Ground Surface (ft)	Depth of Well Relative to Top of PVC (ft)	Well Screen Length (ft)	Screened Interval Relative to Ground Surface (ft)	Thickness of Bentonite Seal (ft)	Height of PVC Well Stickup (ft)	Elevation of Top of PVC Well (MSL) (ft)
1	MW4–1	10.5	12.97	4	5.4–9.4	2.0	2.47	700.12
2	MW4–2	4.0	6.64	1	2.2–3.2	0.5	2.64	702.44
3	MW4–3	9.0	11.46	4	3.9–7.9	1.0	2.46	699.90
4	MW4–4	10.0	12.51	4	4.9–8.9	1.5	2.51	680.37
5	MW4–5	6.0	8.46	2	3.1–5.1	0.7	2.46	700.46
6	MW16–1	6.0	7.94	2	3.3–5.3	2.2	1.94	735.544
7	MW16–2	4.1	6.02	2	1.4–3.4	1.1	1.92	734.56
8	MW16–3	5.0	7.38	2	2.3–4.3	1.8	2.38	735.48
9	MW17–1	8.5	10.34	4	3.4–7.4	1.0	1.84	736.33
10	MW17–2	6.0	7.96	2	3.3–5.3	0.3	1.96	733.75
11	MW17–3	6.0	7.8	2	3.1–5.1	0.7	1.80	732.15
12	MW17–4	6.0	8.46	2	3.1–5.1	0.7	2.46	734.59
13	MW24–1	10.0	12.06	4	4.9–8.9	1.9	2.06	637.75
14	MW24–2	16.0	18.52	9	5.9–14.9	1.4	2.52	632.18
15	MW24–3	15.0	17.25	9	4.9–13.9	0.9	2.25	631.53
16	MW25–1	5.0	7.78	1	3.1–4.1	0.7	2.78	742.69
17	MW25–2	8.5	11.20	4	3.4–7.4	0.8	2.70	746.11
18	MW25–3	6.5	9.80	2	4.0–6.0	1.0	3.30	745.56
19	MW26–1	6.0	8.22	2	3.3–5.3	0.8	2.22	753.57
20	MW26–2	14.0	16.58	9	3.9–12.9	1.0	2.58	761.42
21	MW26–3	14.0	16.42	9	4.3–13.3	1.0	2.42	753.92
22	MW26–4	11.5	13.80	4	6.4–10.4	1.5	2.30	752.42
23	MW45–1	6.0	8.65	2	3.25–5.25	0.8	2.65	625.08
24	MW45–2	10.0	12.41	4	5.33–9.33	1.2	2.41	626.76
25	MW45–3	11.33	14.07	4	6.6–10.6	1.25	2.74	626.45
26	MW45–4	7.0	9.74	2	4.25–6.25	0.5	2.74	633.04

Notes:
1. All wells were installed by Empire Soils Investigations, Inc. under the supervision of Engineering–Science, Inc.
2. Data obtained from Well Development forms and UXB survey summary (3/8/94).
3. All wells were installed in Till/Weathered Shale.
4. All wells were constructed of 2–inch PVC well casing with 0.010 inch PVC well screen.

TABLE 2.2 – 2

MONITORING WELL DEVELOPMENT INFORMATION

SENECA ARMY DEPOT
7 AOCs

NG	INSTALLATION DATE	INDICATORS TEMPERATURE (°C)	pH (standard units)	CONDUCTIVITY (μmhos/cm)	TURBIDITY (NTUs)	GALLONS REMOVED	BORING VOLUMES
	12/6/93	9/9.8/9/7/−1	7.5/7.21/7.23/7.15/7.24	820/690/690/750/700	56/5.68/1.27/1.95	18.5	
	11/10/93	5/5	8.04/7.68	550/455	16.5/3.31/1000	5.3	2
	11/10/93	10/10.5/10/9	7.31/7.3/7.32/7.21	650/650/650/650	28.7/2.27	8	
	12/5/93	8.9/7.5/8.7/8.5/9.1/8.2	7.6/7.23/7.47/7.19/7.29/7.28	500/465/490/478/480/462	64.2/168/240/294/3.25	13.8	[illegible]
	12/5/93	6.2/6.2/7/6.8	7.4/7.6/7.23/7.5/7.3	600/580/570	15.3/5.3/32.5/7.72	9	3
	10/26/93	11.3/11.7/11.7/12/12.3	6.92/7.54/6.52/6.71/6.78	600/600/600/600/600	750/2.5/1.1/1.3/6.9	18	[illegible]
	10/26/93	9.6/10/9.9/9.6/9.8	7.03/6.89/7.2/6.86/6.9	500/500/500/490/490	750/2.3/0.8/0.6/0.3	11.5	[illegible]
	10/26/93	10.5/9.7/9.5/9.5/9.4	6.56/6.83/7.13/7.06/6.87	315/295/290/275/265	750/51/11/7.9	13.8	4
	12/1/93	5/6/6/6/6	7.12/7.16/7.1/7.06/7	400/405/380/390/390	1000/600/2.19/4.48/2.35	25	4
	11/2/93	9.6/9/9.2/8.9/9.6	7.6/7.15/6.54/7.4/6.5	500/550/600/600/600	1/15.7/3.5/1.7	19.5	[illegible]
	11/30/93	0/5/4	7.5/7.65/7.6	400/435/420	5.09/2.92	7.5	[illegible]
	12/1/93	3/3/3	7.45/7.49/7.56	370/350/355	8.3	12	[illegible]
	12/1/93	5.5/5.5/2.5/5	7.2/7.15/7.5/7.2	460/460/450/440	1000/8.72/39.8	30.8	[illegible]
	11/6/93	12.5/12.1/13.2/13/11.8	6.5/7.5/7.42/7.79/7.49	700/650/650/650/600	154/50.6/5.55	40.5	[illegible]
	11/6/93	13.1/13.6/13.5/13.1/13.2	7.44/7.24/7.39/7.56/7.52	550/550/550/550/550	106/16.9/59/58.4	48.5	[illegible]
	12/3/93	4/4/4/4/4	6.97/6.98/6.96/7./7	470/500/525/550/600	1000/129/30.3/10.3/4.44	21.7	[illegible]
	11/7/93	12.6/10.6/12	7.53/7.4/7.19	700/650/700	3.03/1.23	17.2	[illegible]
	11/7/93	12.6/10.7/12.2	7.36/7.37/7.42	500/450/500	1.13/1.73	14.3	3
	11/17/93	10.5	7.62	550	5.23	6.6	1
	11/18/93	DRY					
	11/18/93	10.5/11/11	6.92/6.65/6.64	700/650/700	37.7/5.32	15	[illegible]
	11/19/93	11.5/11.5/12/12	6.98/7.04/7.07/7.07	850/850/850/850	5.95/20/6.13	14	[illegible]
	11/20/93	DRY					
	11/20/93				1.26	1.4	[illegible]
	11/21/93	2/4	7.1/7.4	750/740	1.59/3.16	8.95	1
	11/22/93	4.5/5.5/6.6/6.6	7.36/7.28/7.37/7.34	600/600/650/650/650/650	31.1/242/26/16.1/2.3	24.6	[illegible]

eveloped by the surge and pump method.

minutes was performed and the water in the well was removed using a peristaltic pump at a rate of between 1.5 and 3 liters per minute. The light surging was performed to remove any silt and clay "skin" that may have formed on the borehole wall during drilling. The relatively low flow rate water removal was performed to develop the well and surrounding formation by removing some silt and clay, while not creating an influx of large amounts of silt and clay, which are major components of the till. Final turbidity values for these wells are shown in Table 2.2-2. Turbidity was measured with a Engineered Systems Model 800 portable field analyzer with full scale ranges of 20 and 200 NTUs. Development operations were performed until the following conditions were met:

- The turbidity of the water was less than 50 NTUs.
- The temperature, specific conductivity, and pH of the well water vary by no more than 10 percent.

2.2.5 Groundwater Sampling

Monitoring wells were sampled for this investigation to evaluate the presence and extent of organic chemical constituents present within the groundwater. Groundwater sampling information is presented in Table 2.2-3. The groundwater sampling procedure is described below.

The wells were purged prior to sampling using a peristaltic pump with the dedicated Teflon tube that extended to the bottom of the well. A low flow purging method was implemented to obtain samples of groundwater that contained the amount of natural turbidity found in groundwater between soil particles.

The thickness of the silt was determined by measuring the depth to the top of the silt and subtracting that from the depth of the well. If the thickness of the silt was greater than 1 inch, then the silt was removed using the peristaltic pump and dedicated Teflon tubing. Silt removal was complete when the water was no longer silt-laden and dark brown-gray in color.

The purging process began with the open-end of the tube at the bottom of the well screen (or at least 6 inches from the bottom of the well). The purging flow rate was between 0.01 and 2 liter per minute (L/min) and the water was purged into a graduated 5-gallon bucket. During the purging process, the water level in the well was monitored with an electronic water level meter. The water was not pumped below one half of the static water column

TABLE 2.2 – 3

MONITORING WELL FIELD SAMPLING INFORMATION

SENECA ARMY DEPOT
7 AOCs

ONITORING WELL	DATE	INDICATORS				GALLONS REMOVED (gal)	STANDING WATER VOLUME (gal)	WELL V REM
		TEMPERATURE (°C)	pH (standard units)	CONDUCTIVITY (μmhos/cm)	TURBIDITY (NTUs)			
MW-4-1	01/21/94	5.0 / 5.5	7.6 / 7.2	600 / 600	3.1	1.90	1.25	
MW-4-2	02/4/94	2 / 2 / 2	7.5 / 7.4 / 7.5	242 / 229 / 228	72.7	0.90	0.30	
MW-4-3	01/20/94	6 / 5.5 / 5.5	7.4 / 7.4 / 7.5	550 / 550 / 550	12.4	2.10	0.70	
MW-4-4	01/31/94	4 / 5 / 4 / 4	7.5 / 7.7 / 7.8	445 / 400 / 400	6.2	4.80	1.60	
MW-4-5	01/20/94	3 / 3	7.6 / 7.6	500 / 480	1.1	0.4	0.20	
MW-16-1	11/19/93	10 / 10.1 / 9.9	7.1 / 7.2 / 7.3	600 / 575 / 575		3.00	0.75	
MW-16-2	11/17/93	9.8 / 9.3 / 9.3	7.6 / 7.6 / 7.6	600 / 500 / 525		1.20	0.40	
MW-16-3	11/17/93	9.9 / 9.5 / 9.7	7.4 / 7.6 / 7.7	385 / 280 / 260		1.50	0.50	
MW-17-1	01/25/94	5. / 4.5 / 5	7.4 / 7.4 / 7.4	385 / 390 / 390	427	2.80	0.90	
MW-17-2	11/18/93	9.3 / 9.4 / 9.6	7.4 / 7.5 / 7.5	700 / 700 / 675	176	0.8	0.80	
MW-17-3	01/25/94	4 / 4	7.5 / 7.6	430 / 420	47	0.80	0.40	
MW-17-4	01/25/94	4 / 4 / 4	7.5 / 7.5 / 7.5	380 / 370 / 370	5.4	1.80	0.60	
MW-24-1	01/23/94	4.5 / 4.5 / 5	7.1 / 7.3 / 7.3	430 / 430 / 435	150	4.20	1.40	
MW-24-2	11/16/93	12.1 / 12.2 / 12.2	7.2 / 7.2 / 7.5	700 / 700 / 700		4.20	1.40	
MW-24-3	11/15/93	13 / 12.7 / 12.6	6.9 / 7.6 / 7	590 / 360 / 560		5.00	1.70	
MW-25-1	02/6/94	3.5 / 3.8 / 4 / 4	6.7 / 6.9 / 7 / 7	700 / 650 / 600 / 600	56.4	1.36	0.34	
MW-25-2	02/4/94	4 / 3.5 / 3	6.9 / 7 / 7.1	600 / 600 / 600	3.55	1.97	0.91	
MW-25-3	11/15/93	11 / 11 / 11	7.2 / 7.2 / 7.5	510 / 500 / 510	2.2	2.40	0.80	
MW-26-1	01/21/94	1.5 / 1	7.8 / 7.6	375 / 400	4.76	0.24	0.16	
MW-26-2	dry	dry						
MW-26-3	01/22/94	6.5 / 8.5 / 8 / 8.25	6.7 / 6.8 / 6.8 / 6.8	700 / 700 / 650 / 650	325	1.60	0.55	
MW-26-4	01/22/94	7 / 7.5 / 7.5	7 / 7 / 7	800 / 775 / 775	5000	0.78	0.26	
MW-1	02/1/94	4 / 4 / 5 / 5	7.5 / 7.5 / 7.5 / 7.5	435 / 450 / 455 / 455	9.43	14.00	3.50	
MW-2	02/2/94	2.5 / 2.5 / 2.5	7.5 / 7.4 / 7.5	330 / 315 / 315	4.4	5.71	2.23	
MW-3	02/1/94	3.5 / 3 / 3.5	7.3 / 7.5 / 7.5	310 / 325 / 340	3.42	17.40	5.8	
MW-4	02/1/94	3.5 / 4 / 4	7.2 / 7.4 / 7.4	440 / 445 / 450	193	9.20	3.00	
MW-5	02/1/94	3 / 3.5 / 4	7.7 / 7.6 / 7.5	370 / 440 / 465	107	16.10	5.40	
MW-45-1	dry	dry						
MW-45-2	02/2/94	NA	NA	NA	0.42	0.46	0.26	
MW-45-3	02/2/94	5.5 / 6 / 5.5	7.4 / 7.5 / 7.5	750 / 800 / 750	368	1.40	0.70	
MW-45-4	01/26/94	5 / 5 / 5	7.2 / 7.3 / 7.3	600 / 600 / 600	9860	0.90	0.30	

height measured before purging was initiated. During removal of the first volume of water, it was determined if the well was a slow or fast recharging well. A fast recharging well supplies water to the well such that the water level is not drawn below the depth of one half of the static height of the water column using flow rates between 0.01 and 2 L/min. A slow recharging well does not supply water to the well to maintain a water level at or above one half of the static height of the water in the well using a minimum purge rate of 0.01 L/min.

The following procedure was used for purging a fast recharging well. After approximately one well volume was removed, the time, flow rate, depth to the bottom of the opening of the Teflon tube and the total volume of water removed was recorded on the sampling data sheet. Measurements of indicator parameters (temperature, specific conductance and pH) were also made this time. The Teflon tube was slowly raised to a point between the top of the well screen and the water surface. After each well volume had been removed the indicator parameters were measured and recorded. Purging of the well continued until three well volumes were removed. After purging the third well volume, the indicator parameters were recorded for the last time. If required, additional temperature, specific conductance, and pH measurements were made until they stabilized (two successive measurements varied by less than 10 percent). Moving the location of the tube from the screened interval to a point near the top of the water surface during purging ensured the removal of any stagnant water from the well prior to sampling. After removal of three well volumes the well was allowed to sit for 2½ hours prior to sampling at which time the water level was measured in the well. If the well had recovered to 95 percent of the original static level, then sampling of the well was performed. If the 95 percent recovery was not achieved after 3 hours, then the recovery requirement for the well was reduced to 85 percent prior to sampling.

For wells that were slow to recharge, purging continued until approximately one-half the well volume had been removed or the water level in the well reached the depth of one half the static height of the water column. At this time, the indicator parameters were measured and the time, flow rate, depth to the bottom of the opening of the Teflon tube, and total volume of water removed were recorded in the sampling data sheet. The Teflon tube was slowly raised to the point between the top of the well screen and the water surface. If this was not feasible, the open end of the tube was raised to the highest point possible to allow water to be pumped. The water level was monitored with an electronic water level meter. Purging of the well continued until one well volume had been removed. Minor adjustments in the depth of the open end of the Teflon tube may have been made during this process, however, the depth to water was not allowed to fall below the one half static water column height. If during purging, the water level was lowered to an unacceptable depth, then the pump was shut off and the well allowed to recharge before continuing. After one well volume had been removed, the indicator parameters were measured and the time, flow rate, depths, and volume of water removed were recorded. If at least one well volume had been removed and the measurements of temperature, specific conductance, and pH had stabilized (i.e., two successive measurements varied be less than 10 percent), then purging stopped. If they have not stabilized, then purging continued until they stabilized. At this time, the well was considered to have been purged enough to ensure that the subsequent water samples collected from the well would be representative of water from the aquifer. After stabilization, the well was allowed to sit for 2-1/2 hours prior to sampling at which time the water level was measured in the well. If the well had recovered to 95 percent of the original static level, then sampling of the well was performed. If the 95 percent recovery had not been achieved after 3 hours, the recovery requirement for the well was reduced to 85 percent prior to sampling. If the well had not recharged to 85 percent after 6 hours, sampling of the well began.

Prior to collecting the sample, the Teflon purging tube was removed from the well and placed into a clean plastic bag during sampling. To sample, the bailer was lowered into the well at a rate of approximately 1/2-inch per second to minimize the disturbance of water and silt in the well. When the bailer was filled with water it was removed at a rate of approximately 1/2-inch per second and the appropriate sample containers were filled. If the well was bailed to near dryness during the sampling process (i.e., the bailer reaches the bottom of the well), sampling was stopped until the well recharged to 85 percent of the original static level. If it did not recharge to 85 percent after 6 hours, sampling continued as water was available for each parameter. When sampling was complete, the dedicated Teflon tubing was returned to the well.

Depending upon the activities performed at the AOC and the constituents of concern, monitoring wells were sampled for most or all of the following parameters:

1. Target Compound List (TCL) for Volatile Organic Compounds (VOC) by NYSDEC CLP
2. TCL for Semivolatiles, Pesticides and Polychlorinated Biphenyls (SVOs, Pesticides and PCBs);
3. Target Analyte List (TAL) (Metals and Cyanide)
4. Method 8150 (Herbicides)
5. Method 8330 (Explosives)

6. Method 418.1 (Total Recoverable Petroleum Hydrocarbons)
7. Method 353.2 (Nitrates)
8. Method 340.2 (Fluoride)

The sampling order was as follows: 1) volatile organic compounds, 2) semivolatile organic compounds, 3) metals, 4) cyanide, 5) explosives 6) pesticides, 7) herbicides, 8) Total Recovered Petroleum Hydrocarbons (TRPH), 9) nitrates and PCBs, and 10) fluoride. The sampling order allowed that metals were collected early in the sequence. Obtaining water samples for metals that are truly representative of the aquifer was a primary goal of the sampling procedure; therefore, collection of water for metals analysis was placed early in the sequence. The results of the testing are discussed in detail in Section 4 of this report.

One round of water level measurements were completed for the monitoring wells. The water level data have been used to determine the direction of groundwater flow within the till/weathered shale aquifer. These data are presented and discussed in detail in Section 3.

2.2.6 Surface Water and Sediment Sampling Procedures

Surface water samples were collected on the site by immersing a clean glass beaker or a sample bottle without preservatives. The sample was then transferred to a pre-preserved sample bottle, if required. Temperature, conductivity, and pH of surface water were measured directly in the field with calibrated meters. pH was measured with an Orion pH meter, Model SA230 or SA230A. Conductivity and temperature were measured with a YSI Model 33 conductivity meter.

Sediment samples were collected by scooping sediment into a decontaminated stainless steel bowl with a decontaminated trowel. Volatile Organic Analytes (VOA) samples were taken first, prior to any mixing of the sediments. Then, the bowl was refilled with additional sediment, if required, thoroughly mixed and the appropriate sample containers filled with sediment. Samples were then placed in coolers containing refrigerants.

2.2.7 Sampling Procedures for Other Materials

Asbestos

Pipes within some of the buildings may have been wrapped with an insulating material containing asbestos. Samples of this insulation material were collected using appropriate health and safety procedures by picking it up by hand and placing it into a glass or plastic, wide-mouth bottle.

Dust

Dust and dirt on the floor of the building at SEAD-16 were sampled for various parameters. This material was sampled using the same procedures as for surface soils (Section 2.2.2) except that the dust and dirt was collected over a broad area of the floor rather than digging into the soil.

2.3 SEAD-4: MUNITIONS WASHOUT FACILITY LEACHFIELD

Based on historical information, wastewater from the washout facility possibly contained explosives and heavy metals. Based on ERCE information and discussions with SEDA personnel, this wastewater could have been discharged to a suspected leach field west of the former building, to an unlined ditch that discharged to a pond approximately 500 feet west of the former building, to an unlined ditch that flowed north and discharged on the north side of the road to possibly a leach field, or to areas near Buildings 2079 and 2084.

Soil samples were collected from the pond area in 1990 and tested for 2,4,6-TNT, 2,4-DNT and 2-6-DNT. Explosives were not detected in any of the samples tested (ERCE 1991). Because this wastewater could leach into the ground, the potential migration pathways include both soil and groundwater. Surface water and sediment from the pond were also considered as potential migration pathways because the pond could have received some wastewater.

2.3.1 Chemicals of Interest

Chemicals of interest at this site are explosives and heavy metals.

2.3.2 Media To Be Investigated

Geophysics

Four 115-foot seismic refraction profiles were performed along two lines laid out perpendicular to each other. Data from the surveys were used to determine the direction of groundwater flow, then, when necessary, the location of the monitoring wells was adjusted to locate a well upgradient and a well downgradient of the AOC.

The exact location of the suspected leach field, west of the washout facility, is unknown. To determine the leachfield's location, GPR and electromagnetic (EM-31) surveys were performed. GPR was the primary geophysical method with the EM-31 providing backup geophysical data. The objective of these surveys was to delineate the location of the suspected leach field and the locations of subsurface pipes and structures that may have serviced the suspected leach field (refer to Figure 2.3-1). A grid of GPR and EM-31 data was collected over the area of the suspected leachfield location. The GPR data was collected continuously along the lines spaced at 10-foot intervals and along selected cross-lines (refer to Figure 2.3-1). Electromagnetic measurements were made on the same lines and cross-lines with measurements taken at 5-foot intervals. Approximately 5,000 linear feet were surveyed.

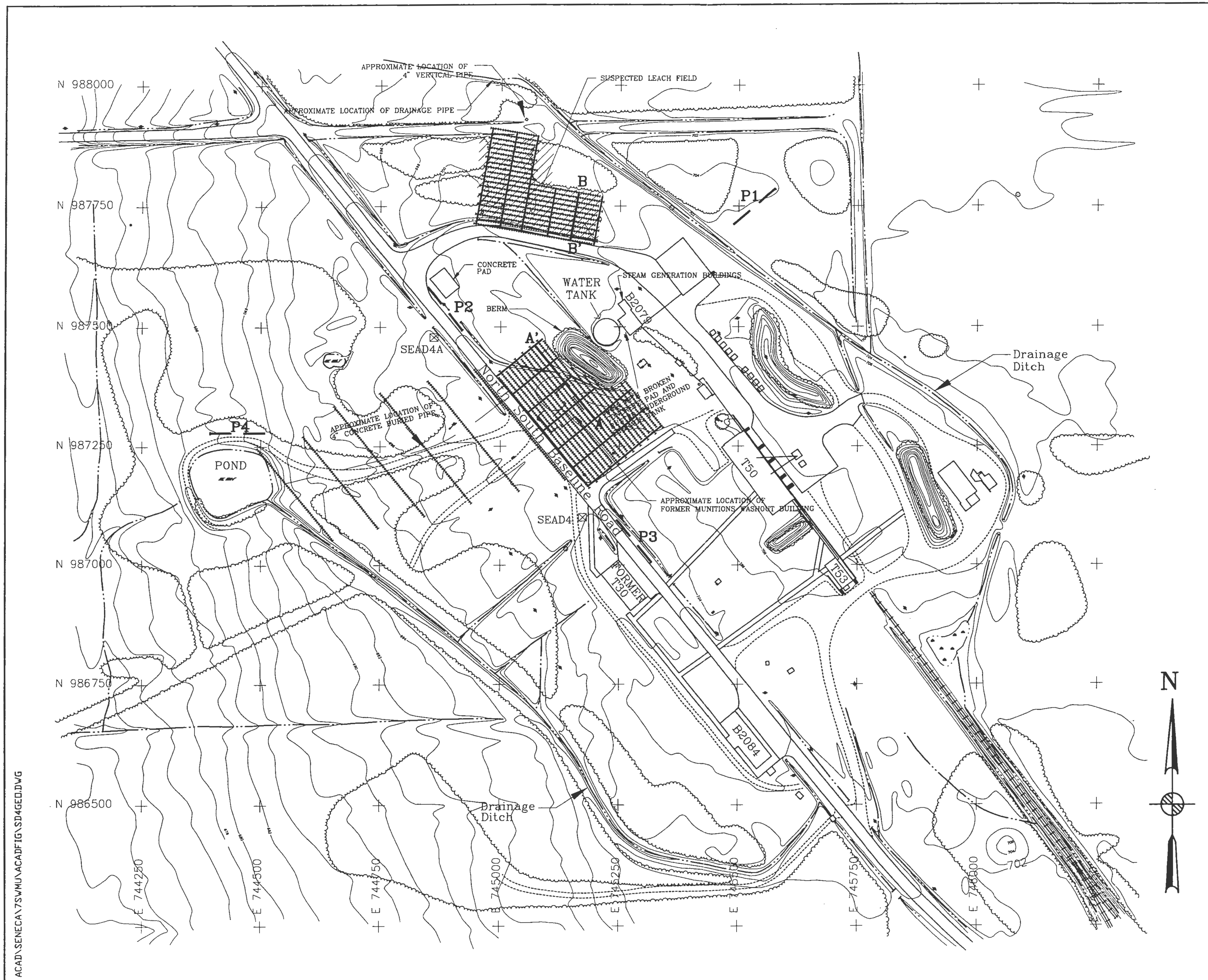
GPR and EM-31 surveys were also performed to determine whether a buried ditch or pipe leading north from the former facility and a leach field north of the road exist. The GPR survey was performed at a line spacing of 10 feet and a cross-line spacing of 50 feet. Approximately 5,000 linear feet of GPR profiles were acquired. EM-31 measurements were made along profiles oriented approximately east-west at 5-foot intervals in the area of the potential pipe and leach field. Approximately 4,100 linear feet of EM data was collected in the area.

In addition, GPR and EM-31 profiles were performed in the area between the pond and the former facility to identify the location of the former ditch through which wastewater was discharged. Six profiles, spaced at 100-foot intervals, were surveyed to locate the former ditch. These profiles were approximately 300 feet in length.

Soils

On November 15, 1993, the field sampling program of the workplan was updated because of the discovery of previously unknown 1959 and 1968 air photos that provided information on the layout of the former munitions washout facility. The information provided about SEAD-4 included:

- The former munitions washout facility location,
- Information regarding piping and other structures,



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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 2.3-1
SEAD-4 MUNITIONS WASHOUT FACILITY
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 200'	MAY 1995	C

- The presence and extent of 2 drainage ditches,
- A discharge pipe from the former washout facility to the pond.

Borings: Ten soil borings (SB) were advanced at SEAD-4 (refer to Figure 2.3-2) to evaluate the vertical extent of impacts. Boring SB4-1 was located in an area considered free of influences of the site activities and provided data on the background soil quality. The other borings were at locations where releases to the environment may have occurred. The five borings were completed as wells at SEAD-4 (Table 2.3-1).

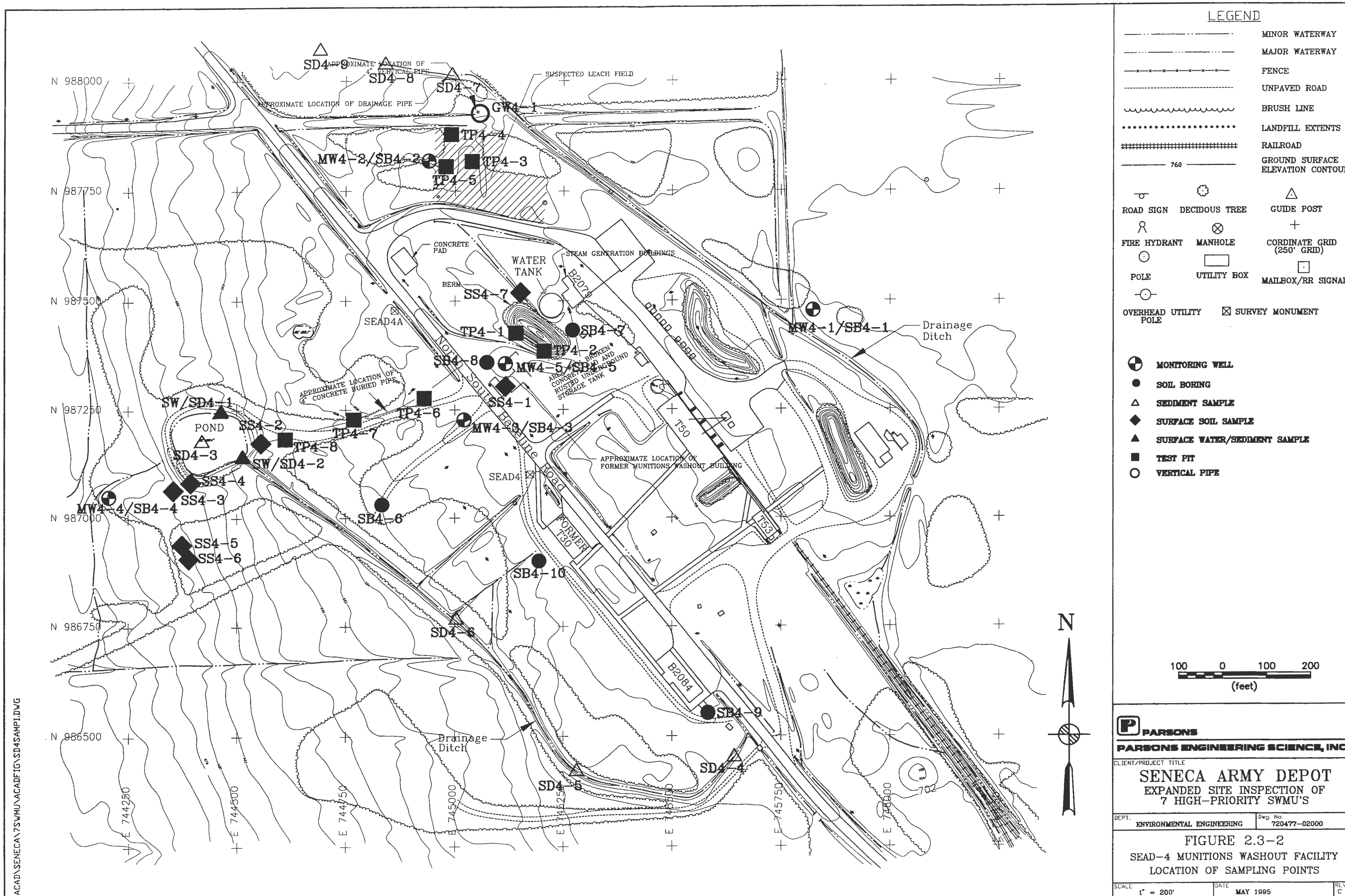
Based on the new information on the site, the soil borings were modified slightly and were located as follows:

- SB4-1, on the upgradient side of the drainage ditch;
- SB4-2, downgradient of the leachfield;
- SB4-3, SB4-6, downgradient of the former munitions washout facility building;
- SB4-4, downgradient of the pond;
- SB4-5, in the area of the former munitions washout facility building;
- SB4-7, near building B-20;
- SB4-8, near the former building where disturbed soils are present and where a building was once located;
- SB4-9, near building 2084;
- SB4-10, near building T-30.

These changes were outlined in a letter submitted to NYSDEC and EPA on November 15, 1993. Approval to proceed was obtained from EPA on November 29, 1993. Approval from NYSDEC was obtained on December 7, 1993.

The three samples from each boring were submitted for chemical analyses identified in Section 2.3.3.

Test Pits: Eight test pits (TP) were excavated at SEAD-4 (Figure 2.3-2). Two excavations (TP4-1 and TP4-2) were located in the former munitions washout facility. Three excavations (TP4-3 to 4-5) were located within the suspected leachfield, north of the munitions facility and three excavations (TP4-6 to 4-8) were located along the clay pipe running west to the pond.



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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 2.3-2
SEAD-4 MUNITIONS WASHOUT FACILITY
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 200'	MAY 1995	C

TABLE 2.3-1

SEAD-4 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

BORING NUMBER	WELL NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL
SB4-1	MW4-1	SB4-1.1	0-2'
		SB4-1.3	4-6'
		SB4-1.6	10-12'
SB4-2	MW4-2	SB4-2.1	0-2'
		SB4-2.2	2-4'
SB4-3	MW4-3	SB4-3.1	0-2'
		SB4-3.3	4-6'
		SB4-3.4	6-8'
SB4-4	MW-4-4	SB4-4.1	0-2'
		SB4-4.2	2-4'
		SB4-4.3	4-6'
SB4-5	MW4-5	SB4-5.1	0-2'
		SB4-5.2	2-4'
SB4-6	Well Not Installed	SB4-6.1	0-2'
		SB4-6.2	2-4'
SB4-7	Well Not Installed	SB4-7.1	0-2'
		SB4-7.3	4-6'
		SB4-7.4	6-8'
SB4-8	Well Not Installed	SB4-8.1	0-2'
		SB4-8.2	2-4'
		SB4-8.3	4-6'
SB4-9	Well Not Installed	SB4-9.1	0-2'
		SB4-9.2	2-4'
		SB4-9.3	4-6'
SB4-10	Well Not Installed	SB4-10.1	0-2'
		SB4-10.2	2-4'
		SB4-10.3	4-6'

Notes:

NS = Not Sampled
1) The sample number contains the sample location with a soil boring (SB) or monitoring well (MW) identifier.
2) All SEAD-4 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, and nitrates.

Four soil samples were composited into one sample for each test pit (Table 2.3-2).

Surface Soils: Seven surface soil samples (SS) were obtained (Figure 2.3-2). Two samples (SS4-1 and SS4-2) were collected from the original bed of the ditch that leads west to the pond. Samples SS4-3 to SS4-6 were obtained from the material that was bulldozed from the pond. Sample SS4-7 was obtained from the original bed of the ditch that leads north from the former facility.

Groundwater

Five monitoring wells (MW) were installed as part of the modified Field Sampling Program for this SEAD (Figure 2.3-2). The following changes were made to the locations of the wells proposed in the workplan because of the availability of additional information on the site:

> MW4-1 was moved approximately 125 feet east to place in on the upgradient side of the drainage ditch. MW4-1 was located upgradient of the munitions works to obtain background groundwater quality.
>
> MW4-3 was moved approximately 75 feet west southwest to locate it directly downgradient of the former munitions washout facility building,
>
> MW4-5 was located in the former munitions washout facility.

Monitoring well MW4-2 was located downgradient of the suspected leachfield location and MW4-4 was located downgradient of the pond as originally depicted in the workplan.

The monitoring wells installed at SEAD-4 were used to evaluate groundwater flow direction and the groundwater quality at areas of the SWMU that may have been affected by the wash water. The presumed direction of groundwater flow at this SWMU was to the west-southwest.

All monitoring wells were constructed so that the entire thickness of the aquifer was screened. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.3.3.

TABLE 2.3-2

SEAD-4 TEST PIT SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

TEST PIT IDENTIFICATION	SAMPLING COMMENTS	SAMPLING DEPTH
TP4-1	Composite of 4 locations in pit	0-3'
TP4-2	Composite of 4 locations in pit	0-3'
TP4-3	Composite of 4 locations in pit	0-4'
TP4-4	Composite of 4 locations in pit	0-4'
TP4-5	Composite of 4 locations in pit	0-3.5'
TP4-6	Composite of 4 locations in pit	0-5'
TP4-7	Composite of 4 locations in pit	0-5'
TP4-8	Composite of 4 locations in pit	0-3'

Notes:

1) The sample number contains the sample location with a test pit (TP) identifier.
2) All samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, and nitrates.

Surface Water and Sediment

A total of nine sediment samples (SD) and two surface water samples (SW) were collected at SEAD-4 (Figure 2.3-2). Two sediment samples (SD4-1 and SD4-2) and two surface water samples (SW4-1 and SW4-2) were collected near the edge of the pond, and, using a boat, one sediment sample (SD4-3) was collected from the deepest part of the pond.

Modifications to the Field Sampling Program, previously mentioned, (November 15, 1993) included the addition of six sediment samples to replace soil boring samples. Three of the six additional sediment samples (SD4-4, 5, and 6) were collected from the drainage ditch located on the southwest side of the site. The remaining three samples (SD4-7, 8 and 9) were collected from the drainage ditch on the northeast side of the site.

Each sediment and surface water sample was tested for the chemical parameters listed in Section 2.3.3.

2.3.3 Analytical Program

A total of 42 soil samples, nine sediment samples, five groundwater samples, and three surface water samples were collected from SEAD-4 for chemical testing. All the samples were analyzed for the following: the TCL VOCs, SVOs, pesticides/PCBs and TAL metals and cyanide according to protocols described in the NYSDEC Contract Lab Program (CLP) Statement of Work (SOW). Explosive compounds were analyzed by EPA Method 8330, herbicides were analyzed by EPA Method 8150, and nitrates were analyzed by EPA Method 352.2. A summary of the analytical program for SEAD-4 is presented in Table 2.1-3.

2.4 SEAD-16: BUILDING S-311 ABANDONED DEACTIVATION FURNACE

Although explosives are most likely to have been completely destroyed in the furnace, heavy metals from the munitions may have exited the furnace in both ash and dust. Because soil samples near the existing deactivation furnace (SEAD-17 described below) have exhibited lead EP Toxicity concentrations in the range of 0 to 384 mg/l, it was assumed that the soils surrounding the abandoned deactivation furnace would also show elevated lead concentrations, especially since the unit had no air pollution control devices. In addition to soils, migration pathways from the furnace included inhalation of soil particulates dispersed in the air and ingestion of groundwater. No drinking water well within the area influenced by this site exists, however, the groundwater at this site has been classified as GA, which means that the quality must be suitable for drinking.

2.4.1 Chemicals of Interest

Explosive compounds of interest include HMX, RDX, TNT and 2,4-DNT. In addition to explosive compounds, heavy metals, primarily lead and barium, are of concern. There is also pipe insulation inside the building that may contain asbestos.

2.4.2 Media To Be Investigated

Geophysics

Seismic refraction profiles, 115-feet long, were performed at four locations at SEAD-16 (Figure 2.4-1). Data from the surveys were used to determine the direction of groundwater flow, then, if necessary, the location of the monitoring wells were adjusted so that one upgradient well and two downgradient wells were installed at the AOC.

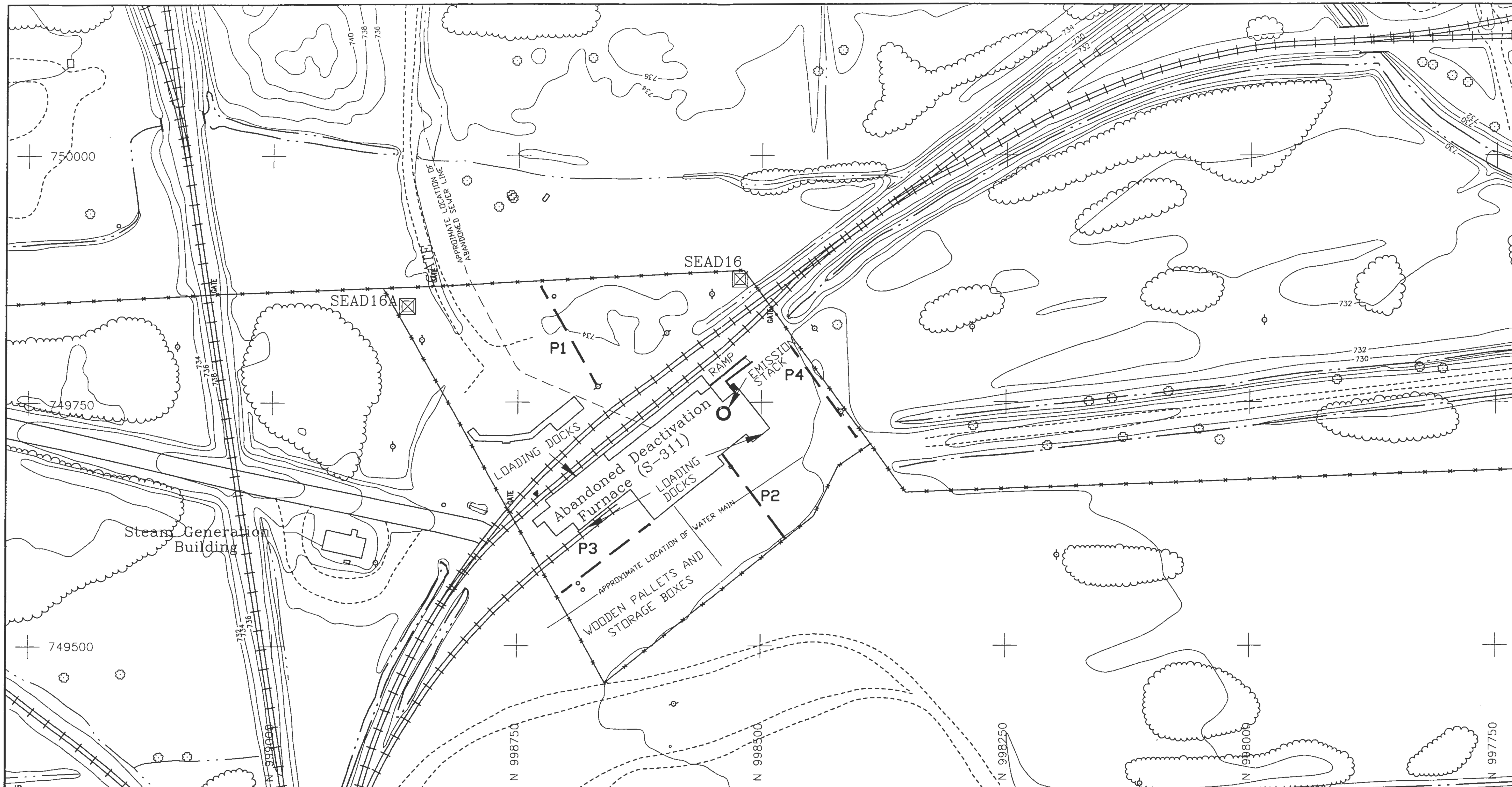
Soils

Sixteen surficial soil samples were collected (0 to 2 inches in depth) in the vicinity of Bldg. S-311, as shown on Figure 2.4-2 and tested for the parameters listed in Section 2.4.3. Sample SS16-16 was used to obtain background surface soil quality data.

Groundwater

Three monitoring wells were installed at the abandoned deactivated furnace area (refer to Figure 2.4-2). One was installed in an upgradient location (MW16-1) for background water quality and two were installed in downgradient locations to determine if hazardous constituents have migrated from this AOC and determine the direction of groundwater flow. The presumed direction of groundwater flow at this AOC was to the southwest; which was confirmed with the seismic data.

One monitoring well was constructed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.4.3.



ACAD\SENECA\7SWMU\ACADFIG\SD16GEO.DWG

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- CORDINATE GRID (250' GRID)
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- SEISMIC PROFILE

50 0 50 100 (feet)

N

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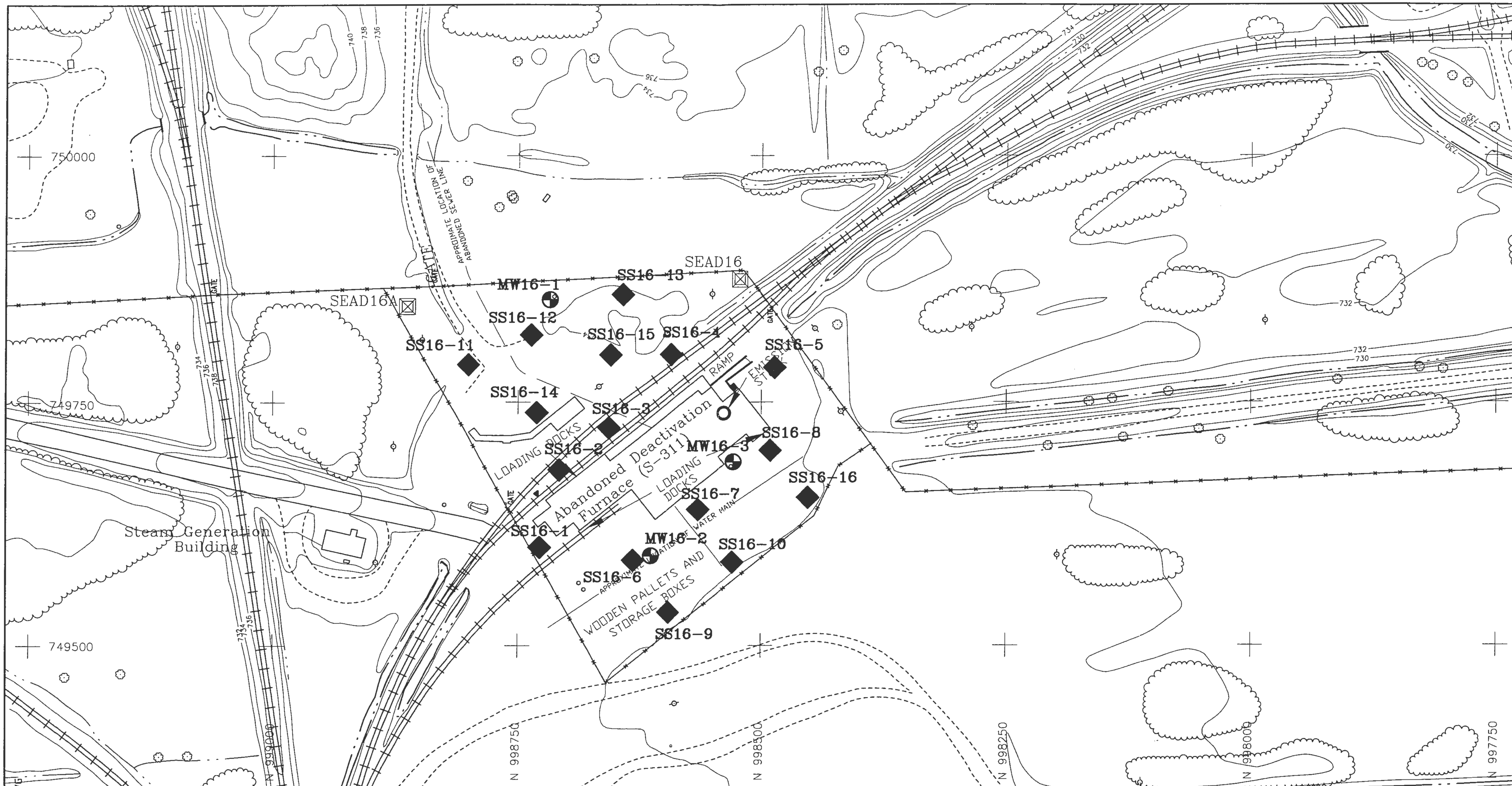
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 2.4-1
SEAD-16 ABANDONED DEACTIVATION FURNACE
LOCATION OF GEOPHYSICAL SURVEYS

SCALE 1" = 100' | DATE MAY 1995 | REV C



ACAD\SENECA\7SWMU\ACADFIG\SD16SAMP.DWG

LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR

SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL

MONITORING WELL
SOIL BORING
SEDIMENT SAMPLE
SURFACE SOIL SAMPLE
SURFACE WATER/SEDIMENT SAMPLE
TEST PIT

50 0 50 100
(feet)

N

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000

FIGURE 2.4-2
SEAD-16 ABANDONED DEACTIVATION FURNACE LOCATION OF SAMPLING POINTS

SCALE 1" = 100'
DATE MAY 1995
REV C

Surface Water

Previous inspections of SEAD-16 have revealed standing water within the furnace. Two samples (SW16-1 and SW16-2) were collected from this standing water and tested for the parameters listed in Section 2.4.3.

Solid Materials from the Building

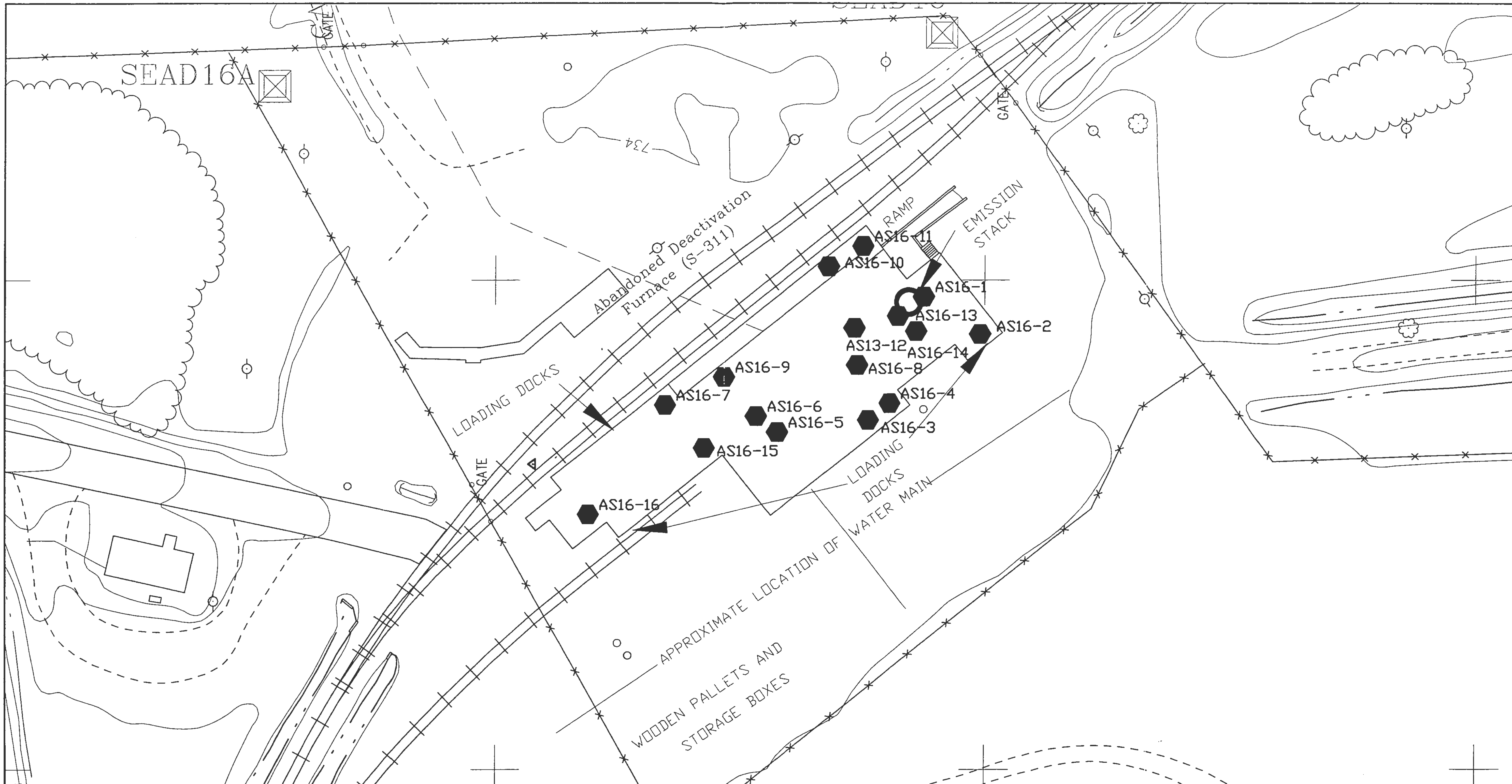
A total of twenty-three samples were collected at seventeen locations (Figures 2.4-3 and 2.4-4). These samples include fifteen samples for asbestos analysis and eight samples for the chemical analyses described in Section 2.4.3. Asbestos samples were identified as AS and floor samples, collected for chemical analysis, were identified as FS. At six locations, samples were collected for both asbestos and chemical analyses. Refer to Table 2.4-1 for a list of samples collected and material descriptions.

2.4.3 Analytical Program

A total of sixteen soil samples, 3 groundwater samples, 8 samples of material on the floor of the building, and 2 surface water samples were collected from SEAD-16 for chemical testing. All these samples were analyzed for the following: the TCL VOCs, SVOs, pesticides/PCBs and TAL metals and cyanide according to the NYSDEC CLP SOW. Explosive compounds were analyzed by EPA Method 8330, herbicides were analyzed by EPA Method 8150, and nitrates were analyzed by EPA Method 352.2. Seven samples of building materials, 2 samples of furnace scale, and six samples of soil inside the building were analyzed for asbestos. A summary of the analytical program for SEAD-16 is presented in Table 2.1-3.

2.5 SEAD-17: BUILDING 367 EXISTING DEACTIVATION FURNACE

The munitions destroyed in the furnace contained propellents, explosives, and pyrotechnics. Lead was drained from the furnace at side taps and poured into ingot bars for recycling. Other heavy metals partitioned into the bottom and fly ash. During the upgrade of this furnace in 1989, an interim closure was performed and, surface soil samples and wipe samples were collected and tested for barium and lead. Some of the soil samples collected exceeded EP Toxicity limits established for lead. The primary migration pathways are expected to be ingestion and dermal contact of soil and ingestion of groundwater. No drinking water well exists within the area influenced by this site, however, the groundwater at this site has been classified as GA, which means that the quality must be suitable for drinking.



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
ASBESTOS SAMPLE LOCATION

50 0 50 100 (feet)

N

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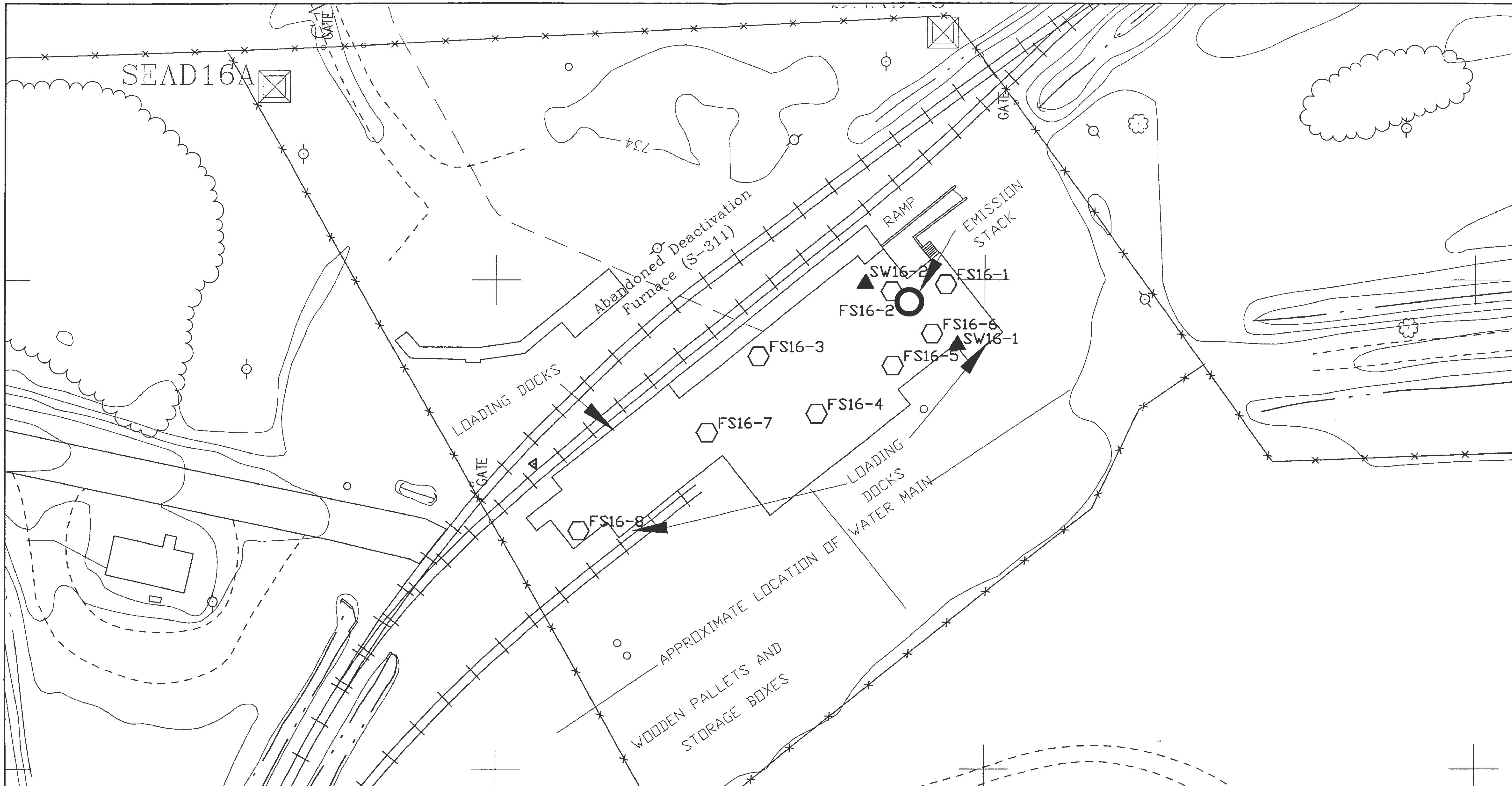
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000

FIGURE 2.4-3
SEAD-16 ABANDONED DEACTIVATION FURNACE ASBESTOS SAMPLE LOCATIONS

SCALE 1" = 50'
DATE MAY 1995
REV C



ACAD\SENECA7SWMU\ACADFIG\SD16FS.DWG

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- CORDINATE GRID (250' GRID)
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- FLOOR SAMPLE LOCATION
- SURFACE WATER SAMPLE LOCATION

50 0 50 100 (feet)

N

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 2.4-4

SEAD-16 ABANDONED DEACTIVATION FURNACE FLOOR SAMPLE LOCATIONS

SCALE	DATE	REV
1" = 50'	MAY 1995	C

TABLE 2.4-1

SEAD-16
SOLID MATERIALS FROM BUILDING S-311
ABANDONED DEACTIVATION FURNACE

SENECA ARMY DEPOT
7 AOCs

BUILDING SAMPLE NUMBER	FLOOR SAMPLE NUMBER	ROOM LOCATION	MATERIAL DESCRIPTION
AS - 16 - 1	N.S.	A	Pipe insulation
AS - 16 - 2	N.S.	A	Sheetrock (2 layers)
AS - 16 - 3	N.S.	E	Pipe insulation
AS - 16 - 4	N.S.	E	Sheet rock
AS - 16 - 5	N.S.	E (hallway)	Transite
AS - 16 - 6	N.S.	E (hallway)	Duplicate of #5
AS - 16 - 7	N.S.	Platform	Roofing debris
AS - 16 - 8	FS - 16 - 4	E (hallway)	Soils
AS - 16 - 9	FS - 16 - 3	D	Soils
AS - 16 - 10	N.S.	C (furnace)	Furnace packing (scale)
AS - 16 - 11	N.S.	C (furnace)	Stack mesh coating (scale)
AS - 16 - 12	N.S.	D	Building debris
AS - 16 - 13	FS - 16 - 6	B (crawl space)	Soils
AS - 16 - 14	FS - 16 - 5	B	Soils
AS - 16 - 15	FS - 16 - 7	D	Soils
AS - 16 - 16	FS - 16 - 8	H	Soils
N.S.	FS - 16 - 1	C	Soils
N.S.	FS - 16 - 2	C	Soils

Notes:

NS = Not Sampled
1) The sample number contains the sample location with an asbestos (AS) or floor sample (FS) identifier.
2) All FS samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, and nitrates. Building samples (AS) were analyzed for asbestos only.

2.5.1 Chemicals of Interest

Heavy metals, primarily lead and barium, and explosives are of concern.

2.5.2 Media To Be Investigated

Geophysics

Seismic refraction profiles, 115-feet long, were performed at four locations around the building (Figure 2.5-1). Data from the surveys were used to determine the direction of groundwater flow, and if necessary, the location of the monitoring wells were adjusted to locate a well upgradient and a well downgradient in the AOC.

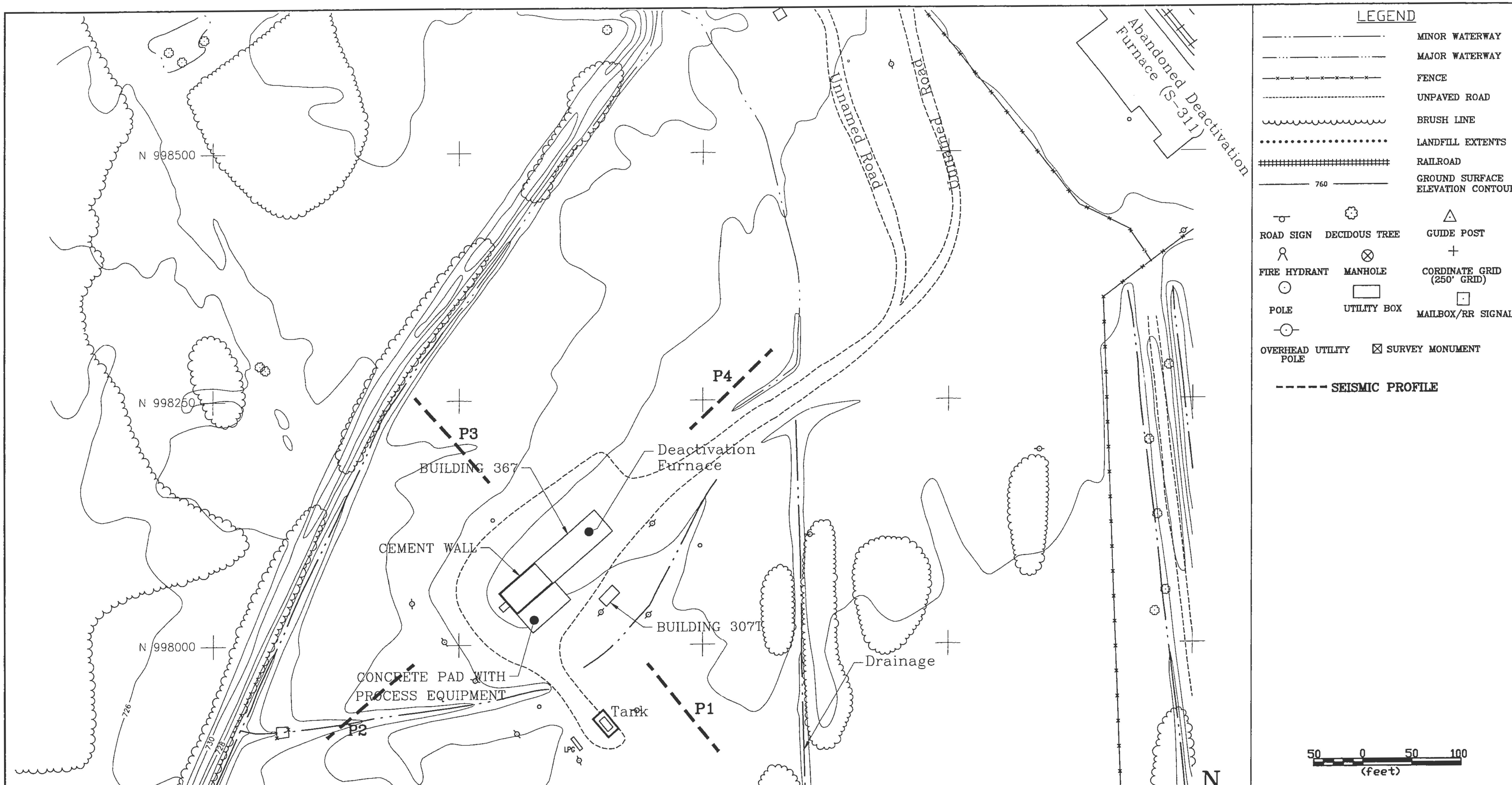
Soil

Borings: Four soil borings were drilled at locations where monitoring wells would be installed (Figure 2.5-2). Depending upon the soil headspace screening results, the presence of soil discoloration or the depth of the water table, two to three samples from each boring were submitted for chemical analyses identified in Section 2.5.3. Soil samples from SB17-1 were used for background soil quality (Table 2.5-1).

Surface Soils: Surficial soil samples from 0 to 2 inches below grade were obtained from 23 locations around Building 367 (Figure 2.5-2). One of the samples, SS17-18, was obtained from the discharge point of the pipe that drains water from the retort inside the building. These samples were submitted for the chemical analyses identified in Section 2.5.3. Soil samples from SB17-1 were used for background soil quality.

Groundwater

Four monitoring wells were installed to assess the potential impact of this AOC on the groundwater quality (Figure 2.5-2). One monitoring well (MW17-1) was installed hydraulically upgradient of the furnace for background water quality, while the remaining three monitoring wells were installed downgradient of this AOC. The presumed direction of groundwater flow on this AOC was to the west-southwest. This was confirmed with the seismic survey.



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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 2.5-1
SEAD-17 ACTIVE DEACTIVATION FURNACE
LOCATION OF GEOPHYSICAL SURVEYS

SCALE 1" = 100' | DATE MAY 1995 | REV C

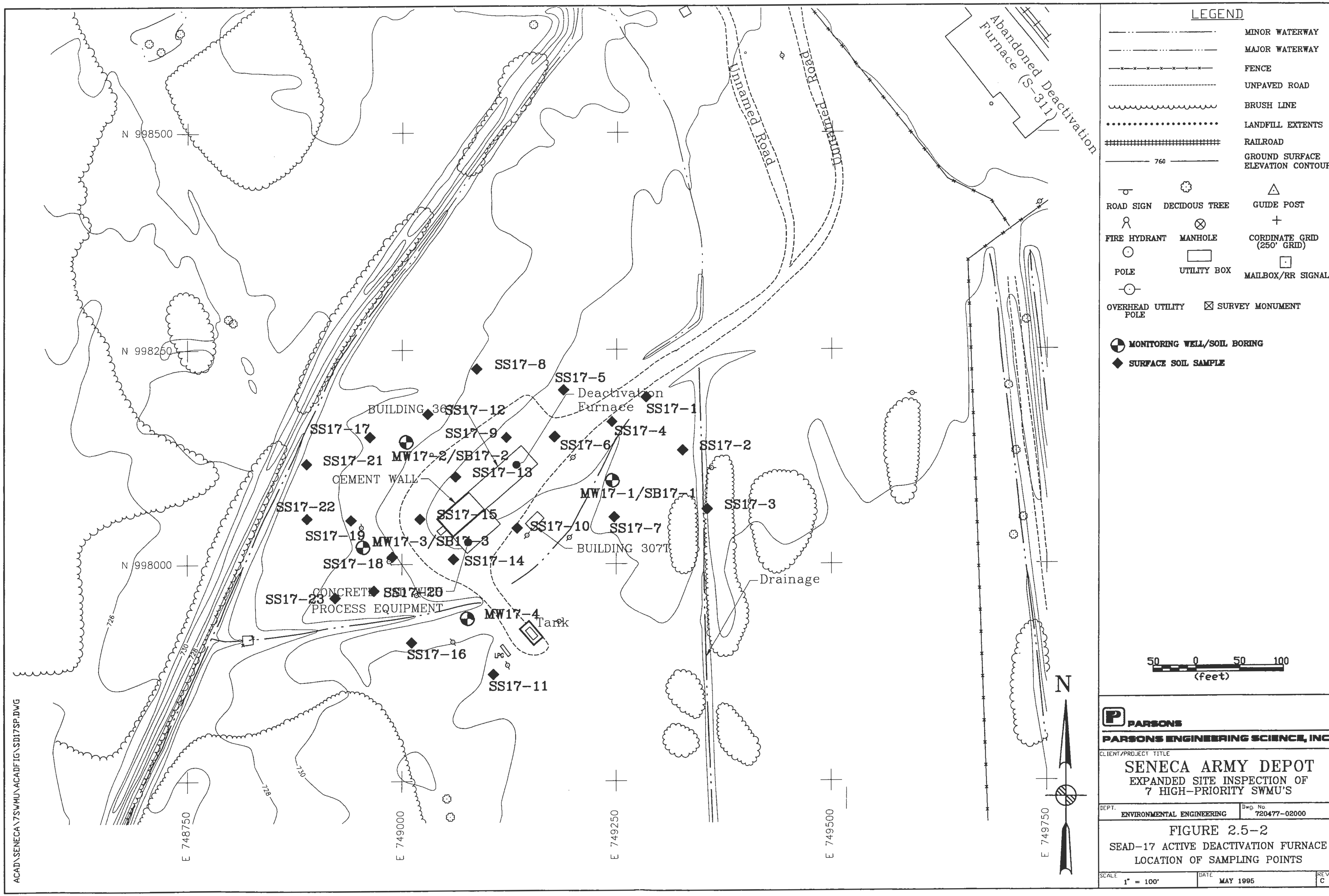


FIGURE 2.5-2
SEAD-17 ACTIVE DEACTIVATION FURNACE
LOCATION OF SAMPLING POINTS

TABLE 2.5-1

SEAD-17 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

BORING NUMBER	WELL NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL
SB17-1	MW17-1	SB17-1.1	0-2'
		SB17-1.2	2-4'
		SB17-1.3	4-6'
SB17-2	MW17-2	SB17-2.1	0-2'
		SB17-2.2	2-4'
SB17-3	MW17-3	SB17-3.1	0-2'
		SB17-3.2	2-4'
SB17-4	MW17-4	SB17-4.1	0-2'
		SB17-4.2	2-4'

Notes:

NS = Not Sampled
1) The sample number contains the sample location with a soil boring (SB) or monitoring well sample (MW) identifier.
2) All samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, and nitrates.

One monitoring well was constructed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.5.3.

2.5.3 Analytical Program

A total of four groundwater samples, nine subsurface soil samples, and 23 surficial soils samples were collected from SEAD-17 for chemical analysis. All the samples were analyzed for the following: the TCL VOCs, SVOs, and pesticides/PCBs and TAL metals and cyanide according to the NYSDEC CLP SOW. Explosive compounds were analyzed by EPA Method 8330, herbicides were analyzed by EPA Method 8150, and nitrates were analyzed by EPA Method 352.2. A summary of the analytical program for SEAD-17 is presented in Table 2.1-3.

2.6 SEAD-24: ABANDONED POWDER BURNING PIT

Although the operating practices of the pit are unknown, explosive compounds and heavy metals are believed to be the primary constituents of concern. Petroleum hydrocarbon fuel may have been used to initiate the burn. Because these explosive compounds and heavy metals could leach into the groundwater, the primary migration pathways are expected to be ingestion of groundwater, inhalation of soil, and dermal contact with soil.

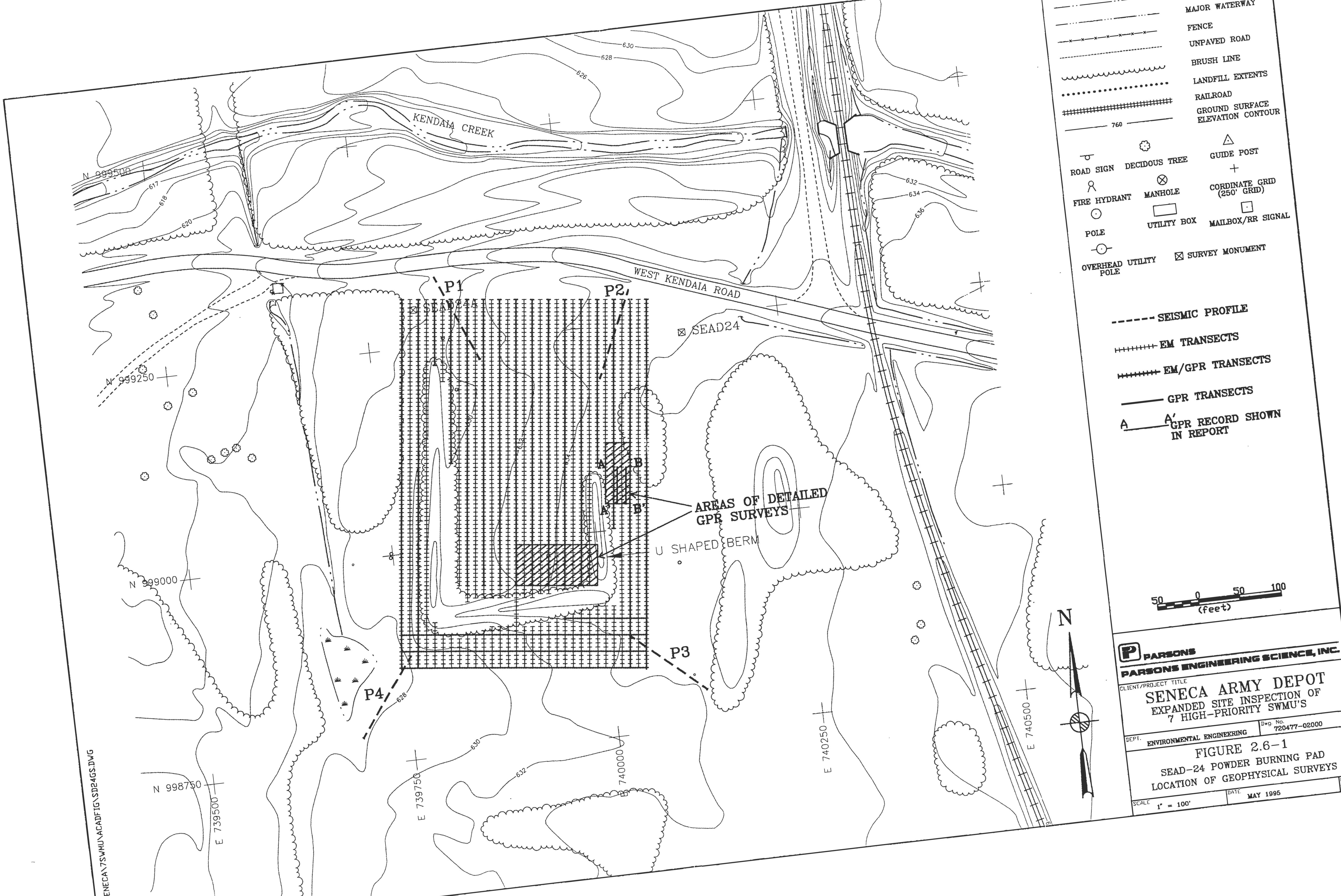
2.6.1 Chemicals of Interest

The primary chemicals of interest are explosive compounds, including HMX, RDX, TNT, 2,4-DNT, heavy metals, VOCs (solvent initiator), and TPH (fuel oil initiator).

2.6.2 Media To Be Investigated

Geophysics

Seismic refraction profiles, 115-feet long, were performed at four locations (Figure 2.6-1). Data from the surveys were used to determine the direction of groundwater flow, then, when necessary, the location of the monitoring wells were adjusted to locate a well upgradient and a well downgradient of the AOC.



MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
760
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
SEISMIC PROFILE
EM TRANSECTS
EM/GPR TRANSECTS
GPR TRANSECTS
A A' GPR RECORD SHOWN IN REPORT
50 0 50 100
(feet)
N
KENDAIA CREEK
WEST KENDAIA ROAD
N 999500
N 999250
N 999000
N 998750
E 739500
E 739750
E 740000
E 740250
E 740500
617
618
620
626
628
630
632
634
636
P1
P2
P3
P4
SEAD24
SEAD244
A
A'
B
B'
AREAS OF DETAILED GPR SURVEYS
U SHAPED BERM
SENECA\7SWMU\ACADFIG\SD24GS.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000
FIGURE 2.6-1
SEAD-24 POWDER BURNING PAD
LOCATION OF GEOPHYSICAL SURVEYS
SCALE 1" = 100'
DATE MAY 1995

To evaluate the subsurface conditions at SEAD-24, EM-31 and GPR surveys were performed to locate potential pits and buried ordnance at the site. A grid of electromagnetic data was collected across the site. The profiles were spaced at 5-foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data was collected along profiles spaced at 20-foot intervals to characterize the extent of disturbed soils at the site. In addition, follow-up GPR surveys were performed to characterize the source of two electromagnetic anomalies. Approximately 7985 feet of GPR profiles were acquired and 12720 feet of EM data was collected.

Soils

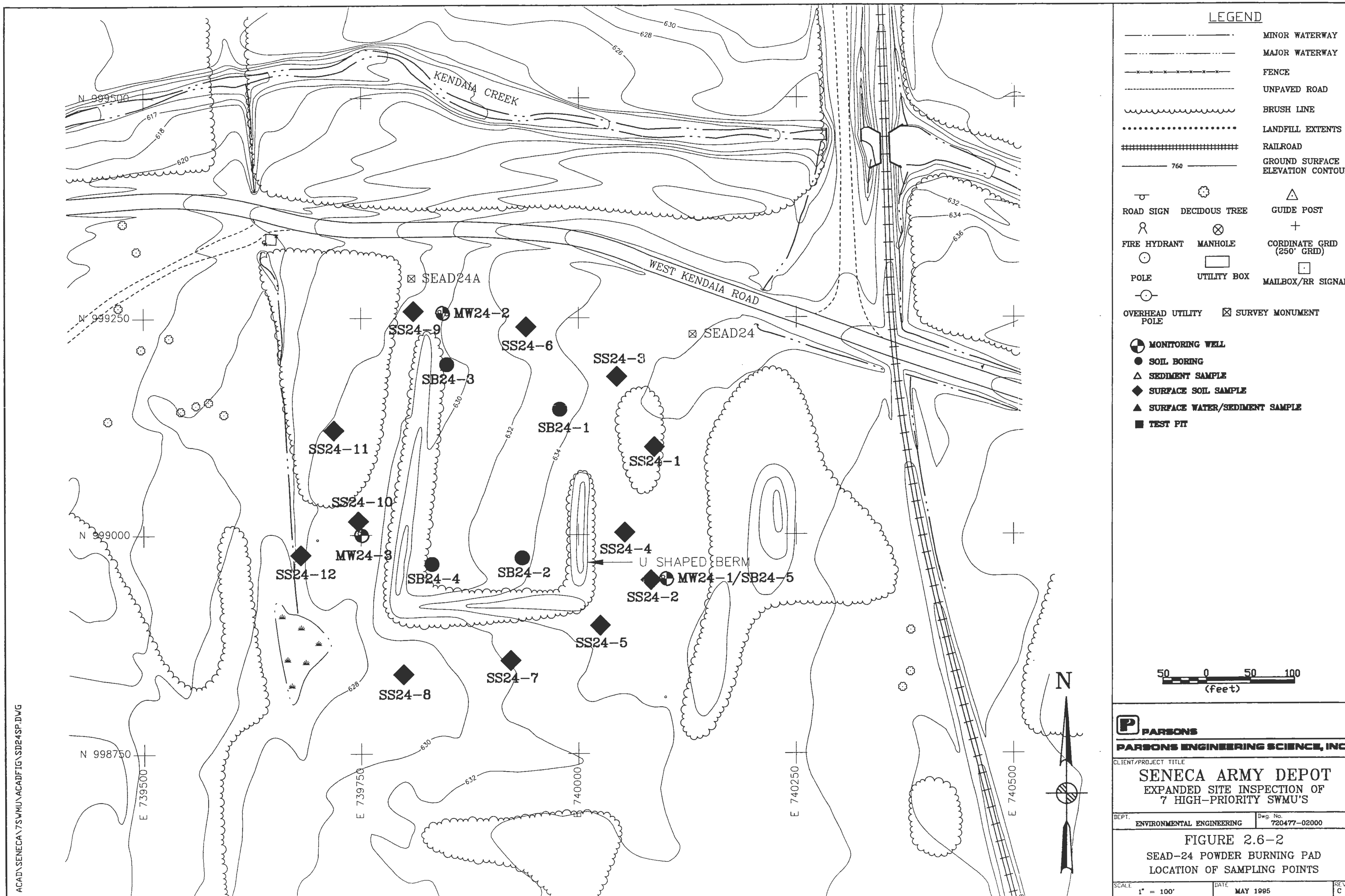
Borings: A total of five borings were performed at SEAD-24 with four of the borings located within the berm area (refer to Figure 2.6-2 and Table 2.6-1)). The borings were drilled at the approximate location shown in the workplan. Boring SB24-5 was drilled to obtain background soil quality data. Three samples from each boring were submitted for chemical analyses identified in Section 2.5.3.

Surface Soils: Surficial soil samples 0 to 2 inches below grade were obtained from 12 locations surrounding the abandoned pit (Figure 2.6-2). These samples were submitted for the chemical analyses identified in Section 2.6.3.

Groundwater

Three monitoring wells were installed at SEAD-24 with one monitoring well (MW24-1) installed upgradient of SEAD-24 to obtain background water quality data (Figure 2.6-2). Two monitoring wells were installed adjacent to and downgradient of this unit to evaluate whether hazardous constituents have migrated from the AOC and to determine the groundwater flow direction. The presumed direction of groundwater flow at this AOC in the workplan was to the northwest; however, the geophysical survey showed the direction to be to the west. As a result of this information, monitoring well MW24-3 was moved from its proposed location to a location west of the burning pit.

One monitoring well was installed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.6.3.



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 2.6-2
SEAD-24 POWDER BURNING PAD
LOCATION OF SAMPLING POINTS

SCALE 1" = 100' | DATE MAY 1995 | REV C

TABLE 2.6−1

SEAD−24 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

BORING NUMBER	WELL NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL
SB24−1	Well Not Installed	SB24−1.1	0−2'
		SB24−1.3	4−6'
		SB24−1.5	8−10'
SB24−2	Well Not Installed	SB24−2.1	0−2'
		SB24−2.3	4−6'
		SB24−2.4	6−8'
SB24−3	Well Not Installed	SB24−3.1	0−2'
		SB24−3.3	4−6'
		SB24−3.5	8−10'
SB24−4	Well Not Installed	SB24−4.1	0−2'
		SB24−4.4	6−8'
		SB24−4.7	12−14'
SB24−5	MW4−1	SB24−5.1	0−2'
		SB24−5.3	4−6'
		SB24−5.5	8−10'
NS	MW4−2	NS	NS
NS	MW4−3	NS	NS

Notes:

NS = Not Sampled
1) The sample number contains the sample location with a soil boring (SB) or monitoring well sample (MW) identifier.
2) All SEAD−24 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, nitrates, and TPH.

2.6.3 Analytical Program

A total of 27 soil samples and three groundwater samples were collected from SEAD-24 for chemical testing. All the samples were analyzed for the following: the TCL VOCs, SVOs, and pesticides/PCBs and TAL metals and cyanide according to the NYSDEC CLP SOW. Explosive compounds were analyzed by EPA Method 8330, herbicides were analyzed by EPA Method 8150, nitrates were analyzed by EPA Method 352.2, and Total Recoverable Petroleum Hydrocarbons were analyzed by EPA Method 418.1. A summary of the analytical program for SEAD-24 is presented in Table 2.1-3.

2.7 SEAD-25: FIRE TRAINING AND DEMONSTRATION PAD

Based on past site activities, spent solvents (prior to RCRA), water-contaminated fuels and oils have been used at this AOC. The primary migration pathways are expected to be ingestion of groundwater, although dermal contact and ingestion of soil and inhalation of the fugitive dust in the air are also potential pathways.

2.7.1 Chemicals of Interest

Petroleum products, primarily benzene, toluene and xylene, and solvents are of concern. Additionally, lead may also be of concern if leaded fuels were used for fire fighting demonstrations. Where waste oil is managed, there is potential for oil containing PCBs to be present.

2.7.2 Media To Be Investigated

Geophysics

Seismic refraction profiles, 115-feet long, were performed at four locations (Figure 2.7-1). Data from the surveys was used to determine the direction of groundwater flow, then, when necessary, the location of the monitoring wells were adjusted to locate a well upgradient and a well downgradient of the pad.

Soils

A total of six soil borings were advanced at this AOC, five within the area of the pad and one, SB25-6, east of the pad to obtain background soil quality data (refer to Figure 2.7-2 and

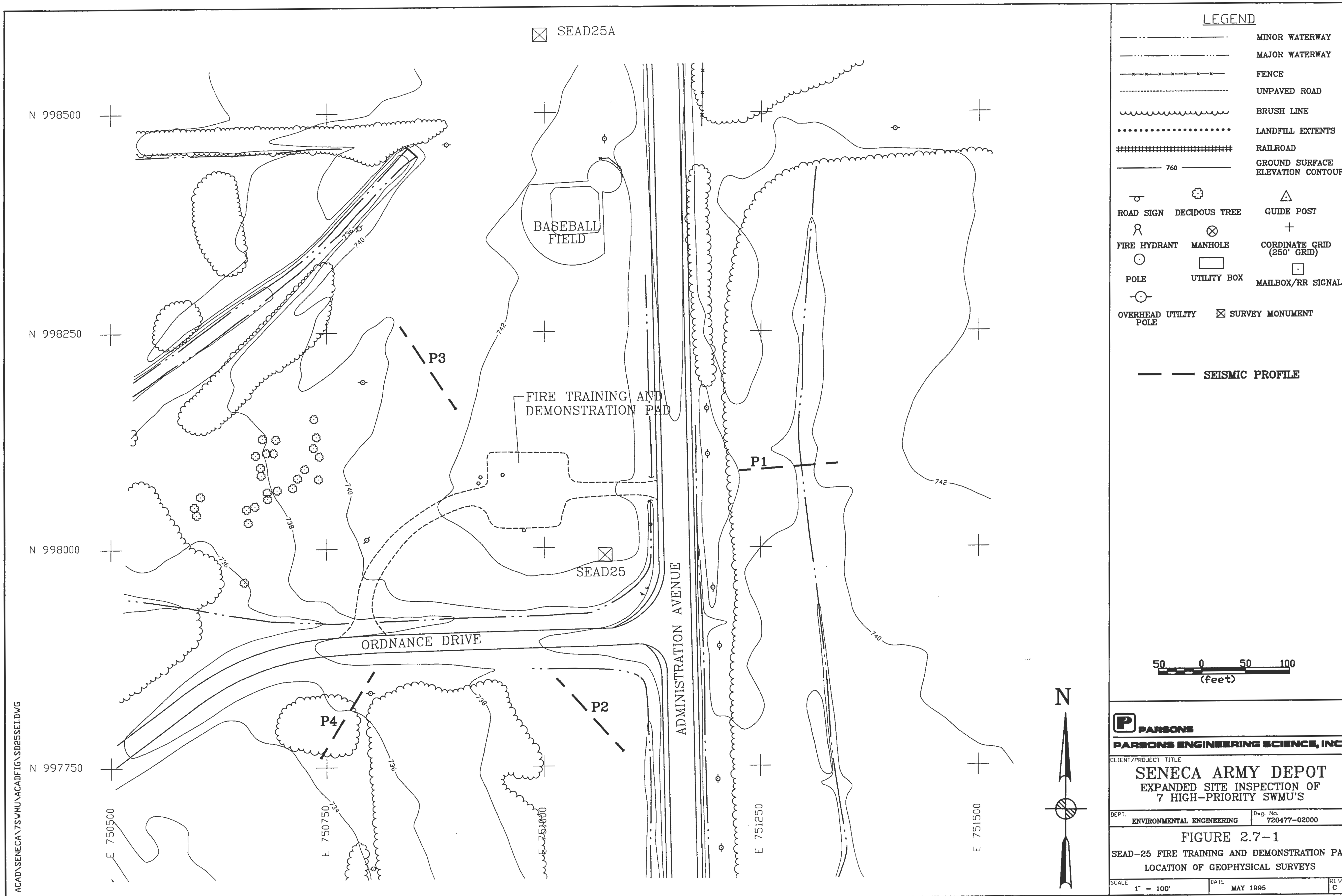
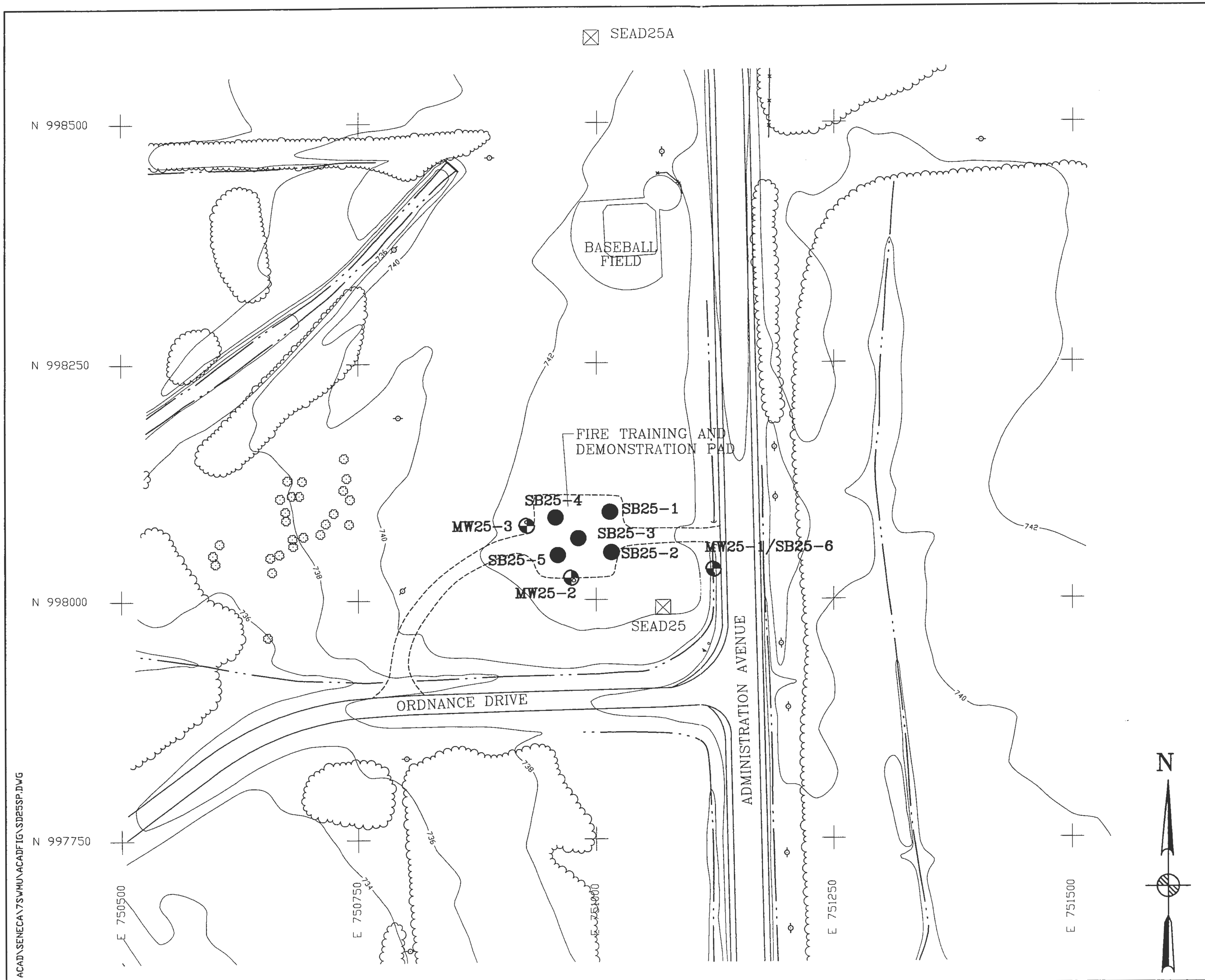


FIGURE 2.7-1
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD
LOCATION OF GEOPHYSICAL SURVEYS



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ROAD SIGN
- DECIDOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- CORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT
- **MONITORING WELL**
- **SURVEY MONUMENT**
- **SOIL BORING**

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	Dwg. No. 720477-02000

FIGURE 2.7-2

SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD
LOCATION OF SAMPLING POINTS

SCALE 1" = 100'	DATE MAY 1995	REV C

Table 2.7-1). Two to three samples from each boring were submitted for chemical analyses identified in Section 2.7.3.

Groundwater

A total of three monitoring wells were installed at this AOC (Figure 2.7-2). One monitoring well (MW25-1) was installed upgradient of the pad to obtain background water quality data, while the remaining two wells were installed adjacent to and downgradient of the pad to determine if hazardous constituents have migrated from the AOC and to determine the direction of groundwater flow. The presumed direction of groundwater flow at this AOC was to the southwest which the geophysical survey confirmed. Monitoring well MW25-3 was moved slightly to the north of the proposed workplan location.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.7.3.

2.7.3 Analytical Program

A total of 17 soil samples and 3 groundwater samples were collected from SEAD-25 for chemical testing. All the samples were analyzed for the following: the TCL VOCs [including methyl tertiary butyl ether (MTBE)], SVOs, and pesticides/PCBs and TAL metals and cyanide according to the NYSDEC CLP SOW. Herbicides were analyzed by EPA Method 8150, nitrates were analyzed by EPA Method 352.2, and Total Recoverable Petroleum Hydrocarbons were analyzed by EPA Method 418.1. A summary of the analytical program for SEAD-25 is presented in Table 2.1-3.

2.8 SEAD-26: FIRE TRAINING PIT AND AREA

Petroleum fuels were staged in the fire training area and burned in the pit in support of fire training activities.

Flammable petroleum fuels were placed on water within the fire pit and ignited. Therefore, constituents in the fuels, in particular the volatile aromatic compounds, may have leached into the subsurface and migrated down to the water table. The primary migration pathways are

TABLE 2.7-1

SEAD-25 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

BORING NUMBER	WELL NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL
SB25-1	Well Not Installed	SB25-1.1	0-2'
		SB25-1.3	4-6'
		SB25-1.4	6-8'
SB25-2	Well Not Installed	SB25-2.1	0-2'
		SB25-2.2	2-4'
		SB25-2.3	4-6'
		SB25-2.4	6-8'
SB25-3	Well Not Installed	SB25-3.1	0-2'
		SB25-3.2	2-4'
		SB25-3.3	4-6'
SB25-4	Well Not Installed	SB25-4.1	0-2'
		SB25-4.2	2-4'
		SB25-4.3	4-6'
SB25-5	MW4-1	SB25-5.1	0-2'
		SB25-5.2	2-4'
		SB25-5.3	4-6'
SB25-6	Well Not Installed	SB25-6.1	0-2'
		SB25-6.2	2-4'
NS	MW25-2	NS	NS
NS	MW25-3	NS	NS

Notes:

NS = Not Sampled

1) The sample number contains the sample location with a soil boring (SB) or monitoring well sample (MW) identifier.
2) All samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, nitrates, and TPH.

expected to be dermal contact and ingestion of soil, ingestion of groundwater, and dermal contact of surface water.

2.8.1 Chemicals of Interest

The primary chemicals of interest are petroleum products, including benzene, toluene and xylenes. Lead may also be a constituent of concern because leaded fuels may have been used. Where waste oil is managed, there is potential for PCB transformer oil and possibly herbicides to be mixed in with it.

2.8.2 Media To Be Investigated

Geophysics

Seismic refraction profiles, 115-feet long, were performed at four locations along two lines (Figure 2.8-1). Data from the surveys was used to determine the direction of groundwater flow, then, when necessary, the location of the monitoring wells were adjusted to locate a well upgradient and a well downgradient of the AOC.

A GPR survey was performed within the fire training area, but not within the fire training pit. The data was collected along eight 1,300-foot-long profiles in the area outlined in Figure 2.8-1. The GPR data was used to detect anomalies and characterize the extent of disturbed soils at the site.

Soils

Borings: A total of four borings were drilled at this AOC (Figure 2.8-2 and Table 2.8-1). One boring (SB26-1) was drilled upgradient of the site and three borings were drilled downgradient of the fire training area. Soil boring SB26-2 is located on the north end of the area. SB26-3 is located directly downgradient of the fire training pit and SB26-4 is located downgradient of the drum storage area. Monitoring wells were installed in each of these completed borings. Two to three samples from each boring were submitted for chemical analyses identifed in Section 2.8.3.

Test Pits: Eight test pits were excavated at anomalies detected during the GPR survey (Figure 2.8-2 and Table 2.8-1). The locations include an area on the southern section near

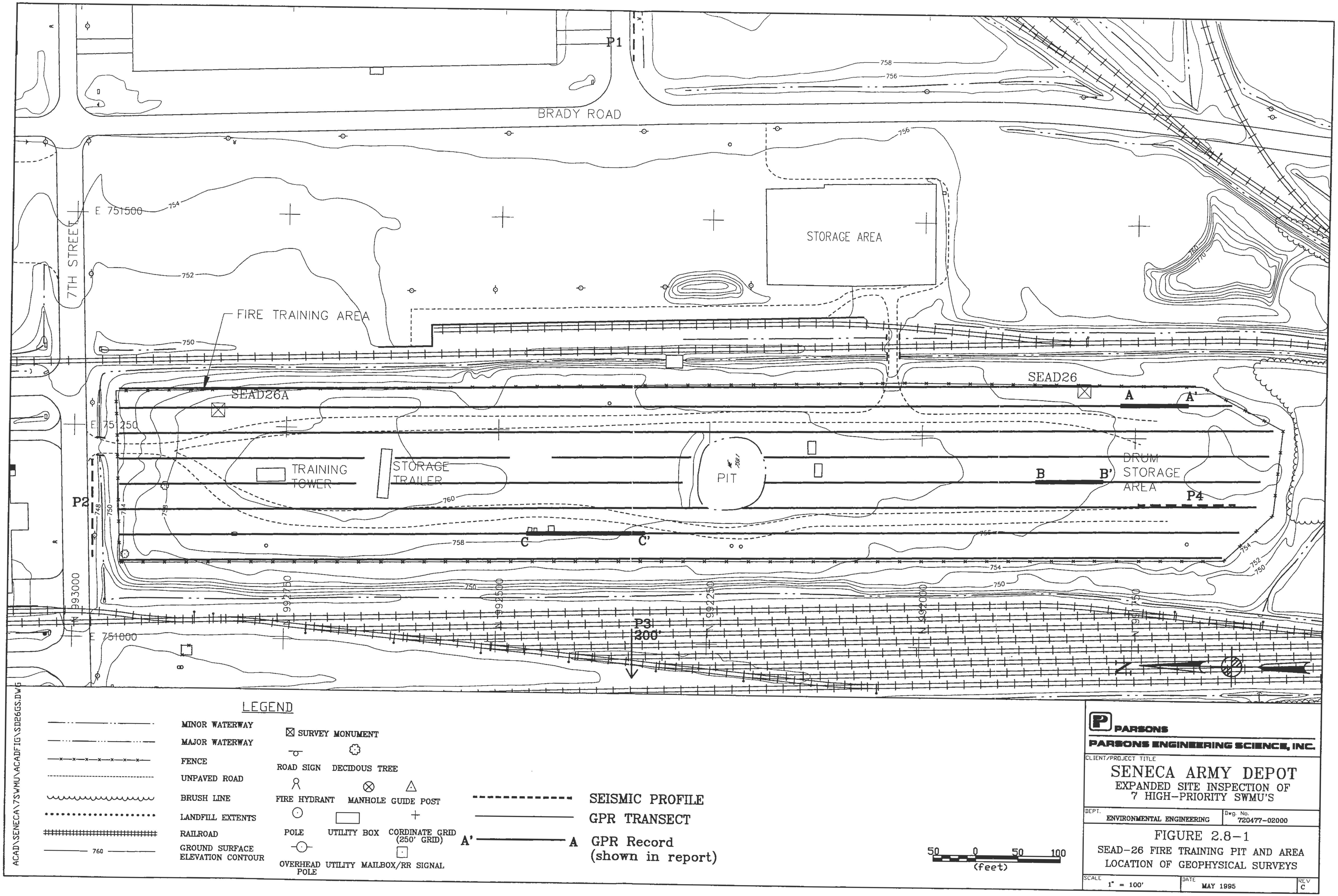
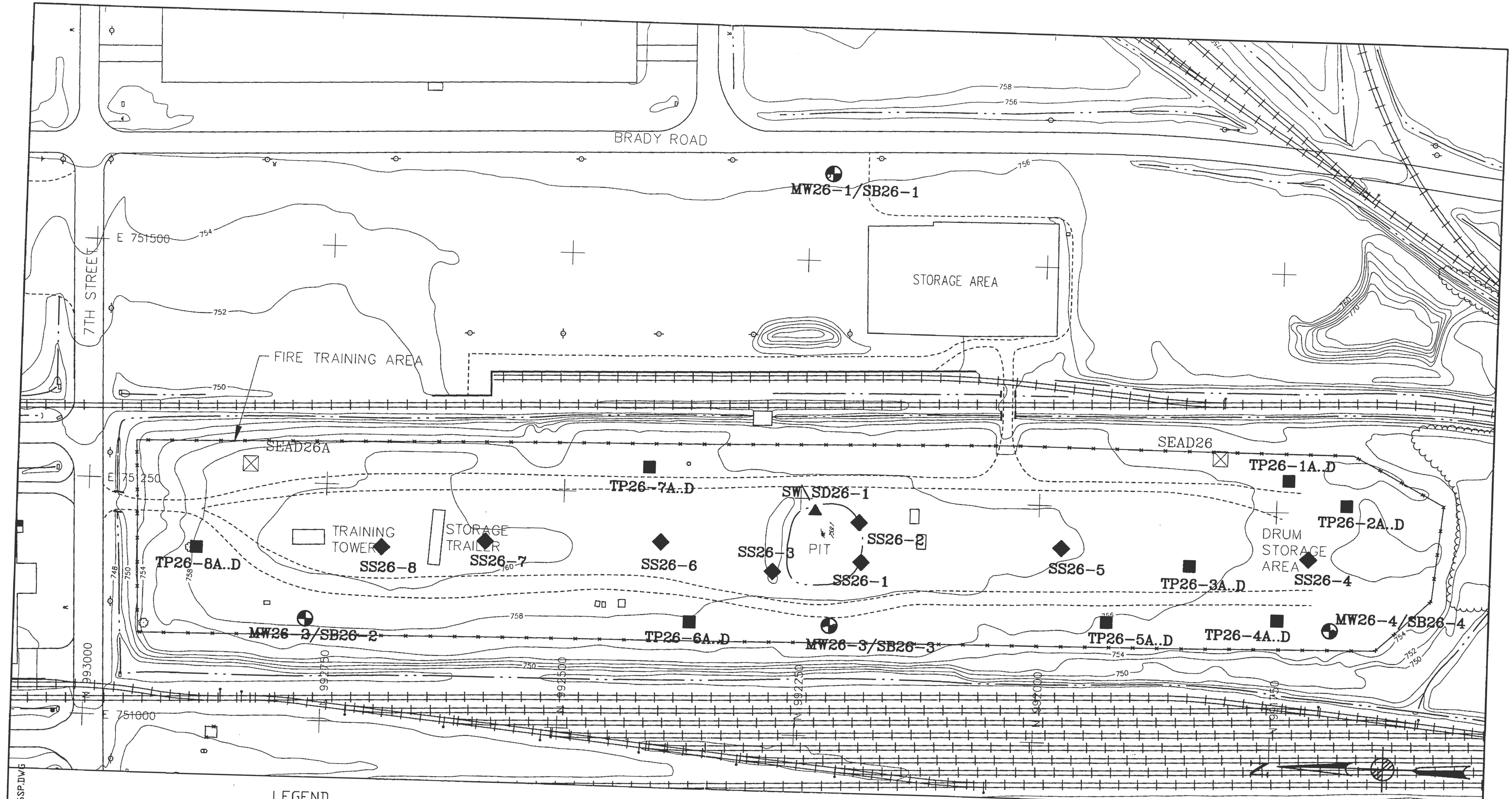


FIGURE 2.8-1
SEAD-26 FIRE TRAINING PIT AND AREA LOCATION OF GEOPHYSICAL SURVEYS



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- CORDINATE GRID (250' GRID)
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MONITORING WELL
- SOIL BORING
- SEDIMENT SAMPLE
- SURFACE SOIL SAMPLE
- SURFACE WATER/SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 2.8-2
SEAD-26 FIRE TRAINING PIT AND AREA LOCATION OF SAMPLING POINTS

SCALE 1" = 100' | DATE MAY 1995 | REV C

TABLE 2.8-1

SEAD-26 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

BORINGS

BORING NUMBER	WELL NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL
SB26-1	MW26-1	SB26-1.1	0-2'
		SB26-1.2	2-4'
SB26-2	MW26-2	SB26-2.1	0-2'
		SB26-2.6	10-12'
		SB26-2.7	12-14'
SB26-3	MW26-3	SB26-3.1	0-2'
		SB26-3.4	6-8'
		SB26-3.6	10-12'
SB26-4	MW26-4	SB26-4.1	0-2'
		SB26-4.2	2-4'
		SB26-4.4	6-8'

TEST PITS

TEST PIT NUMBER	SAMPLING COMMENTS	SAMPLE NUMBER	SAMPLE DEPTH
TP26-1	Grab Sample	TP26-1.1	0-8"
	Grab Sample	TP26-1.2	6.5-7'
TP26-2	Grab Sample	TP26-2.1	0-8"
	Grab Sample	TP26-2.2	5.5'
TP26-3	Grab Sample	TP26-3.1	0-12"
	Grab Sample	TP26-3.2	6.5-7'
TP26-4	Grab Sample	TP26-4.1	0-8"
	Grab Sample	TP26-4.2	4.5'
TP26-5	Grab Sample	TP26-5.1	0-13"
	Grab Sample	TP26-5.2	5.8-6.5'
TP26-6	Grab Sample	TP26-6.1	0-8"
	Grab Sample	TP26-6.2	5.6'
TP26-7	Grab Sample	TP26-7.1	0-8"
	Grab Sample	TP26-7.2	5.6-6'
TP26-8	Grab Sample	TP26-8.1	0-8"
	Grab Sample	TP26-8.2	6-6.5'

Notes:

NS = Not Sampled
1) The sample number contains the sample location with a soil boring (SB), monitoring well (MW), or test pit (TP) identifier.
2) All samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, nitrates, and TPH.

the drum storage area, near the fire training pit, and on the northern section near the entrance gate. A total of two soil samples were collected from each test pit.

Surface Soils: Eight surface soil samples were collected within the fence of the fire training area (Figure 2.8-2). Three samples (SS26-1 to 26-3) were obtained at the perimeter of the fire training pit. Sample SS26-4 was located within the drum storage area at the southern end of the fenced area and Sample SS26-5 was located downgradient of the drum storage area. Samples SS26-6 and SS26-7 were located north of the pit in an area which had stressed vegetation and burned vehicles. Sample SS26-8 was located near the tower. The surface soil samples were collected from the 0 to 2 inch depth.

Groundwater

Four wells were installed at SEAD-26, one upgradient (MW26-1) for background water quality data and three adjacent and downgradient (refer to Figure 2.8-2) to determine the groundwater flow direction and determine if hazardous constituents have migrated from the SWMU. The presumed direction of groundwater flow at this AOC was to the southwest. The goephyscial survey showed the direction to be more to the west. Adjustments to the location of monitoring wells were based upon the seismic survey to assure wells were placed in upgradient and downgradient locations.

Monitoring well MW26-2 was located on the north end of the SWMU downgradient of the fire training building, MW26-3 was located downgradient of the pit, and MW26-4 was located on the south end of the SWMU downgradient of the drum storage area.

One monitoring well was constructed at each location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.8.3.

Oil, Surface Water, and Sediment

Two samples were obtained from the fire training pit: one of the surface water (SW26-1), and one of the sediment at the bottom of the pit (SD26-1) (refer to Figure 2.8-2). These samples were analyzed for the parameters listed in Section 2.8.3. No oil sample was obtained as outlined in the workplan because no oil was present on the water in the pit at the time of sampling.

2.8.3 Analytical Program

A total of 35 soil samples, three groundwater samples, one sediment sample, and one surface water sample were collected from SEAD-26 for chemical testing. All these samples were analyzed for the following: the TCL VOCs (including MTBE), SVOs, pesticides/PCBs and TAL metals and cyanide according to the NYSDEC CLP SOW. Herbicides were analyzed by EPA Method 8150, nitrates were analyzed by EPA Method 352.2, and Total Recoverable Petroleum Hydrocarbons were analyzed by EPA Method 418.1. A summary of the analytical program for SEAD-26 is presented in Table 2.1-3.

2.9 SEAD-45: OPEN DETONATION FACILITY

Based on the operating practices at SEAD-45, metals, nitrates, and explosive compounds have the potential to be adsorbed into the soil or to migrate to the water table.

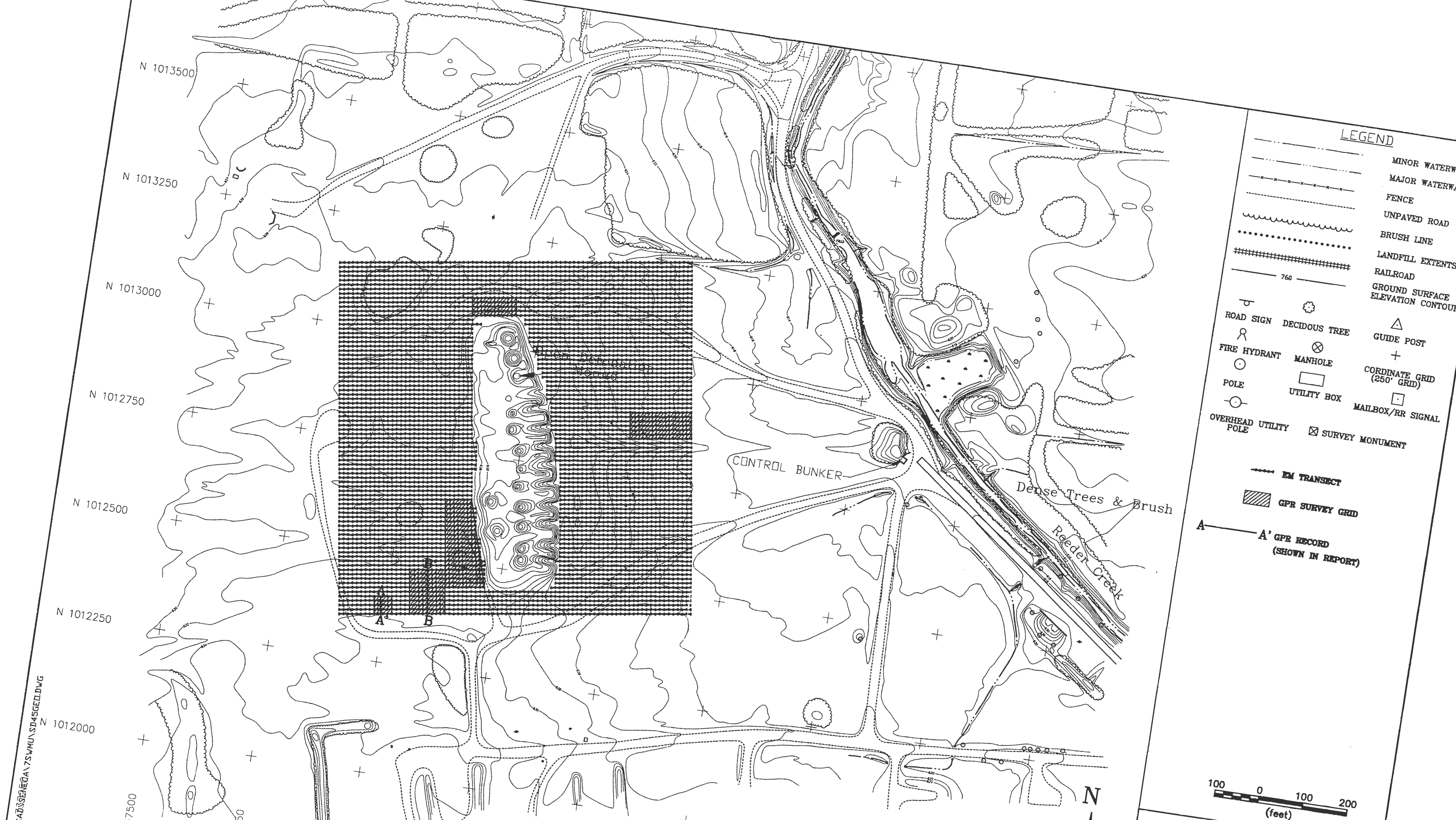
2.9.1 Chemicals of Interest

The primary chemicals of interest are heavy metals, explosive compounds, and nitrates.

2.9.2 Media To Be Investigated

Geophysics

To evaluate the potential for buried unexploded ordinance at the OD ground, GPR and EM-31 surveys were performed in the area surrounding the elongate detonation hill (Figure 2.9-1). The electromagnetic data was collected along profiles spaced at 10-foot intervals with readings spaced every 5 feet along each profile. Where the electromagnetic data indicated anomalies possibly associated with buried metallic objects, a subsequent ground-penetrating survey was performed to characterize the anomaly source. Approximately 310 feet of GPR profiles were acquired and 27,800 feet of EM data was collected. A total of 10 test pits were excavated to observe the types of buried metallic objects present at this AOC.



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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg. No.
720477-02000
FIGURE 2.

Soils

Test Pits: A total of fifteen test pits were excavated at SEAD-45 (Figure 2.9-2 and Table 2.9-1). Five test pits were excavated in the open detonation mound and one soil sample, at a 3 foot depth, was obtained from each of these test pits for chemical analysis. Ten test pits were excavated on the north and west edges of the mound and in the field on the east of the mound. These ten locations were at the site of anomalies detected during the geophysical survey and were exploratory only.

Surface Soils: Nine surficial soil samples at 0 to 2 inch depths, were obtained from locations east and west of the ten open detonation pits (Figure 2.9-2). Chemical analysis of these samples were used to evaluate the effect of wind-blown material from the pits on the environment in the two prominent wind directions, east and west.

Soil quality data was compared to background soil quality data obtained during the RI investigation at the adjacent Open Burning grounds.

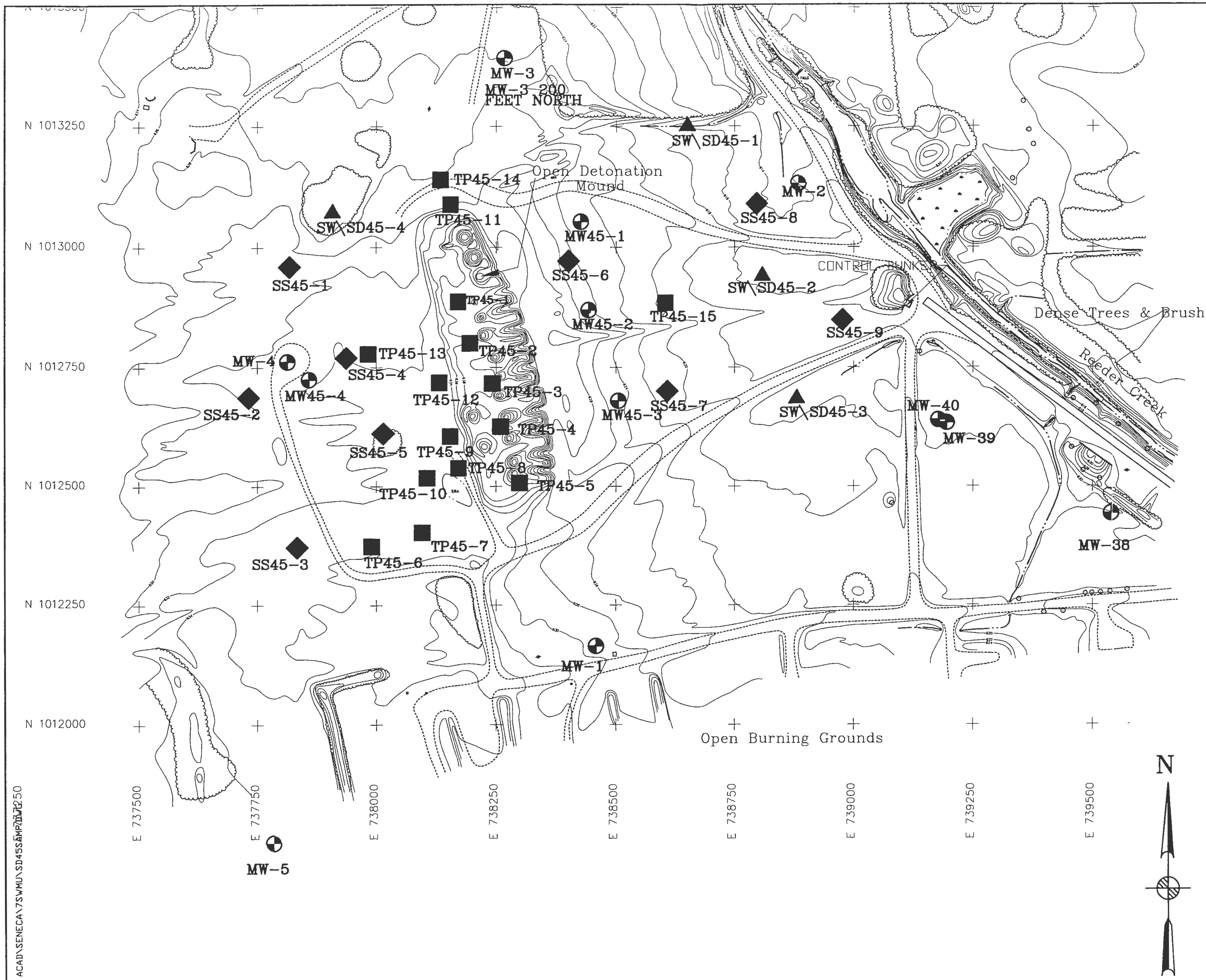
Groundwater

Four wells were installed at SEAD-45. One well (MW45-4) was located upgradient of the mound to obtain background water quality data and three wells were located downgradient of the detonation mound as shown on Figure 2.9-2. The direction of groundwater flow at this AOC is northeast to east toward Reeder Creek based on data from the existing wells.

One monitoring well was constructed at each location and screened over the entire thickness of the aquifer above competent bedrock. MW45-1 was found to be a dry well. Following installation and development, one groundwater sample was collected from MW45-2, 3, & 4. Existing wells MW-1 through MW-5 were also sampled with the three new wells.

Surface Water and Sediment

A surface water sample and a sediment sample were collected at the same sampling point from each of four locations at SEAD-45. Three sets of samples (SW/SD 45-1, 2, and 3) were collected from three drainage channels east of the detonation mound. One set (SW/SD45-4) was collected from within the marsh area northwest of the detonation mound as shown in Figure 2.9-2. Surface water and sediment quality data will be compared to background



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- ROAD SIGN
- DECIDOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- CORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT
- MONITORING WELL
- SOIL BORING
- SURFACE SOIL SAMPLE
- SURFACE WATER/SEDIMENT SAMPLE
- TEST PIT

100 0 100 200
(feet)

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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 2.9-2
SEAD-45 OPEN DETONATION GROUNDS
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 200'	MAY 1995	C

TABLE 2.9-1

SEAD-45 TEST PIT SAMPLING SUMMARY

SENECA ARMY DEPOT
7 AOCs

TEST PIT NUMBER	SAMPLING COMMENTS	SAMPLING DEPTH
TP45-1	Grab Sample	3'
TP45-2	Grab Sample	3'
TP45-3	Grab Sample	3'
TP45-4	Grab Sample	3'
TP45-5	Grab Sample	3'
TP45-6	Not Sampled - confirmed geophysical anomoly	NS
TP45-7	Not Sampled - confirmed geophysical anomoly	NS
TP45-8	Not Sampled - confirmed geophysical anomoly	NS
TP45-9	Not Sampled - confirmed geophysical anomoly	NS
TP45-10	Not Sampled - confirmed geophysical anomoly	NS
TP45-11	Not Sampled - confirmed geophysical anomoly	NS
TP45-12	Not Sampled - confirmed geophysical anomoly	NS
TP45-13	Not Sampled - confirmed geophysical anomoly	NS
TP45-14	Not Sampled - confirmed geophysical anomoly	NS
TP45-15	Not Sampled - confirmed geophysical anomoly	NS

Notes:

NS = Not Sampled

1) The sample number contains the sample location with a test pit (TP) identifier.

2) All samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, herbicides, explosives, and nitrates.

surface water and sediment data obtained during the RI investigation at the adjacent open burning grounds.

2.9.3 Analytical Program

Fourteen soil samples, eight groundwater samples, four surface water samples and four sediment samples were collected from SEAD-45 for chemical testing. All the samples were analyzed for the following: the TCL VOCs, SVOs, and pesticides/PCBs and TAL metals and cyanide according to the NYSDEC CLP SOW. Explosive compounds were analyzed by EPA Method 8330, herbicides were analyzed by EPA Method 8150, and nitrates were analyzed by EPA Method 352.2. A summary of the analytical program for SEAD-45 is presented in Table 2.1-3.

3.0 GEOLOGICAL, GEOPHYSICAL, AND HYDROLOGICAL SETTING

3.1 SEAD-4: MUNITIONS WASHOUT FACILITY LEACHFIELD

3.1.1 Geology

Based on the results of the drilling program, till and calcareous shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. In most of the borings, a very thin soil horizon was observed with till present at most locations within one foot of the ground surface. The depths of the borings at this site were up to 10.5 feet below the ground surface.

The till is light brown and composed of silt and clay, with some black shale fragments (up to 0.25 inches in diameter); however, larger shale fragments (rip-up clasts) were observed at many locations near the till/weathered shale contact. Some areas of oxidized till were noted in the upper portion of the till strata.

Competent, calcareous black shale was encountered at depths between approximately 4 and 10.5 feet below the ground surface at the Munitions Washout Facility. The elevations of the competent bedrock determined during the drilling and seismic programs indicate that the shale slopes to the west mimicking the land surface. The upper portion of the competent shale (0.2 to 2.5 feet) is weathered.

3.1.2 Geophysics

3.1.2.1 Seismic Survey

The results of the seismic refraction survey conducted in SEAD-4 are shown in Table 3.1-1. The seismic profiles detected 5 to 15 feet of till (1,000-7,700 feet/second) overlying bedrock (12,000-14,000 ft/s). In particular, the unconsolidated material included unsaturated till (1,000-1,400 ft/s), compact unsaturated till (3,500-4,200 ft/s), and saturated till (5,000-7,700 ft/s).

Saturated till was only detected beneath profile P4 near the pond. At the locations of the other profiles, either saturated till was not present or the saturated layer was too thin to be detected by the seismic refraction method. Profiles P2 and P3 suggest that a layer of compact, unsaturated till is present at a depth of 1 to 3 feet.

TABLE 3.1-1
SEAD-4 EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elev.[2]	W.T./Till[3]		Bedrock	
			Depth	Elev.	Depth	Elev.
P1	0	117.8			5.4	112.4
	57.5	117.5			6.3	111.2
	115	117.7			5.4	112.3
P2	0	113.4	2.6	110.8	7.6	105.8
	57.5	113.4	2.5	110.9	7.2	106.2
	115	113.0	1.5	111.5	6.1	106.9
P3	0	116.3	2.5	113.8	9.5	106.8
	57.5	116.6	1.6	115.0	10.4	106.2
	115	117.1	1.7	115.4	11.4	105.7
P4	0	104.1	3.5	100.6	12.5	91.6
	57.5	102.1	4.3	97.8	14.5	87.6
	115	100.0	3.5	96.5	9.2	90.8

[1]All distances are in feet.
[2]All elevations are relative to a temporary benchmark and are in feet.
[3]Water table or dense glacial till

A review of the relative elevation of bedrock, presented in Table 3.1-1, demonstrates that the bedrock surface slopes to the west or southwest following the slope of the surface topography. Groundwater flow is also expected to be directed to the west or southwest, following the slope of the relatively impermeable bedrock surface.

3.1.2.2 EM-31 Survey

An EM-31 survey was conducted in the following three areas: the vicinity of the former washout plant, the suspected leach field, and the drainage pipe leading west to the man-made pond. The quadrature response from the suspected leach field (Figure 3.1-1) clearly shows the more conductive road bed and the effects of the two concrete tanks. Otherwise, the apparent conductivity (quadrature response) of the ground is extremely uniform in this area. The in-phase response shows a greater variability, perhaps suggestive of disrupted ground.

The quadrature response in the area of the former munitions washout plant is dominated by the linear signatures of buried pipes. Four pipes are clearly visible. Large anomalies in the south and east corners of this grid are due to reinforced concrete pads. The pipes are also evident in the in-phase response (Figure 3.1-2); however, this parameter exhibits considerably more variability, perhaps due to disturbed soil and buried metallic debris.

The EM lines acquired between the road and the pond failed to detect any significant anomalies. Both EM parameters exhibit very little variability, suggesting that the soil is relatively uniform and undisturbed. The clay pipe which discharges into the pond was not detected.

3.1.2.3 GPR Survey

GPR surveys were also conducted in the three areas investigated by the EM method. The depth of penetration was limited to about 3 to 5 feet due to the abundance of electrically conductive clay in the till.

The GPR survey conducted in the vicinity of the former munitions washout plant detected numerous anomalous responses that may be classified as linear anomalies, point source anomalies, and stratigraphic anomalies. Some of the linear anomalies correspond to segments of buried pipes detected by the EM-31 survey. Point source anomalies are very common to the GPR method. Such anomalies may be attributed to buried metallic debris, construction

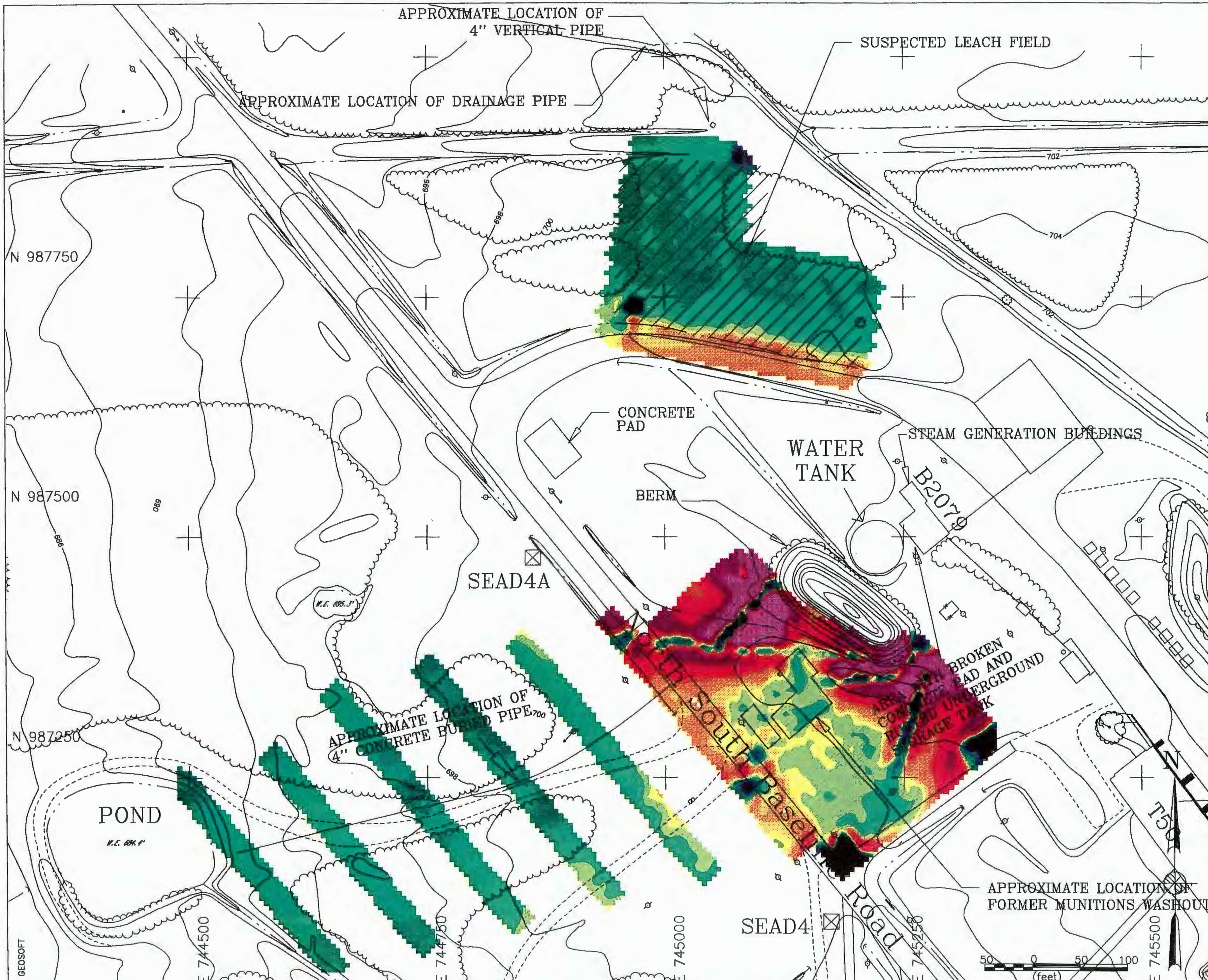

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FIGURE 3.1-1
SEAD-4 MUNITIONS WASHOUT FACILITY
EM SURVEY, QUADRATURE RESPONSE

SCALE 1" = 100' | DATE MAY 1995 | REV C

debris, boulders, or local inhomogeneities in the soil. Stratigraphic anomalies are typically evidenced by disruption of layering of the soil or by local changes in the electrical properties of the soil. Stratigraphic anomalies are typically caused by excavation and backfilling, although natural variation in the composition of glacial till may produce such effects.

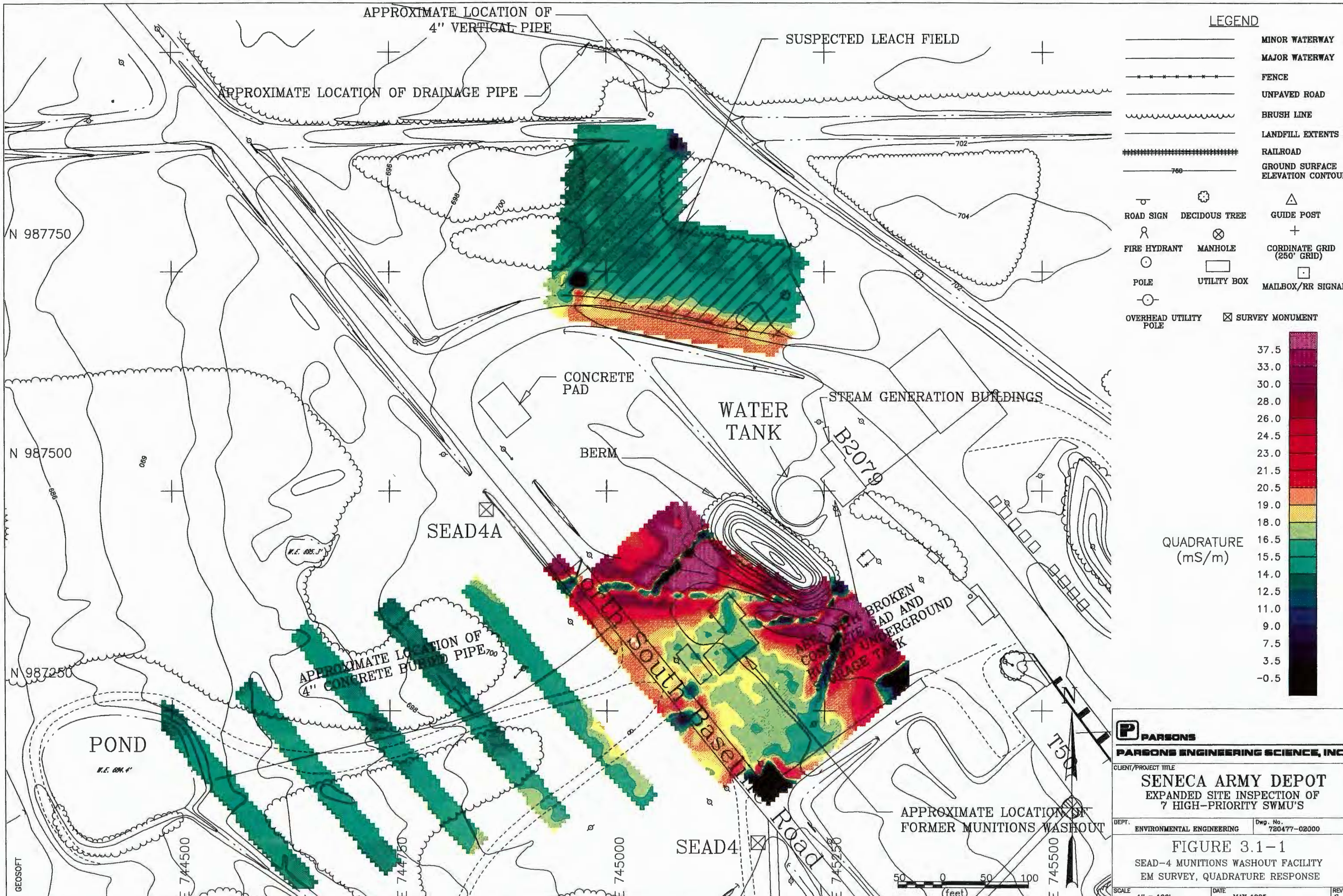
Figure 3.1-3 shows the GPR record acquired across profile A-A' shown in Figure 2.3-1. The left half of the record shows limited penetration of only about 15 nanoseconds (ns) or about 3 feet. The right half of the profile shows 6 to 8 hyperbolic anomalies located at about 10 ns (2 feet), reverberating to a time of about 30 ns. This record is characteristic of the GPR survey conducted in this grid. Areas of abundant hyperbolic anomalies are interspersed with areas of limited penetration. Some of the hyperbolic anomalies can be correlated from line to line (linear anomalies) but most appear to be isolated sources.

The GPR survey conducted in the area of the suspected leach field detected an anomalous zone parallel to the road in the main section of the grid. This zone is characterized by strong banding and reverberation throughout the record. An example of the response is shown in profile B-B' from about 55 to 80 feet (Figure 3.1-4) along the length of the profile. No pronounced linear anomalies or pipes were detected in this area.

The GPR profiles between the road and the pond did not detect any continuous anomalies that could be attributed to the 6-inch clay pipe that terminates at the pond. Several strong hyperbolic anomalies were observed in the transect along the road; however, none of these features could be traced away from the road. The GPR records acquired in this area were conspicuously devoid of anomalous responses.

3.1.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography including the network of drainage swales on the site; a settling pond in the western part of the site is the only sustained surface water body. Within the developed eastern area of the site, surface water flow is believed to be controlled mainly by the small drainage swales that parallel the roadways. Also, any surface water that does not flow into one of the drainage swales along the roads is captured by the perimeter drainage swale that surrounds the site to the north, east, and south. Surface water flow in the northern perimeter drainage swale may be affected by the contribution of water from a discharge pipe embedded in a concrete berm north of the leach field. A small area in the extreme south-southeastern portion of the site is believed to


APPROXIMATE LOCATION OF 4" VERTICAL PIPE
SUSPECTED LEACH FIELD
APPROXIMATE LOCATION OF DRAINAGE PIPE
N 987750
N 987500
N 987250
CONCRETE PAD
WATER TANK
STEAM GENERATION BUILDINGS
B2079
BERM
SEAD4A
SEAD4
POND
APPROXIMATE LOCATION OF 4" CONCRETE BURIED PIPE
AREA WITH BROKEN CONCRETE PAD AND BURIED UNDERGROUND STORAGE TANK
North South Baseline Road
APPROXIMATE LOCATION OF FORMER MUNITIONS WASHOUT
T50
E 744500
E 744750
E 745000
E 745250
E 745500
50 0 50 100
(feet)
GEOSOFT
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
QUADRATURE (mS/m)
37.5
33.0
30.0
28.0
26.0
24.5
23.0
21.5
20.5
19.0
18.0
16.5
15.5
14.0
12.5
11.0
9.0
7.5
3.5
-0.5
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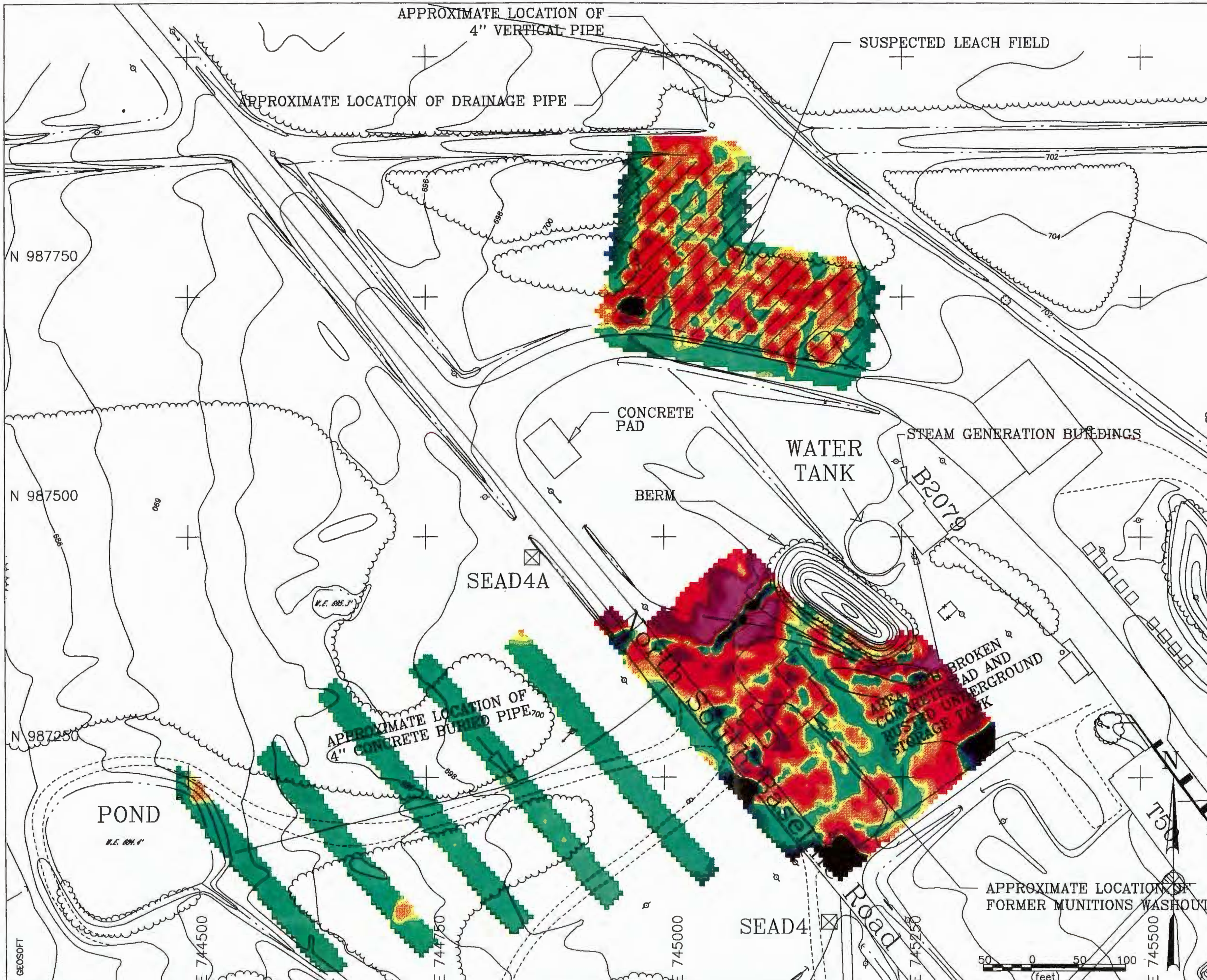
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000
FIGURE 3.1-1
SEAD-4 MUNITIONS WASHOUT FACILITY
EM SURVEY, QUADRATURE RESPONSE
SCALE 1" = 100'
DATE MAY 1995
REV C



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EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

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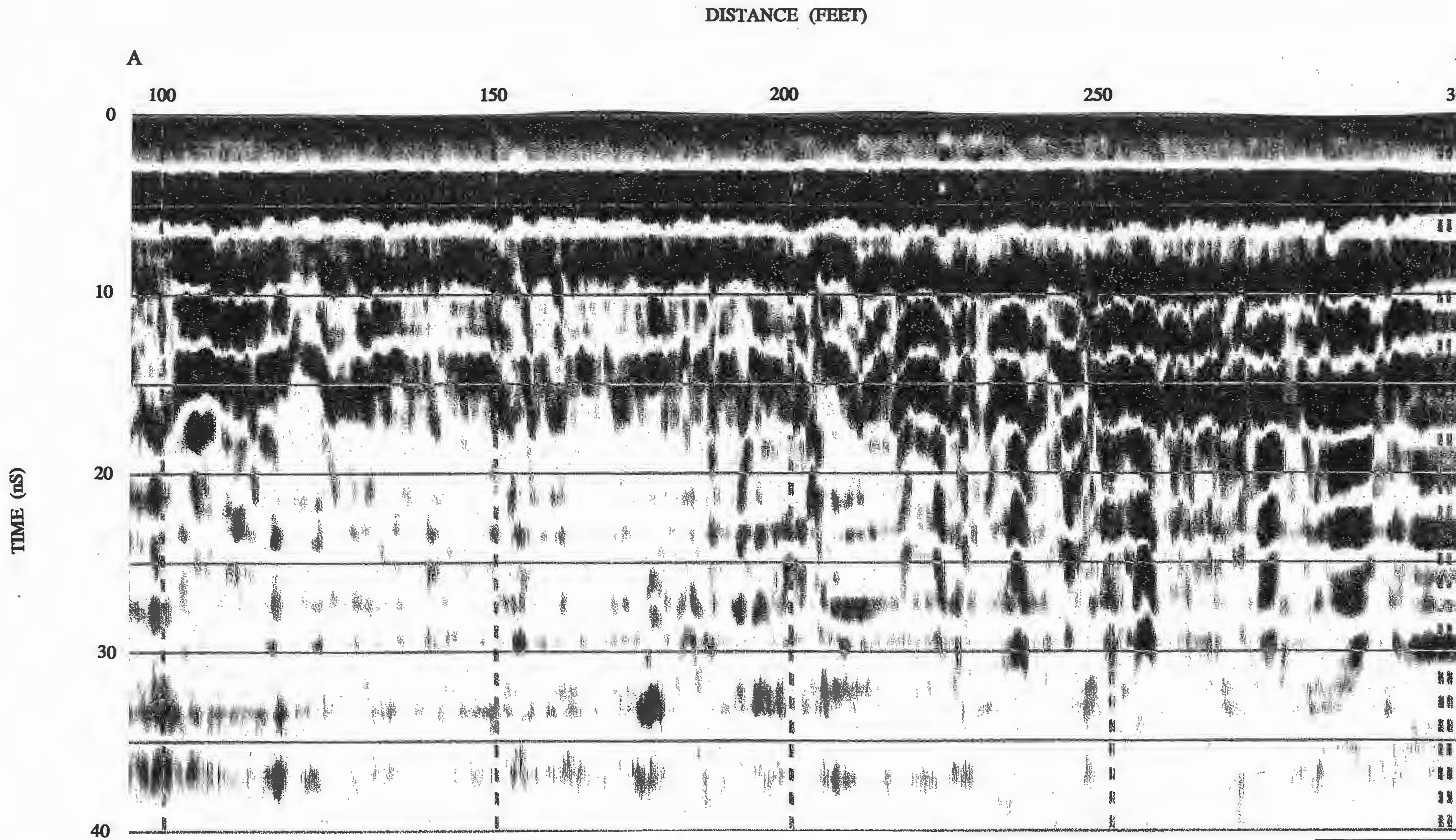
FIGURE 3.1-2
SEAD-4 MUNITIONS WASHOUT FACILITY
EM SURVEY, IN-PHASE RESPONSE

SCALE 1" = 100' | DATE MAY 1995 | REV C



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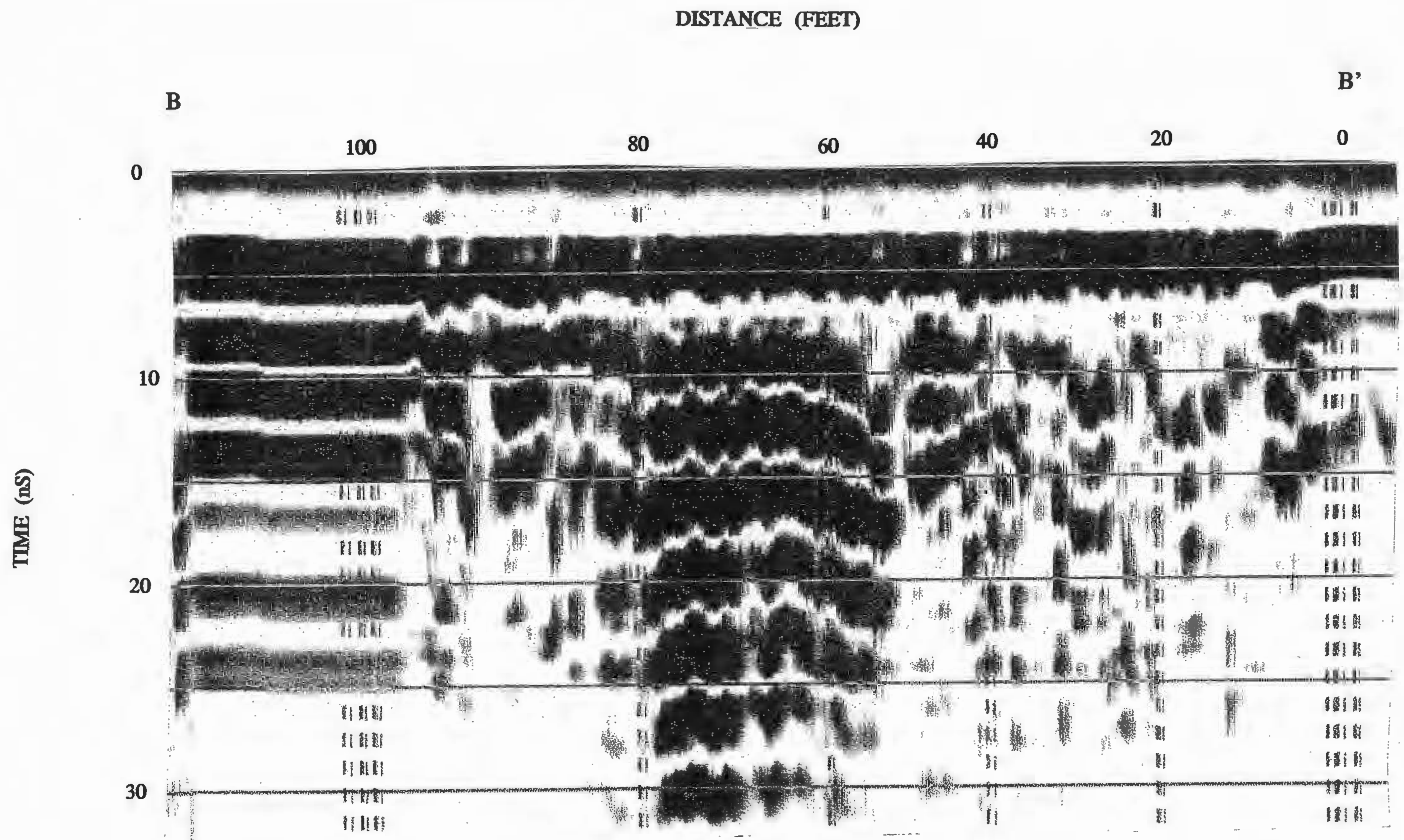
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	NO. 720477-02000

FIGURE 3.1-3. SEAD-4
GPR PROFILE A-A'

SCALE



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CLIENT/PROJECT TITLE SENECA ARMY DEPOT EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S	
DEPT. ENVIRONMENTAL ENGINEERING	NO. 720477-02000
FIGURE 3.1-4. SEAD-4 GPR PROFILE B-B'	
SCALE	

have a southeasterly surface water flow direction via drainage swales along North-South Baseline Road and the SEDA railroad tracks.

In the undeveloped portion of the site west of North-South Baseline Road surface water flow over the grasslands is not controlled by defined drainage pathways, with the exception of the large perimeter drainage swale to the west; any surface water that flows into this swale would be directed north into the settling pond. The settling pond also receives water that drains from a 4-inch clay pipe that originates at the location of the former munitions washout building. There is an overflow PVC pipe located in the western bank of the pond which would divert water from the pond to an area immediately to the west if the water level were to rise above it. There is network of small drainage swales west of the pond which eventually discharge into a well defined west-draining swale in the southern part of the site.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on the groundwater elevations measured in five monitoring wells on April 4, 1994 (Table 3.1-2 and Figure 3.1-5). Due to the large size of the site and the relatively few well locations, only a general flow direction could be determined for the site. It is likely that there may be local variations in the flow direction and gradient. The noticeable steepening of the land surface gradient in the western portion of the site when compared to the eastern portion is, in all likelihood, also present in the groundwater gradient across the site. The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil, and in most instances the deeper weathered shale horizons are saturated. Recharge of water to the monitoring wells during sampling was generally fair to poor.

3.2 SEAD-16: BUILDING S-311 ABANDONED DEACTIVATION FURNACE

3.2.1 Site Geology

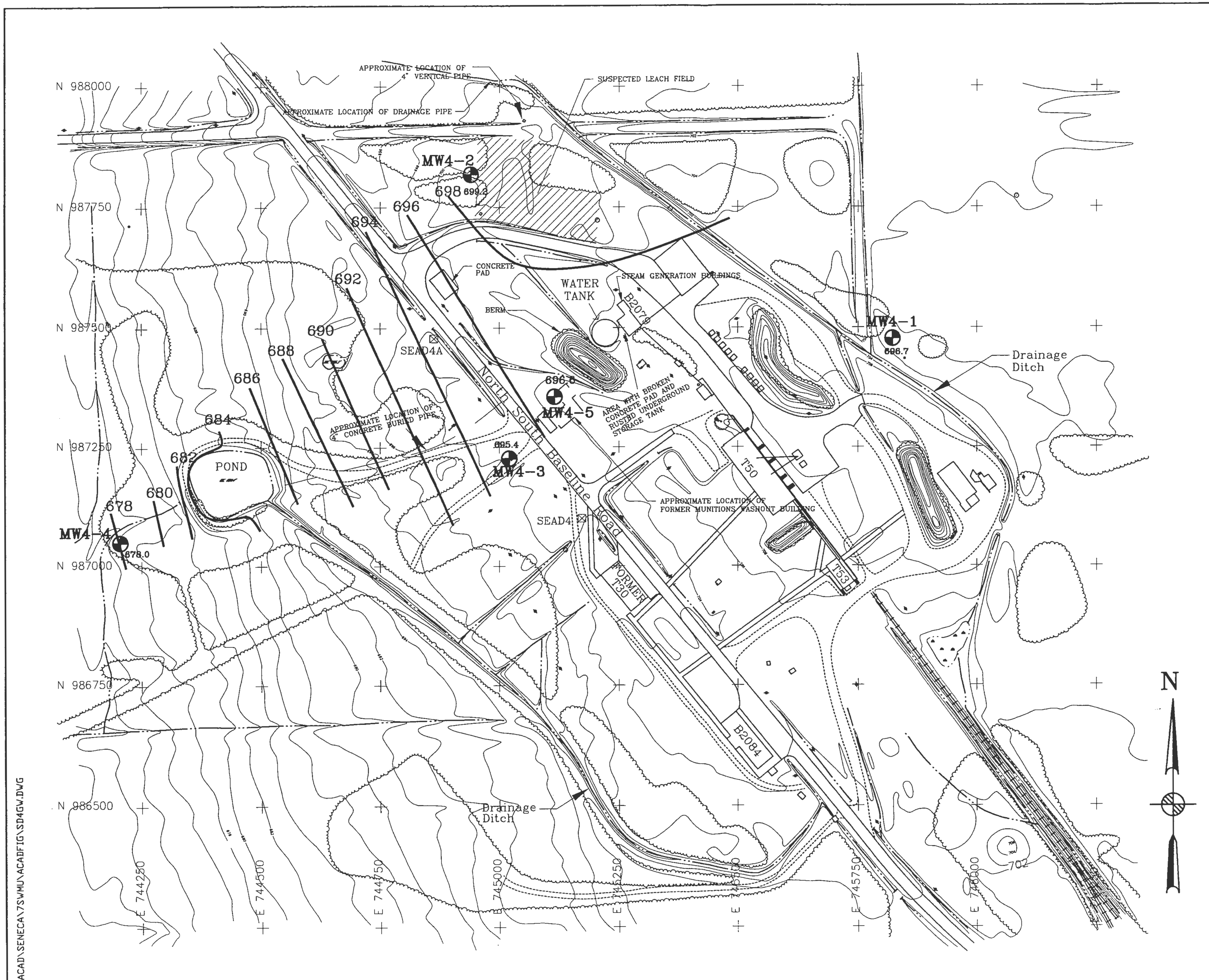
Based on the results of the drilling program, till and calcareous black shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. In most of the borings, a very thin soil horizon was observed with till present at most locations within one foot of the ground surface. The depths of the borings at this site were up to 6.0 feet below the ground surface.

In the unpaved eastern portion of the site, a thin layer of fill (from 0 to 0.4 feet) was observed in boring MW16-1. Coal chips and brick shards were also present in the split spoon

TABLE 3.1–2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD–4

G	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROU ELE (
	700.12	12/16/93	6.44	693.68	1/21/94	5.24	694.88	4/4/94	3.45	
	702.44	11/20/93	4.53	697.91	2/4/94	4.87	697.57	4/4/94	3.28	
	699.90	11/20/93	4.62	695.28	1/20/94	7.06	692.84	4/4/94	4.47	
	680.37	12/18/93	2.76	677.61	1/31/94	2.76	677.61	4/4/94	2.38	
	700.46	12/18/93	5.72	694.74	1/20/94	7.14	693.32	4/4/94	3.91	



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ROAD SIGN
- DECIDOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- CORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT
- MW26-1 748.3 MONITORING WELL WITH WATER TABLE ELEVATION
- 744 GROUNDWATER ELEVATION CONTOUR

NOTES

1. MONITORING WELL WATER LEVEL SURVEY DATE: 4/4/94
2. GROUNDWATER CONTOUR ELEVATION DATUM IS NGVD OF 1929

100 0 100 200
(feet)

PARSONS
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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 3.1-5
SEAD-4 MUNITIONS WASHOUT FACILITY GROUNDWATER ELEVATION MAP

SCALE 1" = 200' | DATE MAY 1995 | REV C

sample. The till in this boring was light brown to yellow-brown and composed of fine sand, silt, and clay, with some black shale fragments (up to 0.25 inches in diameter): however, larger shale fragments were observed near the till/weathered shale contact. Some areas of oxidized till were noted in the upper portion of the till strata.

In the paved western portion of the site the stratigraphy varies slightly from the normal. In both borings MW16-2 and MW16-3 a crushed shale bed was encountered immediately below the asphalt (0.4 to 2 feet below the ground surface). The crushed shale is believed to represent a portion of an old road that existed near the loading docks on the western side of the building. Till was observed in only one of the borings (MW16-3) from 2.3 to 3.0 feet below the ground surface. In boring MW16-2 the crushed shale bed directly overlies the weathered shale. It is likely that the till was scraped from this area prior to laying the crushed shale roadway.

Competent, calcareous black shale was encountered at depths between approximately 2 and 4 feet below the ground surface. The thickness of the weathered shale is between 1 and 2 feet on-site.

3.2.2 Geophysics

The results of the seismic refraction survey conducted in SEAD-16 are shown in Table 3.2-1. The seismic profiles detected from 2 to 8.5 feet of till (1200 to 3500 ft/s) overlying bedrock (11,500 to 13,000 ft/s). Saturated till was not detected at this site. Either the water table was situated within the bedrock, or the thickness of saturated till was small (<2 feet). In these situations, the seismic refraction method is incapable of detecting the water table.

The bedrock elevation, as determined from the seismic refraction survey, does not exhibit a consistent slope. Therefore, at SEAD-16, the slope of the bedrock does not provide a reliable means of estimating the direction of groundwater flow.

3.2.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the grass-covered eastern portion of the site, surface water likely accumulates in local topographic low areas. Near the survey monuments SEAD16-1 and SEAD16-2, surface water

TABLE 3.2-1
SEAD-16 EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elev.[2]	Bedrock	
			Depth	Elev.
P1	0	100.0	3.0	97.0
	57.5	100.0	6.0	94.0
	115	99.7	7.3	92.4
P2	0	99.5	5.5	94.0
	57.5	99.7	2.3	97.4
	115	100.2	3.2	97.0
P3	0	99.0	4.1	94.9
	57.5	99.0	4.2	94.8
	115	99.0	4.2	94.8
P4	0	99.3	6.5	92.8
	57.5	100.1	8.5	91.6
	115	100.6	4.9	95.7

[1]All distances are in feet.

[2]All elevations are relative to a temporary benchmark and are in feet.

is directed off-site to the southeast and northwest, respectively, via small drainage swales. In the paved western portion of the site, the asphalt provides an impenetrable surface which results in an increased amount of surface water runoff on the site. Based on topographic expression, surface water flow on the asphalt is to the west.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west-southwest based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3.2-2 and Figure 3.2-1). The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and, in most instances, the deeper weathered shale horizons are saturated. Recharge of water to the monitoring wells during sampling was generally good.

3.3 SEAD-17: BUILDING 367 EXISTING DEACTIVATION FURNACE

3.3.1 Site Geology

Based on the results of the drilling program, till and calcareous black shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. In most of the borings, a very thin soil horizon was observed with till present at most locations within one foot of the ground surface. The depths of the borings at this site were up to 8.5 feet below the ground surface.

The till is light brown and composed of silt and clay, some fine sand and some black shale fragments (up to 0.25 inches in diameter); however, larger shale fragments (rip-up clasts) were observed at many locations near the till weathered shale contact. Areas of oxidized till were noted in the upper portion of the till strata.

Competent, calcareous black shale was encountered at depths between approximately 2.5 and 6.6 feet below the ground surface. The elevations of the competent bedrock, as determined during the drilling and seismic programs, indicate that the shale slopes to the west mimicking the land surface. The upper portion of the competent shale (2 to 2.5 feet) is weathered.

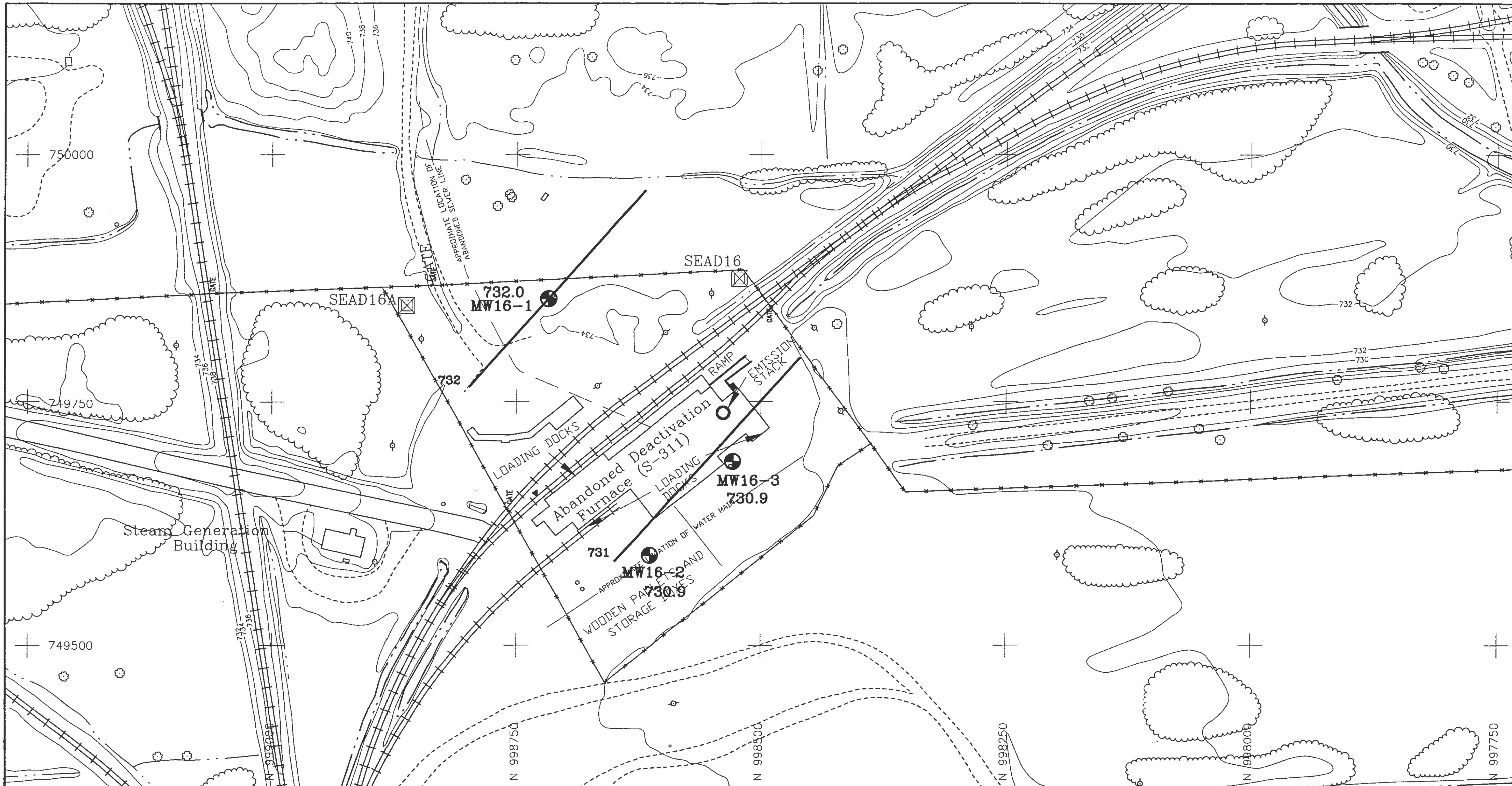
3.3.2 Seismic Survey

The results of the seismic refraction survey conducted in SEAD-17 are presented in Table 3.3-1. The seismic profiles detected 4 to 7 feet of till (1,100 to 1,400 ft/s) overlying bedrock

TABLE 3.2-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-16

NG	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROU ELE
	735.54	11/5/93	4.4	731.14	11/19/93	3.40	732.14	4/4/94	3.52	
	734.56	11/5/93	3.72	730.84	11/17/93	3.54	731.02	4/4/94	3.65	
	735.48	11/4/93	4.52	730.96	11/17/93	4.22	731.26	4/4/94	4.60	



ACAD\SENECA\7SWMU\ACADFIG\SD16SI.DWG

LEGEND

MINOR WATERWAY

MAJOR WATERWAY

FENCE

UNPAVED ROAD

BRUSH LINE

LANDFILL EXTENTS

RAILROAD

760 GROUND SURFACE ELEVATION CONTOUR

SURVEY MONUMENT

ROAD SIGN

DECIDOUS TREE

FIRE HYDRANT

MANHOLE

GUIDE POST

POLE

UTILITY BOX

CORDINATE GRID (250' GRID)

OVERHEAD UTILITY POLE

MAILBOX/RR SIGNAL

MW26-1 748.3 MONITORING WELL WITH WATER TABLE ELEVATION

744 GROUNDWATER ELEVATION CONTOUR

NOTES
1. MONITORING WELL WATER LEVEL SURVEY DATE: 4/4/94
2. GROUNDWATER CONTOUR ELEVATION DATUM IS NGVD OF 1929

50 0 50 100 (feet)

N

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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 3.2-1

SEAD-16 ABANDONED DEACTIVATION FURNACE GROUNDWATER ELEVATION MAP

SCALE 1" = 100' | DATE MAY 1995 | REV C

TABLE 3.3-1
SEAD-17 EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elev.[2]	Bedrock Depth	Bedrock Elev.
P1	0	99.0	6.6	92.4
	57.5	98.7	6.2	92.5
	115	98.9	7.3	91.6
P2	0	96.4	5.6	90.8
	57.5	95.6	4.4	91.2
	115	94.6	5.6	89.0
P3	0	97.3	5.4	91.9
	57.5	95.8	4.5	91.3
	115	96.1	5.3	90.8
P4	0	100.4	4.7	95.7
	57.5	100.7	4.7	96.0
	115	101.3	4.1	97.2

[1]All distances are in feet.

[2]All elevations are relative to a temporary benchmark and are in feet.

(11,000 to 12,600 ft/s). Saturated till was not detected at SEAD-17. Either the water table was situated within the bedrock or the thickness of saturated till was small (< 2 feet). In these situations, the seismic refraction method is incapable of detecting the water table.

The seismic refraction survey indicates that the bedrock surface slopes gently to the west or southwest, generally following the slope of the ground surface. Groundwater is expected to flow to the west or southwest, following the slope of the relatively impermeable bedrock surface.

3.3.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography. There are no sustained surface water bodies on-site. Most of the surface water flows off of the crushed shale roadway surrounding the deactivation furnace onto lower ground which surrounds it. A drainage swale traverses the eastern and southern portions of the site and transports surface water to the west. This swale intersects with a well-defined south-draining swale that is defined by a elongate stand of low brush and trees. In the extreme northern portion of the site, a small swale drains to the north and west. The regional surface water flow is believed to be controlled by the overall westward sloping ground surface.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3.3-2 and Figure 3.3-1). The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and in some instances the deeper weathered shale horizons were saturated. Recharge of water to the monitoring wells during sampling was generally poor to fair.

3.4 SEAD-24: ABANDONED POWDER BURNING PIT

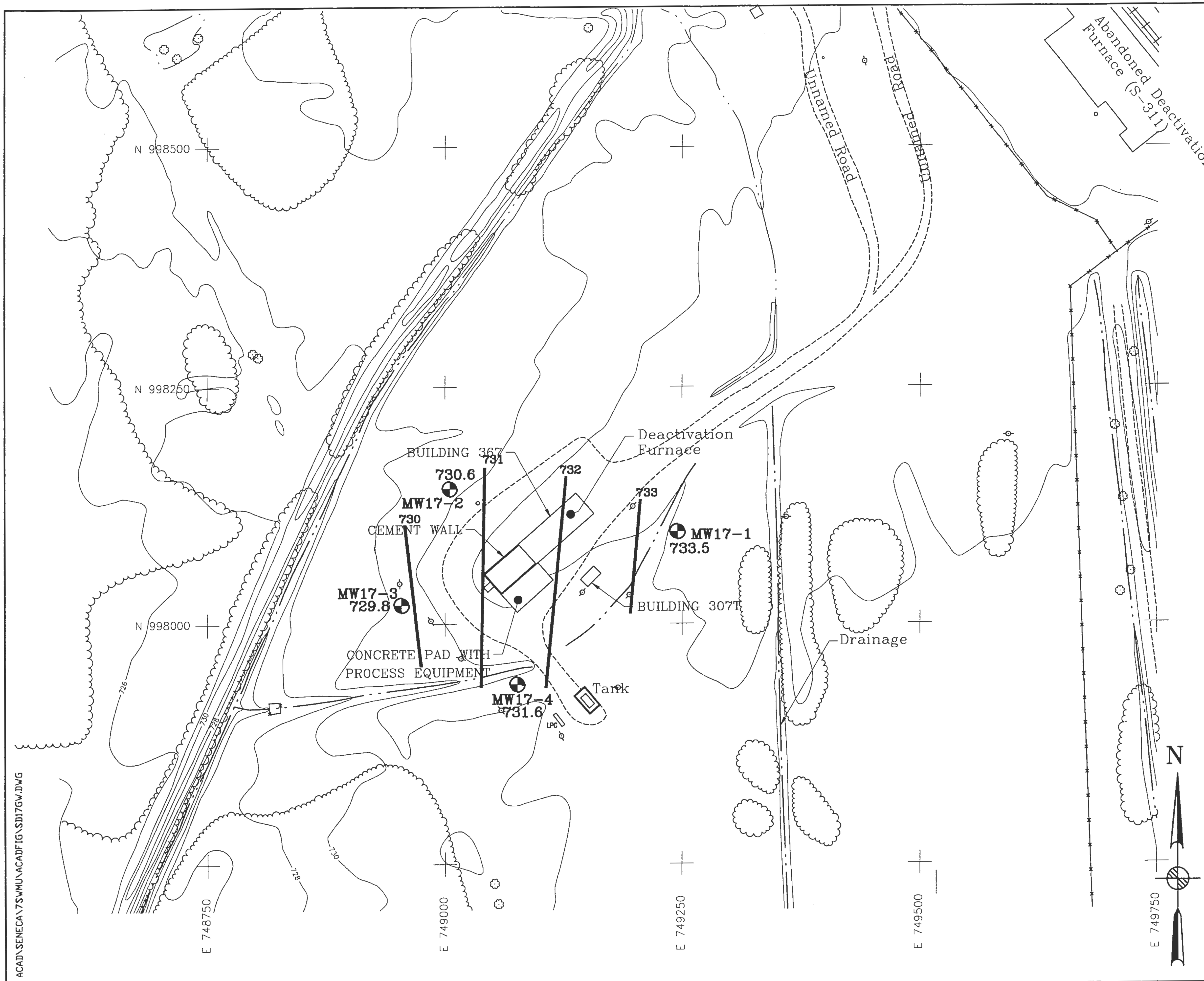
3.4.1 Site Geology

Based on the results of the drilling program, till and calcareous black shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. In most of the borings a very thin soil horizon was observed with till present at most locations within one foot of the ground surface. The depths of the borings at this site were up to 16 feet below the ground surface.

TABLE 3.3−2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEADー17

NG	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROU ELI
	736.33	1/6/94	4.76	731.57	1/25/94	4.98	731.35	4/4/94	2.80	
	733.75	1/6/94	3.26	730.49	11/18/94	3.18	730.57	4/4/94	3.19	
	732.15	1/6/94	4.08	728.07	1/25/94	5.37	726.78	4/4/94	2.38	
	734.59	1/6/94	4.43	730.16	1/25/94	4.78	729.81	4/4/94	3	



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT

MW17-1 733 MONITORING WELL WITH WATER TABLE ELEVATION

733 GROUNDWATER ELEVATION CONTOUR

NOTES
1. MONITORING WELL WATER LEVEL SURVEY DATE: 4/4/94
2. GROUNDWATER CONTOUR ELEVATION DATUM IS NGVD OF 1929

50 0 50 100
(feet)

PARSONS
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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 3.3-1
SEAD-17 ACTIVE DEACTIVATION FURNACE GROUNDWATER ELEVATION MAP

SCALE 1" = 100' | DATE MAY 1995 | REV C

At the Powder Burning Pit, there is a stratigraphic division within the till (an upper and lower unit) which is defined more by a change in density than by a change in composition. The relative density of the lower till, as measured by blow counts during split spoon sampling, is greater than that for the upper till. Blow counts for the upper till are generally between 10 and 50 blows per 6 inches of penetration of the spoon, and for the lower till are between 50 and 120 blows. The density change may be explained by a difference in mode of deposition for the two till units, such that the lower till (lodgement till) was deposited directly beneath a moving glacier, and the upper till (ablation till) was deposited by a stagnant, ablating glacier. Another explanation may be weathering of the upper portion of the till, rendering it less dense than the unweathered till below. The till is light brown and composed of silt and clay, and some black shale fragments, however, larger shale fragments (rip-up clasts) were observed at many locations near the till weathered shale contact. Oxidized areas of till were noted in the upper portion of the till strata.

Competent, calcareous black shale was encountered at depths between approximately 8 and 12 feet below the ground surface. The elevations of the competent bedrock determined during the drilling and seismic programs indicate that the shale slopes to the west mimicking the land surface. The upper portion of the competent shale (1 to 6 feet) is weathered.

3.4.2 Geophysics

3.4.2.1 Seismic Survey

The results of the seismic refraction survey conducted in SEAD-24 are shown in Table 3.4-1. The seismic profiles detected 5 to 18 feet of till (1,100 to 6,000 ft/s) overlying bedrock (12,000 to 13,000 ft/s). In particular, the till material includes unsaturated till (1,100 to 1,400 ft/s) and saturated till (4,700 to 5,500 ft/s).

The water table was detected in each of the four seismic profiles. The relative water table elevations shown in Table 3.4-1 indicate that the groundwater flows to the west. The bedrock surface also shows a gradual slope to the west. Bedrock was found to be greater than 10 feet deep except at the end of profile P3 furthest from the bermed area where the depth to bedrock was only 5 feet.

TABLE 3.4-1
SEAD-24 EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elev.[2]	W.T./Till[3]		Bedrock	
			Depth	Elev.	Depth	Elev.
P1	0	102.6	3.0	99.6	12.5	90.1
	57.5	100.8				
	115	99.8	5.4	94.4	18.1	81.7
P2	0	107.4	4.0	103.4	17.5	89.9
	57.5	107.0	3.5	103.5	16.0	91.0
	115	106.5	3.0	103.5	11.5	95.0
P3	0	106.6	4.7	101.9	13.7	92.9
	57.5	106.0	3.8	102.2	10.8	95.2
	115	106.1			5.0	101.1
P4	0	100.0	2.6	97.4	13.6	86.4
	57.5	99.7	4.2	95.5	13.2	86.5
	115	99.8	4.0	95.8	12.5	87.3

[1]All distances are in feet.

[2]All elevations are relative to a temporary benchmark and are in feet.

[3]Water table or dense glacial till

3.4.2.2 EM-31 Survey

Figure 3.4-1 shows the quadrature response (apparent conductivity) of the EM grid surveyed in and around the abandoned powder burning pit. In general, the ground is more conductive within the bermed area and south of the bermed area. In contrast, the ground is less conductive on the berm and northeast of the berm. The general differences in EM conductivity are likely due to changes in soil moisture content. Several small isolated quadrature anomalies were found on or near the berms.

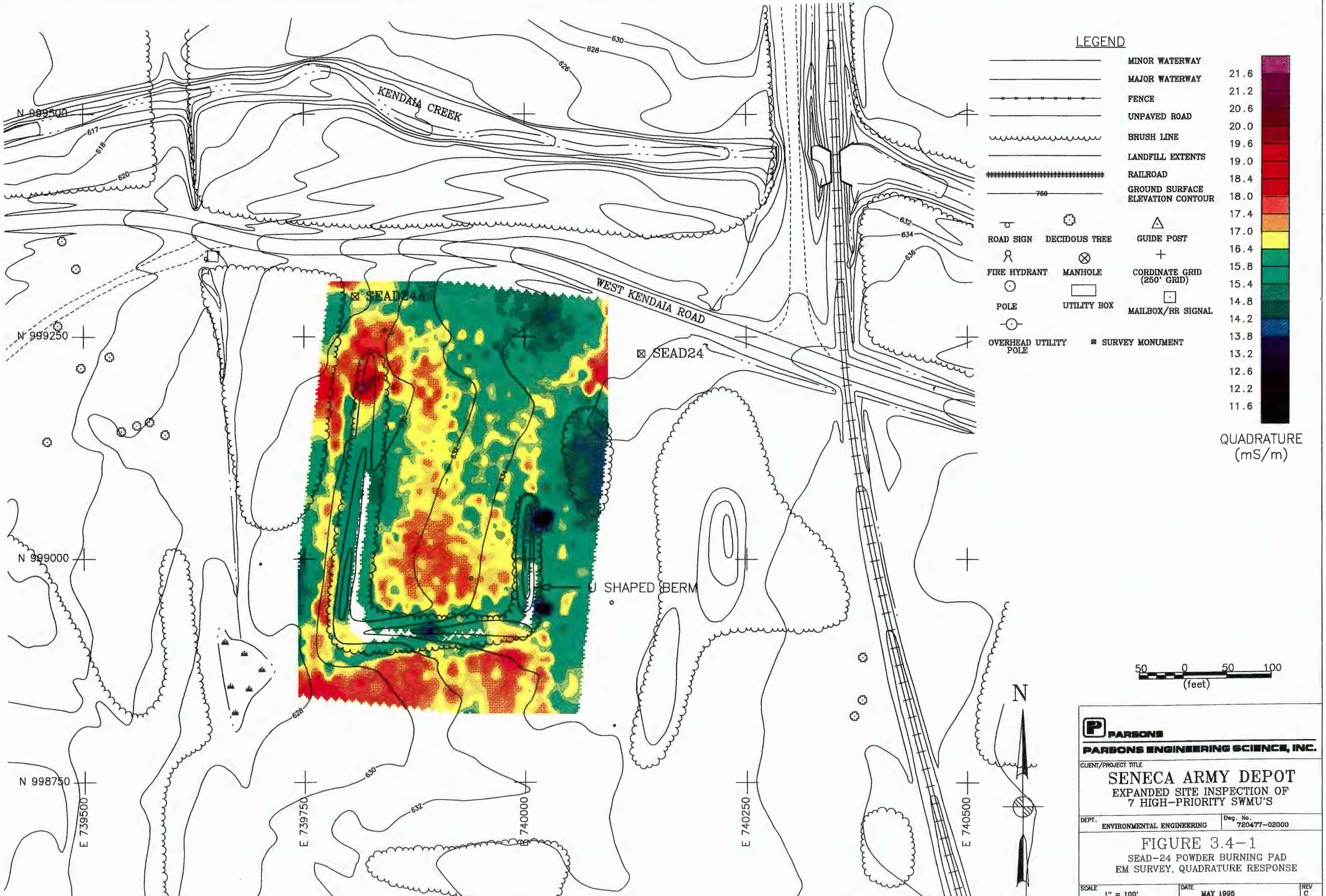
The in-phase response is particularly sensitive to metal objects. Several small isolated targets were delineated by the in-phase response of SEAD-24 (Figure 3.4-2). These anomalies include one on the northern side of the east berm and two small anomalies in the southeastern portion of the bermed area. A fourth metallic anomaly was located on the southwestern edge of the grid.

The quadrature and in-phase EM response of the areas investigated at SEAD-24 do not indicate the presence of large quantities of buried metallic debris. Several small isolated metallic objects may occur in this area, however disposal pits are not likely to exist in the area surveyed.

3.4.2.3 GPR Survey

A GPR survey was conducted at a 20-foot spacing within SEAD-24. Two detailed GPR grids were also surveyed to further characterize several EM anomalies (Figure 2.6-1). In general, the GPR survey in SEAD-24 detected continuous, undisturbed layering in the soil with no pronounced hyperbolic anomalies. In certain limited areas, the ground appears to have been disturbed and backfilled. No linear anomalies, e.g.,pipes, or zones of numerous subsurface anomalies were detected. The depth of penetration of the GPR surveys was approximately 30 ns or about 6 feet.

The follow-up GPR survey conducted on the northeast side of the east berm detected a possible pipe or culvert trending east from the berm. The second follow-up GPR grid was conducted in the southeast portion of the bermed area. This GPR survey detected several areas of disrupted or excavated soil (Figure 3.4-3). Also, several poorly-defined hyperbolic anomalies were detected in this area (Figure 3.4-4). These anomalies may be caused by small isolated metallic or non-metallic objects.



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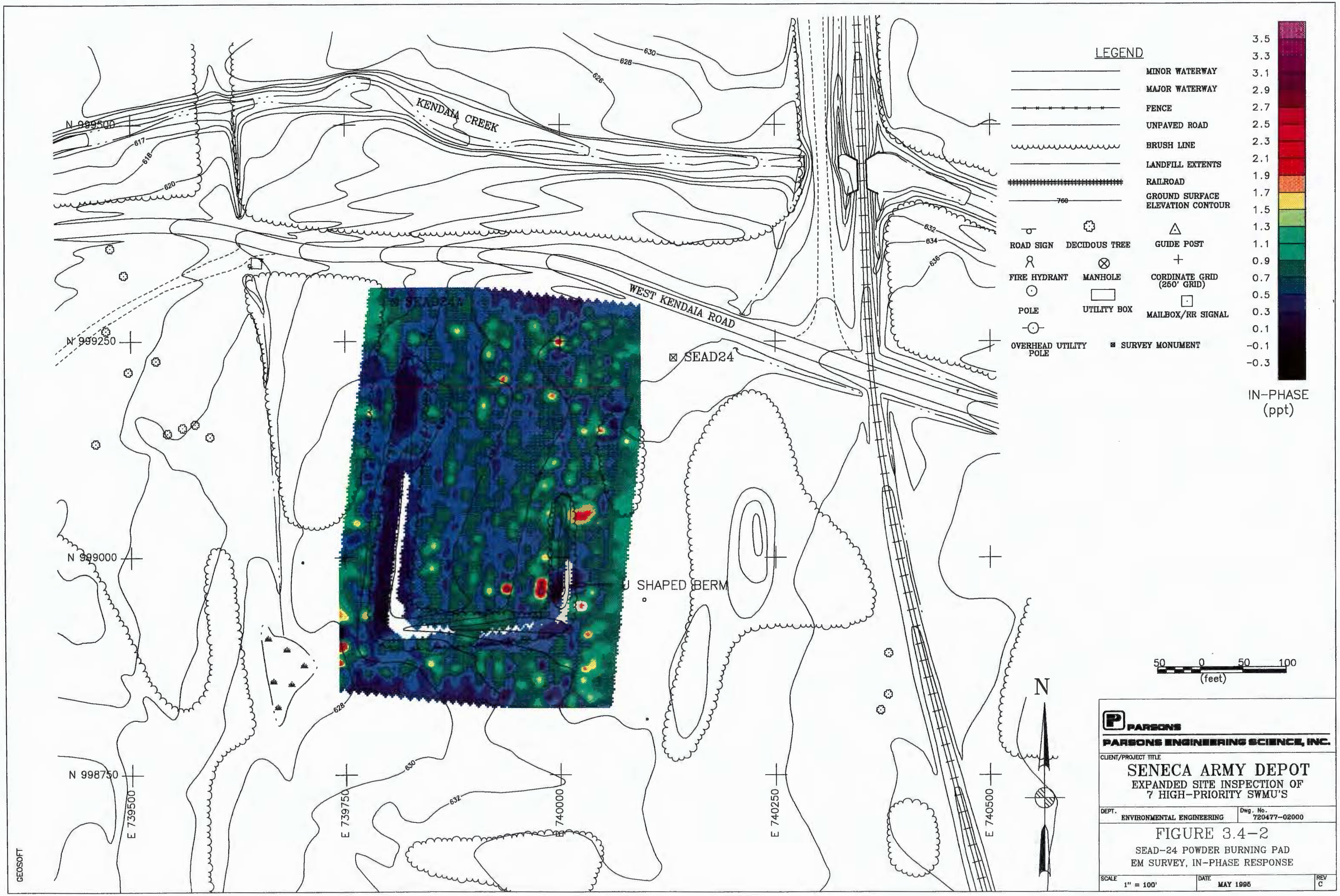
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	Dwg. No. 720477-02000

FIGURE 3.4-1
SEAD-24 POWDER BURNING PAD
EM SURVEY, QUADRATURE RESPONSE

SCALE 1" = 100'	DATE MAY 1995	REV C



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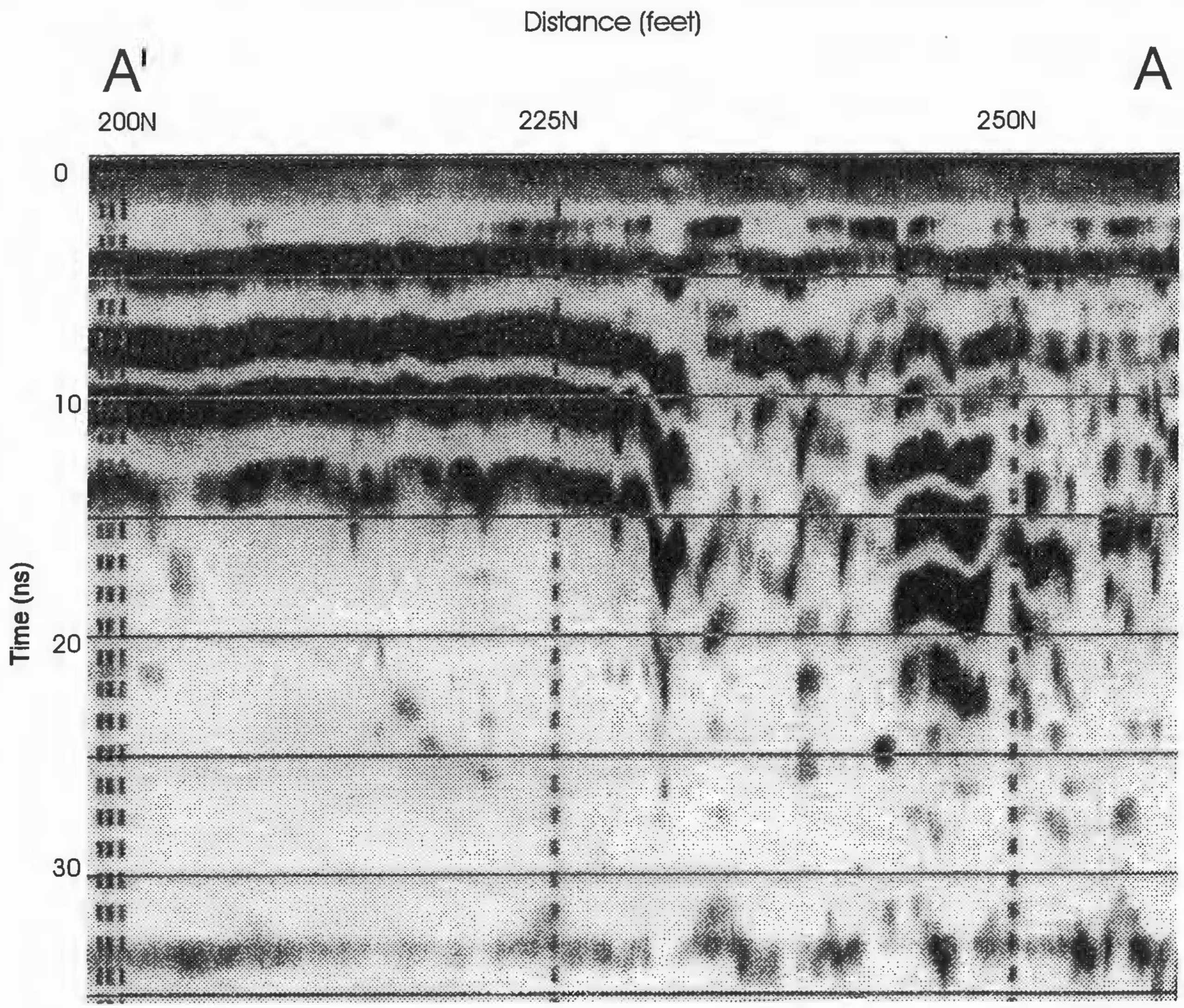
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 3.4-2
SEAD-24 POWDER BURNING PAD
EM SURVEY, IN-PHASE RESPONSE

SCALE 1" = 100' | DATE MAY 1995 | REV C



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ENGINEERING-SCIENCE, INC.

CLIENT/PROJECT TITLE

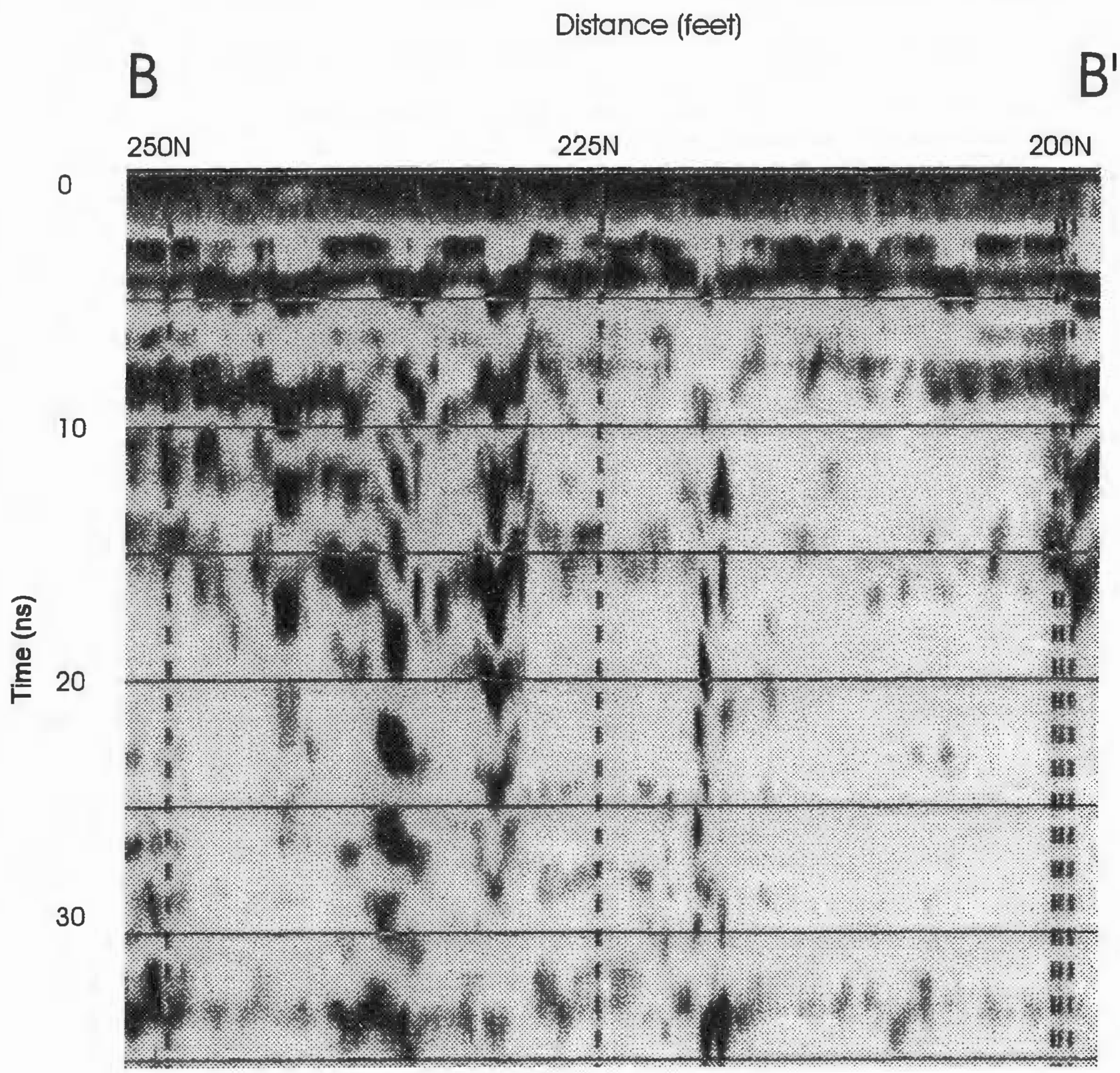
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMUs

DEPT. ENVIRONMENTAL ENGINEERING	NO. 720477-01002

FIGURE 3.4-3 SEAD-24

GPR PROFILE A-A'

SCALE N/A



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ENGINEERING-SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMUs

DEPT. ENVIRONMENTAL ENGINEERING | NO. 720477-01002

FIGURE 3.4-4 SEAD-24

GPR PROFILE B-B'

SCALE N/A

3.4.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography with the most notable topographic feature being the U-shaped berm. No sustained surface water bodies are present on-site; however, Kendaia Creek, which contains running water throughout the year, is located approximately 150 feet north of the site. Locally, some surface water flow would be directed down the flanks of the berm and would accumulate in low-lying areas on-site. The regional surface water flow is believed to be controlled by the overall westward sloping ground surface. The surface water is believed to drain west into a small wetland area and a poorly defined north-south-trending drainage swale. Surface water in the wetland drains north via the swale, passes through a conduit under West Kendaia Road, and eventually is discharged into Kendaia Creek. Kendaia Creek flows into Seneca Lake located approximately 2 miles west of the site.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3.4-2 and Figure 3.4-5). Although the groundwater elevation data reported from the well development and groundwater sampling activities were collected over a period of 2 months. These data indicate that the direction of groundwater flow may vary and at times may be more towards the northwest. The distribution of groundwater in the till portion of the aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil. At selected drilling locations, the till at the base of the upper less dense till was wet compared to the mostly moist to dry lower more dense till, indicating that some groundwater may be perched on the denser till. This phenomena was not observed at all of the drilling locations. Recharge of groundwater to the monitoring wells during sampling was generally fair to poor.

3.5 SEAD-25: FIRE TRAINING AND DEMONSTRATION PAD

3.5.1 Site Geology

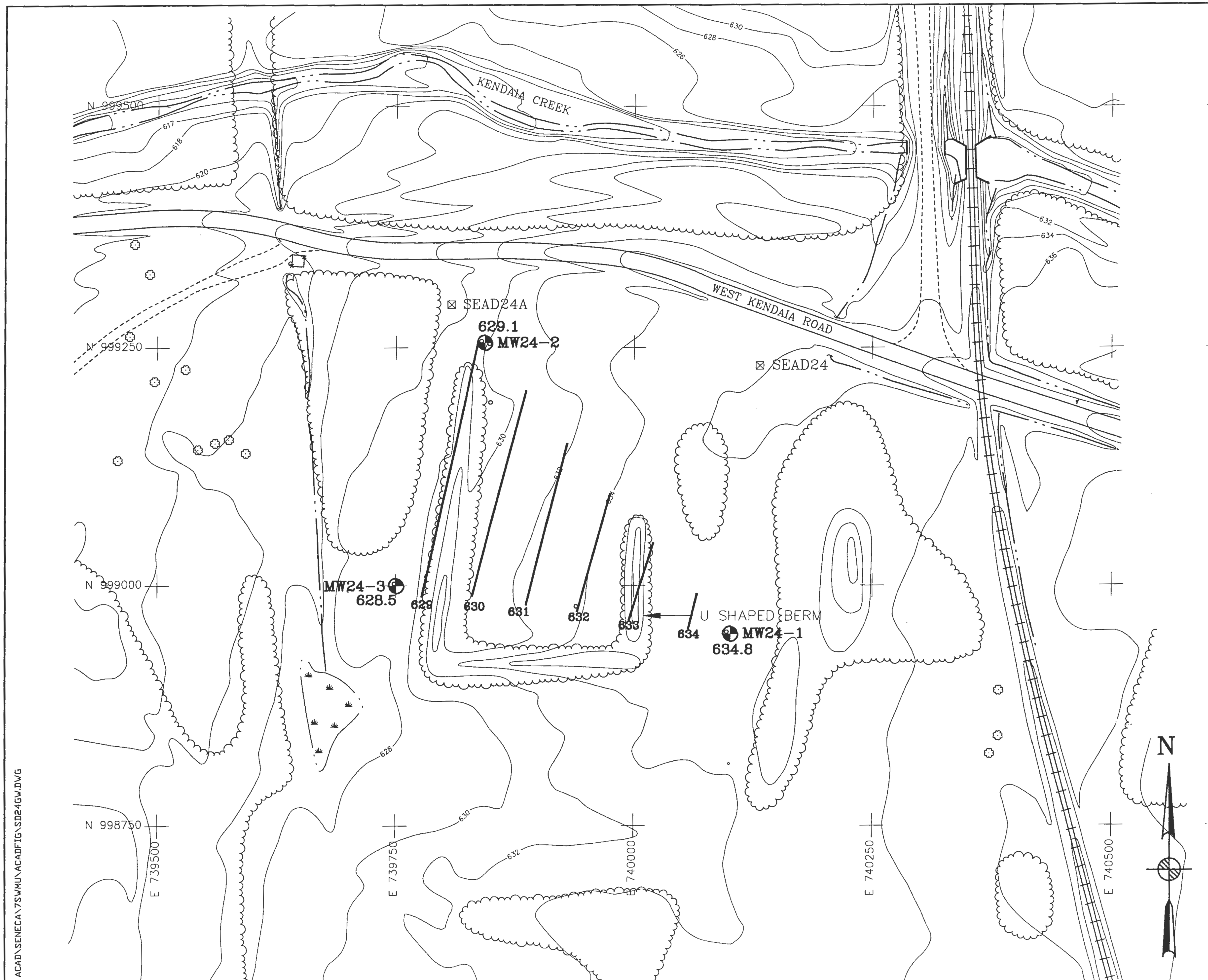
Based on the results of the drilling program, till and calcareous black shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. The surface of the pad is composed of a thin crushed shale fill. The depths of the borings at this site were up to 8.5 feet below the ground surface.

An approximately one foot-thick crushed shale layer (fill) occurs at the ground surface according to information obtained from the borings performed on the shale pad; in most instances a petroleum odor was noted in this crushed shale unit as well as in the till below the pad. In the boring performed outside the limits of the crushed shale pad, a very thin soil horizon was observed with till present within one foot of the ground surface.

TABLE 3.4-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-24

G	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		GROU ELE (
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	
	637.75	1/10/94	4.36	633.39	1/23/94	3.63	634.12	4/4/94	2.99	
	632.18	11/7/93	10.44	621.74	11/16/94	9.99	622.19	4/4/94	3.11	
	631.53	11/8/93	7.55	623.98	11/15/94	6.89	624.64	4/4/94	3.06	



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
MW24-1 634.8 MONITORING WELL WITH WATER TABLE ELEVATION
634 GROUNDWATER ELEVATION CONTOUR

NOTES
1. MONITORING WELL WATER LEVEL SURVEY DATE: 4/4/94
2. GROUNDWATER CONTOUR ELEVATION DATUM IS NGVD OF 1929

50 0 50 100
(feet)

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 3.4-5
SEAD-24 POWDER BURNING PAD
GROUNDWATER ELEVATION MAP

SCALE 1" = 100' | DATE MAY 1995 | REV C

The till is greenish-gray and composed of silt and clay, some fine sand, and some black shale fragments (up to 0.25 inches in diameter). Oxidized areas of till were noted in the upper portion of the till strata.

Competent, calcareous black shale was encountered at depths between approximately 3.5 and 6.5 feet below the ground surface. The elevation of the competent bedrock determined during the drilling program indicate that the shale is relatively flat. The upper portion of the competent shale (2 to 2.5 feet) is weathered.

3.5.2 Seismic Survey

The results of the seismic refraction survey conducted in SEAD-25 are presented in Table 3.5-1. The seismic survey detected 4 to 8 feet of till (1,100 to 1,350 ft/s) overlying bedrock (12,600 to 14,400 ft/s). Saturated till was not detected at SEAD-25. Either the water table was situated within the bedrock, or the thickness of saturated till was small (< 3 feet). In these situations, the seismic refraction method is incapable of detecting the water table.

The seismic survey indicates that the bedrock surface slopes to the southwest, generally following the slope of the ground surface. Based on this information, groundwater is expected to flow to the southwest, following the slope of the bedrock surface.

3.5.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by the local topography and the most significant relief on-site is in the form of a small crushed shale pad. No sustained surface water bodies are present on-site. Well defined drainage ditches are present approximately 100 feet to the east and west of the pad along paved roads, and approximately 325 feet to the northwest of the pad. Based on topographic expression, most of the surface water on-site flows radially from the crushed shale pad and onto lower ground which surrounds it. To the east, surface water is directed to a drainage swale next to Administration Drive. The surface water flow direction on the west side of the pad is believed to be to the west-southwest and is controlled by the gentle southwesterly sloping ground surface. The well defined drainage swale 325 feet northwest of the site drains to the southwest.

TABLE 3.5-1
SEAD-25 EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elev.[2]	Bedrock Depth	Bedrock Elev.
P1	0	100.0	4.9	95.1
	57.5	97.0	5.9	91.1
	115	97.3	4.0	93.3
P2	0	95.8	6.6	89.2
	57.5	96.3	5.9	90.4
	115	96.5	6.8	89.7
P3	0	98.8	7.6	91.2
	57.5	98.1	7.1	91.0
	115	97.4	7.2	90.2
P4	0	94.0	4.1	89.9
	57.5	92.9	4.6	88.3
	115	93.6	3.9	89.7

[1]All distances are in feet.

[2]All elevations are relative to a temporary benchmark and are in feet.

The groundwater flow direction in the till/weathered shale aquifer on the site is shown to be to the east-southeast based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3.5-2 and Figure 3.5-1). This flow direction is approximately opposite to the southwesterly flow direction determined by an examination of the regional topography in this area of SEDA and by seismic data, which mapped a relatively flat (although westward-sloping) bedrock surface at the site. At SEDA, the direction of the slope of the bedrock surface is a good indication of the direction of groundwater flow. Also, groundwater flow directions were to the west or southwest at other nearby sites. One explanation for the discrepancy may be that the area around the purported background well (MW25-1), which is installed in a water-filled drainage swale on Administration Avenue, is susceptible to increased drainage away from the site via the swale. This may explain the lower water table elevation in this area compared to those measured in the purported downgradient wells immediately west and southwest of the site.

Considering the scenarios presented above and the local topography near the pad as presented in the 2-foot contour map (Figure 3.5-1), it is more probable that there is some mounding of groundwater beneath the site which would result in easterly, southerly and westerly semi-radial flow away from the pad. In addition to the data presented above, an easterly component to the groundwater flow is supported by the presence of an area of low topography east of Administrative Drive which also contains a small north-draining swale; it was also reported by SEDA personnel that a small, shallow pond used to exist in this area but it has subsequently been filled in. By examining only the water table elevations in wells MW25-2 and MW25-3 (the intended downgradient wells) a south-southwesterly component to the groundwater flow is also plausible. It is unlikely (based on local topography) that there is a northward component to groundwater flow. With the current array of monitoring wells on-site, there is insufficient groundwater elevation data to definitively clarify the flow of groundwater beneath this site.

The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and in some instances the deeper weathered shale horizons were saturated. The recharge of water to the wells during sampling was generally fair.

TABLE 3.5–2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD–25

G	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		GROU ELE (
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	
	742.69	1/8/94	5.95	736.74	2/6/94	5.67	737.02	4/4/94	5.45	
	746.11	11/11/93	5.12	740.99	2/4/94	5.54	740.57	4/4/94	4.35	
	745.56	11/9/93	4.8	740.76	11/15/93	4.78	740.78	4/4/94	3.15	

3.6 SEAD-26: FIRE TRAINING PIT AND AREA

3.6.1 Site Geology

Based on the results of the drilling program, two major types of geologic materials (till and weathered shale), as well as significant amounts of fill materials are present on-site. The till lies stratigraphically above the shale; however, on the pad, no till was encountered. The depths of the borings at this site were up to 14 feet below the ground surface.

An approximately 10- to 12-foot-thick fill unit was encountered in the test pits and borings performed on the raised Fire Training Area. The composition and thickness of the fill varied depending on the location of the investigation point. In the southern portion of the pad near test pits TP26-1 through TP26-4 the fill was composed mostly of large broken shale pieces (from 2 to 20 inches long) with occasional wood and/or metal debris. This shale fill, as well as a crushed metal bucket, was also found at TP26-7 near the central portion of the site. In TP26-5 the fill was composed of brown-gray medium to coarse sand with some silt and clusters of bricks. A similar type of sandy fill was encountered at TP26-6 and TP26-7. At TP26-6, a large concrete slab (5 feet by 3 feet by 8 inches) was also uncovered.

At the Fire Training Area, the till, which would be expected to occur between the fill and the black shale, was conspicuously absent in the borings. The absence of till on the Fire Training Area is supported not only by visual inspection of the split spoon samples but also by the density of subsurface materials encountered; the fill which comprises the raised Fire Training Area was noticeably less dense than the till encountered at the background location. A plausible explanation for the absence of till under the Fire Training Area is that it was scraped off in preparation for filling of the site.

In the background boring that was performed east of the raised Fire Training Area, a thin crushed shale horizon (approximately one foot thick) was observed at the surface with till present within one foot below it. The till is light brown and composed of silt, some cobbles, some black shale fragments and a trace of fine sand. Oxidized areas of till were noted in the upper portion of the till strata.

Black calcareous shale was encountered at a depth of 3.4 feet at the background location and at depths between approximately 9 and 12 feet below the ground surface on the raised fire training pad. The elevations of the competent bedrock determined during the drilling and seismic programs indicate that the shale slopes to the west mimicking the regional land surface topography around the otherwise raised Fire Training Area. The upper portion of the competent shale is weathered.

3.6.2 Geophysics

3.6.2.1 Seismic Survey

The results of the seismic refraction survey conducted in SEAD-26 are presented in Table 3.6-1. The seismic profiles detected approximately 4 to 12 feet of till (1,200 to 6,300 ft/s) overlying bedrock (12,000 to 14,300 ft/s).

Saturated till (5,300 to 6,300 ft/s) was detected only by profile P2, located north of the fire training area (see Figure 2.8-1). At the locations of the other profiles, either saturated till was not present or the saturated layer was too thin to be detected by the seismic refraction method.

Table 3.6-1 shows that the elevation of the bedrock slopes to the west. The groundwater flow is also expected to be directed to the west following the slope of the relatively impermeable bedrock surface.

3.6.2.2 GPR Survey

A GPR survey was conducted along 8 transects running the length of the fire training area. Figure 3.6-1 shows the locations of the GPR anomalies delineated by the survey. The approximate depth of each anomaly was calculated by assuming a 2-way transit time of the radar signal of 5 nanoseconds (ns) per foot. Many distinct anomalies occur across the site. A zone of concentrated anomalies was located in the southern portion of the site. No linear features were identified and correlated between adjacent GPR lines. The depth of penetration was generally limited to about 4 feet.

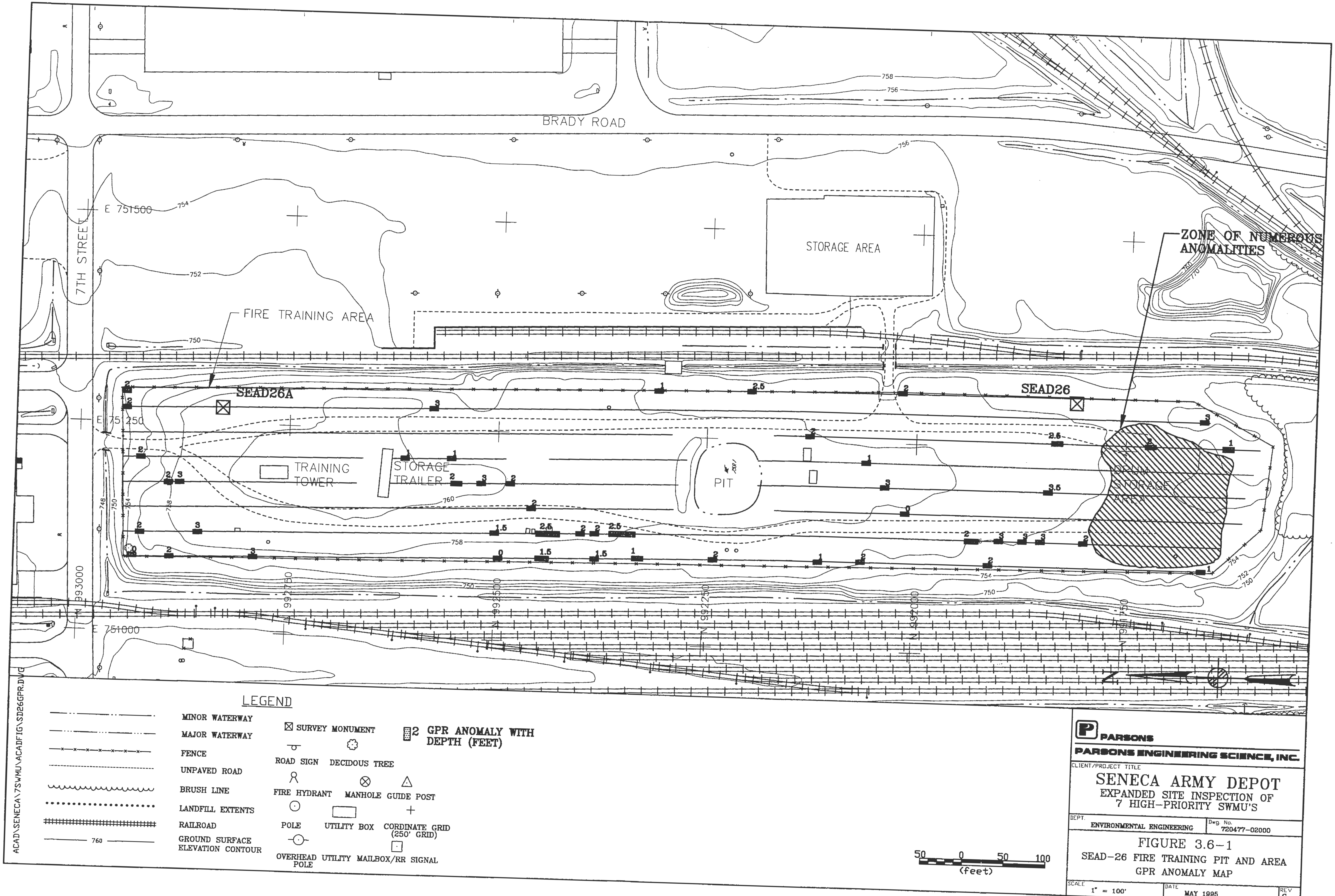
Profile A-A' (Figure 3.6-2) shows numerous small hyperbolic anomalies located at a shallow depth (7-8 ns) between profile distances of 1205 and 1235 feet. Profile B-B' (Figure 3.6-3) shows a strong hyperbolic anomaly at a distance of 1110 feet. Profile C-C' (Figure 3.6-4) shows many pronounced anomalies. The most distinct anomalies are located at the following profile distances: 505', 510', 517', 548', 564', 585' to 592', 600', and 608'. The results of the test pitting program, discussed in the following section, will describe the results of the excavation of some of the anomalies shown in these figures.

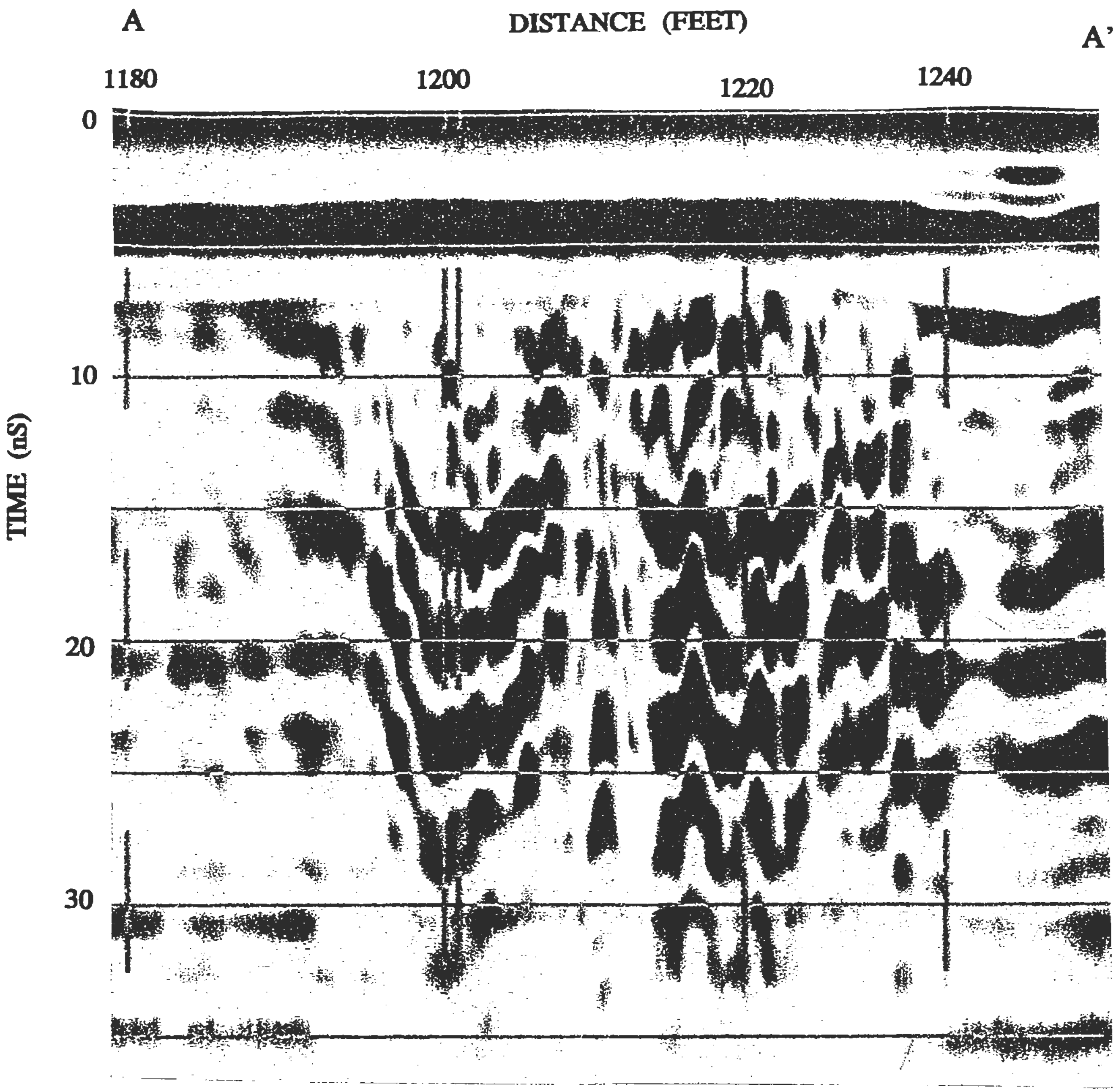
TABLE 3.6-1
SEAD-26 EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elev.[2]	Water Table		Bedrock	
			Depth	Elev.	Depth	Elev.
P1	0	100.0			5.2	94.8
	57.5	100.0			4.7	95.3
	115	100.3			4.6	95.7
P2	0	91.8	2.1	89.7	9.1	82.7
	57.5	91.2	2.8	88.4	11.5	79.7
	115	91.1	2.6	88.5	10.7	80.4
P3	0	90.9			5.8	85.1
	57.5	90.8			7.2	83.6
	115	90.0			7.5	82.5
P4	0	98.0			11.4	86.6
	57.5	98.3			11.5	86.8
	115	98.5			9.2	89.3

[1]All distances are in feet.

[2]All elevations are relative to a temporary benchmark and are in feet.


BRADY ROAD
7TH STREET
E 751500
E 751250
E 751000
STORAGE AREA
ZONE OF NUMEROUS ANOMALITIES
FIRE TRAINING AREA
SEAD26A
SEAD26
TRAINING TOWER
STORAGE TRAILER
PIT
DRUM STORAGE AREA
N 993000
N 992750
N 992500
N 992250
N 992000
N 991750
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
2 GPR ANOMALY WITH DEPTH (FEET)
(feet)
ACAD\SENECA\7SWMU\ACADFIG\SD26GPR.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000
FIGURE 3.6-1
SEAD-26 FIRE TRAINING PIT AND AREA GPR ANOMALY MAP
SCALE 1" = 100'
DATE MAY 1995
REV C



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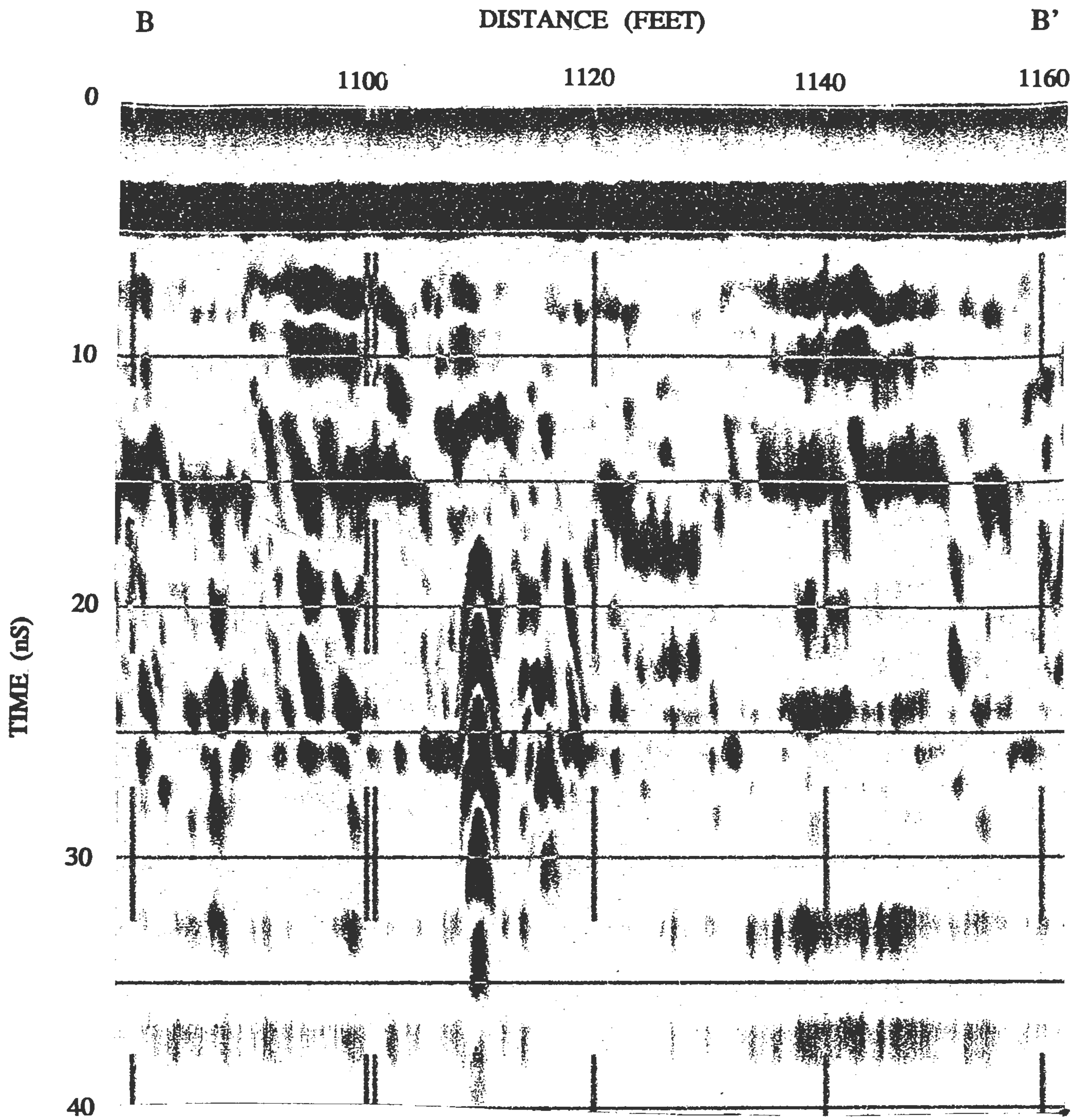
CLIENT/PROJECT TITLE SENECA ARMY DEPOT EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S	
DEPT. ENVIRONMENTAL ENGINEERING	NO. 720477-02000
FIGURE 3.6-2. SEAD-26 GPR PROFILE A-A'	
SCALE	



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CLIENT/PROJECT TITLE

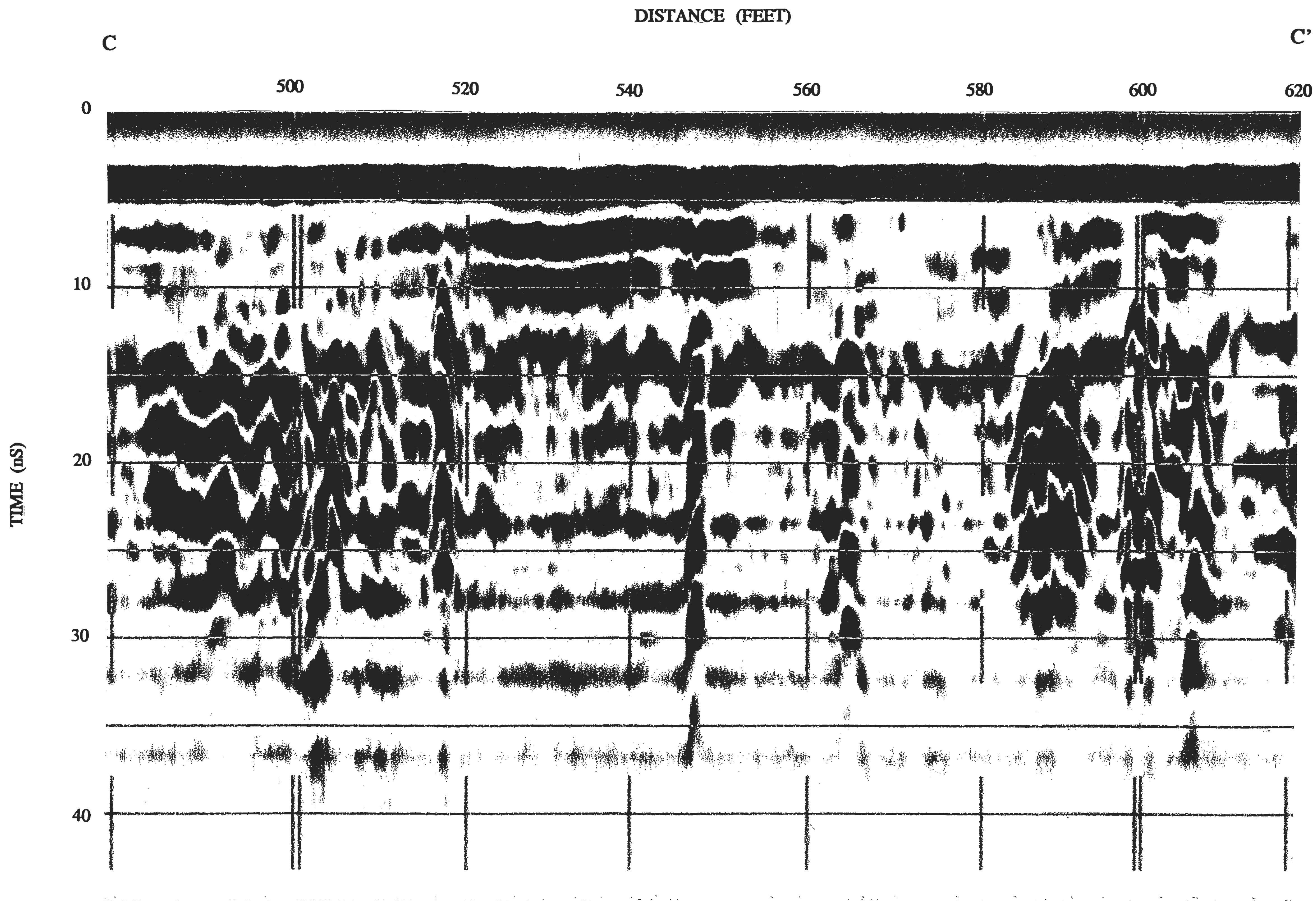
SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT.	NO.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 3.6-3. SEAD-26
GPR PROFILE B-B'

SCALE



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EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING
NO. 720477-02000

FIGURE 3.6-4. SEAD-26
GPR PROFILE C-C'

SCALE

3.6.2.3 Excavation of Geophysical Anomalies

Eight test pits were excavated in SEAD-26 to characterize the sources of several of the GPR anomalies. The locations of these test pits have been presented in Figure 2.8-2, and the test pit reports are presented in Appendix B. The following discussion focuses on the excavation of the anomalies shown in Figures 3.6-2 to 3.6-4.

Test pit TP26-1 was excavated in the center of the anomalous zone shown in Figure 3.6-2 (profile A-A'). Many large boulders were encountered at the approximate depth of the GPR anomalies. A steel pipe, 3 inches in diameter, was encountered at a depth of 4.5 feet which may exceed the effective depth of penetration of the survey. Therefore, the boulders are the most likely cause of the GPR anomalies in this area.

The anomaly shown in profile B-B' (Figure 3.6-3) was excavated as TP26-3. Two large pieces of wood were located at a depth of 2.6 feet within gravel fill. No other objects were found that would cause the observed anomaly at the indicated depth. It is surprising, although not impossible, that pieces of wood would produce such a distinct signature.

Test pit TP26-6 was excavated at the location of the broad anomaly from 585 to 592 feet along profile C-C' (Figure 3.6-4). A large concrete slab was located at the depth of the GPR anomaly. This slab was positively identified as the source of the observed anomaly.

The sources of most of the GPR anomalies encountered during this test pitting program appear to be caused by non-metallic construction debris and boulders. Although some metallic debris was located (e.g., pipes, bucket, steel fragments), this constitutes only a small portion of the excavated material.

3.6.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events at the Fire Training Area is controlled by small changes in relief on the surface of the pad. A small surface collection pond near the center of the pad collects runoff only from a small area. Although very shallow, the pond is believed to be sustained throughout the year due to the bentonite clay liner which forms its base. Beyond the area of internal drainage at the pond, surface water flow is likely directed down the elongate scarps on the eastern and western sides of the pad; some flow likely occurs from the northern and southern ends also. The swale that is present at the base of the scarp on the northeastern, northern, and western sides of the pad collects surface water which drains from the pad. The swale drains south between the elevated pad and the SEDA railroad tracks where it intersects a separate west-flowing swale. A conduit beneath the railroad tracks allows surface water to flow west beyond the tracks.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west on the southern portion of the site and the southwest on the northern portion of the site based on the groundwater elevations measured in four monitoring wells on April 4, 1994 (Table 3.6-2 and Figure 3.6-5). The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and in most instances the deeper weathered shale horizons were saturated. The recharge of water to the wells during sampling was generally good, although one well (MW26-2) was dry during the sampling period.

3.7 SEAD-45: OPEN DETONATION FACILITY

3.7.1 Site Geology

Based on the results of the drilling program, till and calcareous black shale (with minor limestone layers) are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. In most of the borings, a very thin soil horizon was observed with till present at most locations within one foot of the ground surface. The depths of the borings at this site were up to 11 feet below the ground surface.

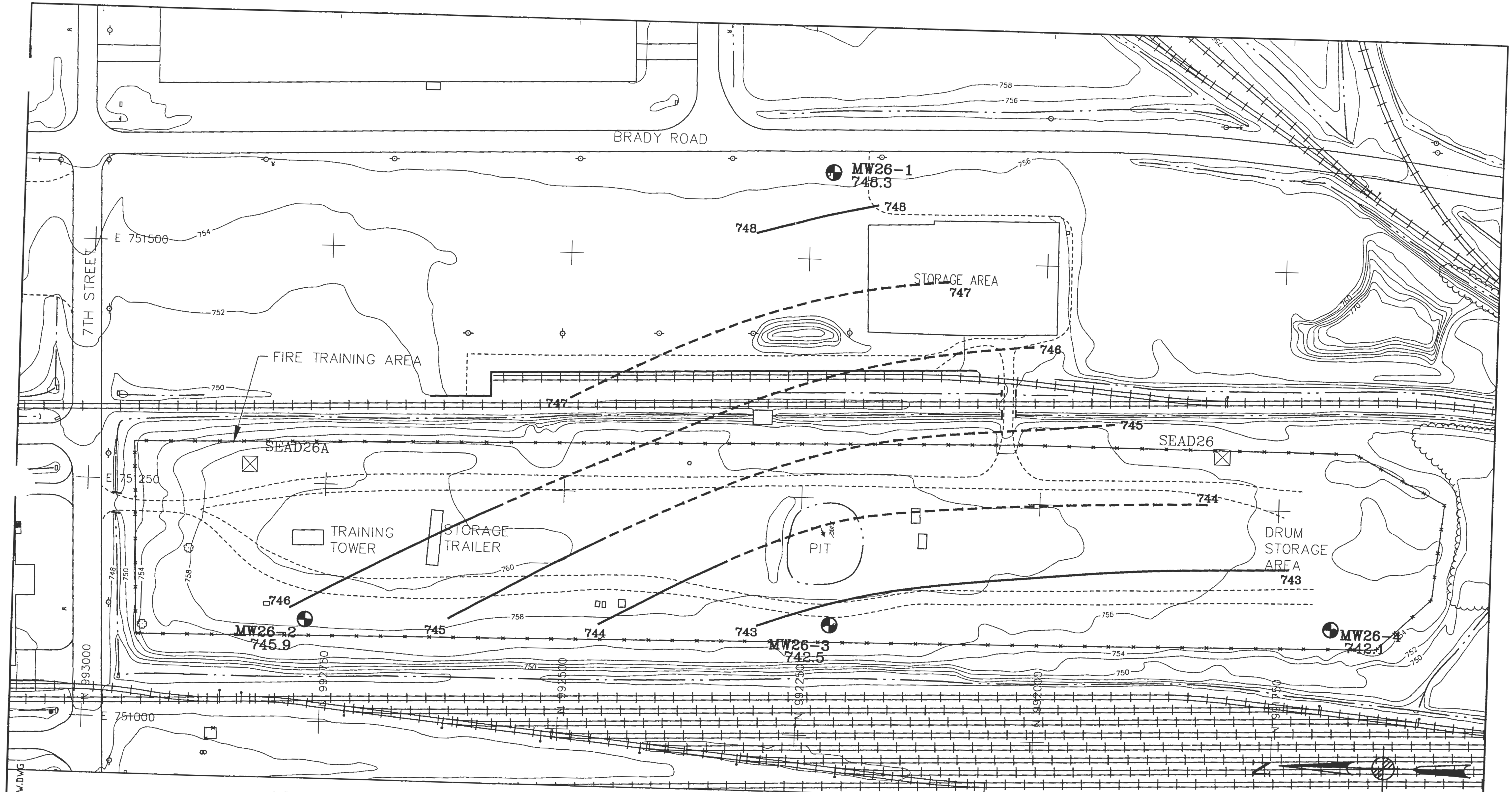
The till is dark brown to gray and composed of silt and clay, some fine sand, and some black shale and limestone fragments; however, larger shale fragments (rip-up clasts) were observed at many locations near the till/weathered shale contact. Oxidized areas of till were noted in the upper portion of the till strata.

Black calcareous shale was encountered at depths between approximately 4 and 11 feet below the ground surface. The elevations of the competent bedrock determined during the drilling and seismic programs indicate that the shale slopes to the east mimicking the land surface. The upper portion of the competent shale (2 to 3 feet) is weathered.

TABLE 3.6-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-26

IG	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROU ELE (
	753.57	11/20/93	4.76	748.81	1/21/94	7.12	746.45	4/4/94	5.28	
	761.42	1/9/94	15.76	745.66	1/25/94	16.50	744.92	4/4/94	15.54	
	753.92	11/20/93	11.42	742.50	1/22/94	12.94	740.98	4/4/94	11.4	
	752.42	12/6/93	10.35	742.07	1/22/94	12.09	740.33	4/4/94	10.28	



LEGEND

MINOR WATERWAY

MAJOR WATERWAY

FENCE

UNPAVED ROAD

BRUSH LINE

LANDFILL EXTENTS

RAILROAD

760 GROUND SURFACE ELEVATION CONTOUR

SURVEY MONUMENT

ROAD SIGN

DECIDOUS TREE

FIRE HYDRANT

MANHOLE

GUIDE POST

POLE

UTILITY BOX

CORDINATE GRID (250' GRID)

OVERHEAD UTILITY POLE

MAILBOX/RR SIGNAL

MW26-1 748.3 MONITORING WELL WITH WATER TABLE ELEVATION

744 GROUNDWATER ELEVATION CONTOUR

ASSUMED GROUNDWATER ELEVATION CONTOUR

NOTES

1. MONITORING WELL WATER LEVEL SURVEY DATE: 4/4/94
2. GROUNDWATER CONTOUR ELEVATION DATUM IS NGVD OF 1929

50 0 50 100
(feet)

ACAD\SENECA MU\ACADFIG\SD26GW.DWG

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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

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Dwg. No. 720477-02000

FIGURE 3.6-5
SEAD-26 FIRE TRAINING PIT AND AREA GROUNDWATER ELEVATION MAP

SCALE 1" = 100'
DATE MAY 1995
REV C

3.7.2 Geophysics

3.7.2.1 EM-31 Survey

The quadrature response of the EM survey conducted in SEAD-45 is shown in Figure 3.7-1. This map shows a major north-trending anomaly west of the current detonation mound. Eight to ten lobes project westward from this feature. The detonation cables that extend from the concrete bunker to the detonation mound produce a substantial quadrature response. Immediately to the north of the existing detonation cables is another east- to west-trending anomaly. A zone of increased quadrature response exists east of the current detonation mound. This feature may be due to the existing blasting wires that branch off of the main detonation cable. Many small, isolated anomalies also exist throughout the site.

The in-phase component of the EM survey is shown in Figure 3.7-2. Most of the anomalies detected by the quadrature response are also evident in the in-phase response. In addition, the in-phase map shows a multitude of small isolated anomalies scattered across much of the site. Also, elevated levels of the in-phase component occur in a broad zone that extends west of the detonation mound to the western edge of the EM grid. The in-phase response is particularly sensitive to concentrations of discrete metallic objects, whereas the quadrature response is much more sensitive to continuous linear features, such as pipes or cables. Therefore, zones of enhanced in-phase response are likely zones of increased concentrations of metallic debris.

3.7.2.2 GPR Survey

Five detailed GPR grids were conducted to further characterize several anomalies identified by the EM survey. Figure 2.9-1 shows the locations of these grids. The first GPR grid was conducted over a small in-phase anomaly in the southwest corner of the EM grid. The GPR record collected along profile A-A' (Figure 3.7-3) shows the suspected GPR signature of the EM anomaly. The anomaly is located at a depth of about 12 ns (about 2.5 feet) at a profile distance of 14 to 18 feet. This anomaly is 10 to 12 feet long.

The second GPR grid was established over the southernmost lobe projecting from the main north- to south-trending EM anomaly. Figure 3.7-4 shows the radar record along profile B-B' within this grid. A distinct hyperbolic anomaly is evident at a profile distance of 38 feet at a time of 14 ns. Since this anomaly could be traced east to west across the GPR grid, it was interpreted to be a pipe.

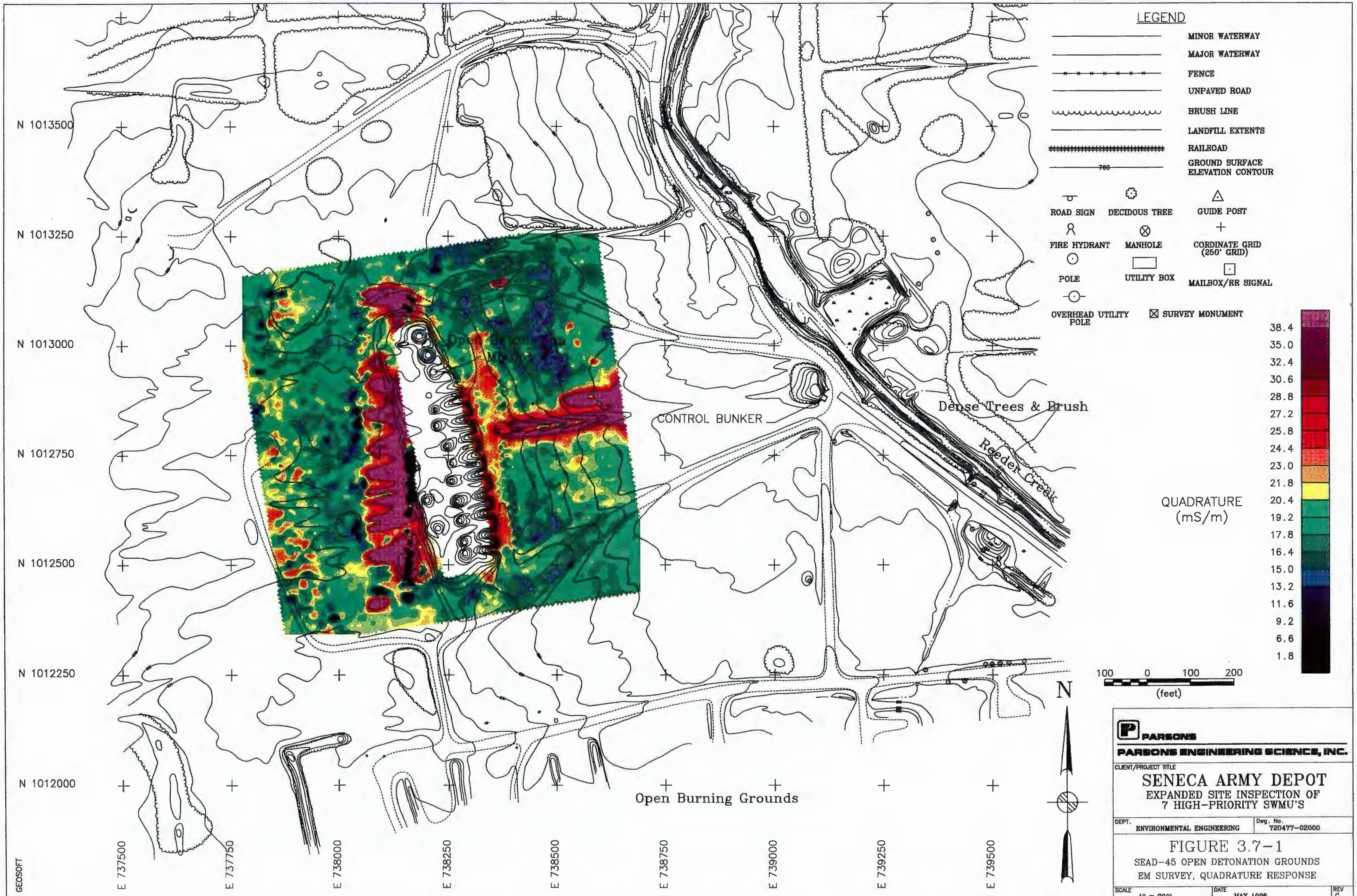

FIGURE 3.7-1
SEAD-45 OPEN DETONATION GROUNDS
EM SURVEY, QUADRATURE RESPONSE

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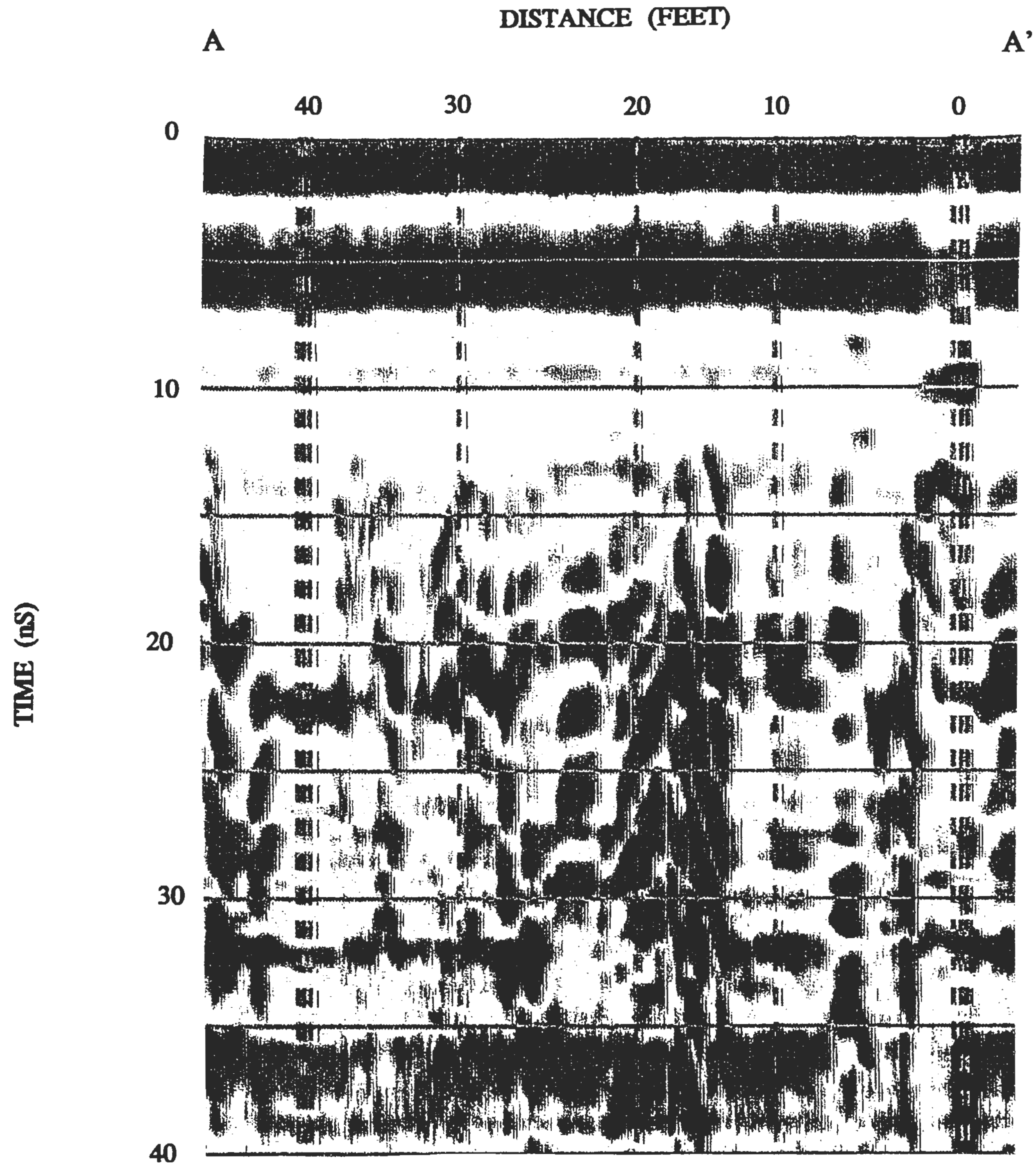
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	Dwg. No. 720477-02000

FIGURE 3.7-2
SEAD-45 OPEN DETONATION GROUNDS
EM SURVEY, IN-PHASE RESPONSE

SCALE 1" = 200'	DATE MAY 1995	REV C



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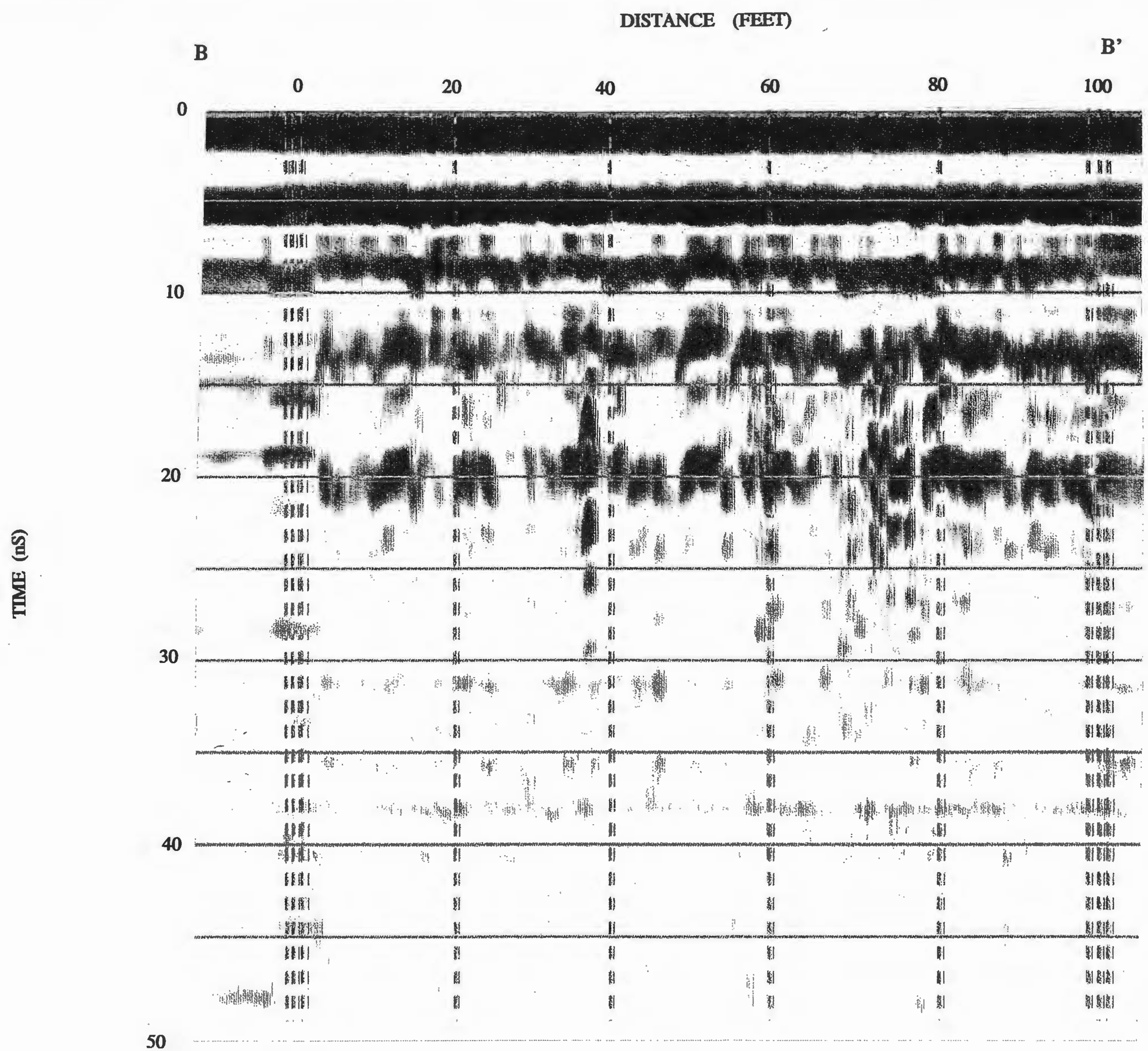
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	NO. 720477-02000

FIGURE 3.7-3. SEAD-45
GPR PROFILE A-A'

SCALE



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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | NO. 720477-02000

FIGURE 3.7-4. SEAD-45
GPR PROFILE B-B'

SCALE

3.7.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography which slopes gently to the east-northeast, as there is little relief on-site other than the demolition mound. In general, surface water flows east making its way into a network of drainage swales throughout the site that eventually lead into Reeder Creek, a sustained surface water body. Reeder Creek flows to the north-northwest along the eastern border of the Demolition Mound.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the east based on the groundwater elevations measured in nine monitoring wells on April 4, 1994 (Table 3.7-1 and Figure 3.7-5). The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and in most instances the deeper weathered shale horizons were saturated. The recharge of water to the wells during sampling was generally poor.

TABLE 3.7-1
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-45

IG	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMEN		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROU ELE (
	625.08	1/17/94	7.87	617.21	3/4/94	7.87	617.21	4/4/94	6.41	
	626.76	1/17/94	10.96	615.80	2/2/94	10.76	616.00	4/4/94	8.24	
	626.45	1/17/94	9.07	617.38	2/2/94	9.87	616.58	4/4/94	6.97	
	633.04	11/12/93	6.64	626.40	1/26/94	7.97	625.07	4/4/94	5.3	
	634.22				2/1/94	8.41	625.81	4/4/94	6.24	
	NA				2/2/94	6.38		4/4/94	5.75	
	NA				2/1/94	6.44		4/4/94	6.49	
	NA				2/1/94	8.3		4/4/94	6.58	
	637.99				2/1/94	3.36	634.63	4/4/94	2.91	

The third and fourth GPR grids were conducted over the southern and northern portions of the main north- to south-trending EM anomaly. Portions of each grid were covered by standing water which prevented significant penetration of the radar signal. Elsewhere, penetration was limited to less than 3 feet due to the increased conductivity of the ground. While many isolated hyperbolic GPR anomalies were detected, no linear anomalies could be traced from line to line. The source of the pronounced north- to south-trending EM anomaly was not observed in the radar records.

The fifth detailed GPR grid encompassed the EM anomaly located immediately north of the existing blasting cable. Numerous GPR anomalies were detected in this area; however, none could be correlated from line to line. The specific source of the EM anomaly could not be identified in the GPR records.

3.7.2.3 Excavation of Geophysical Anomalies

Ten test pits were excavated to identify the sources of various EM anomalies. The test pit locations have been shown in Figure 2.9-2, and the test pit reports are presented in Appendix B. This section presents a summary of the test pit results as related to the interpretation of the EM survey.

The major north- to south-trending anomaly identified in the quadrature and in-phase EM components was determined to be caused by a 1-inch galvanized pipe containing electrical wires. This pipe was excavated at a depth of 1.5 to 2.5 feet in test pits TP45-3, TP45-4, and TP45-6. The excavation of TP45-5 revealed another 1-inch galvanized pipe running from east to west. This test pit was centered over one of the west-trending anomalous lobes identified by the EM survey (Figure 3.7-1). The north- to south-trending EM anomaly west of the current detonation mound is attributed to the conduit and blasting wire associated with former detonation operations. The 8 to 10 anomalous lobes are caused by the conduit and blasting wire leading to the former blasting pits.

Test pit TP45-10 encountered an east- to west-trending pipe 3 inches in diameter directly north of the berm that houses the existing conduit and blasting cables. This section of pipe probably carried the blasting wires to the former detonation pits interpreted west of the existing detonation mound. The other test pits encountered a variety of material, including munitions fragments, wood, ash, wire, nails, etc., all of which may have contributed to the observed EM anomalies.

Maximum Concentration

Total VOCs	10 ppm
Total SVOs	500 ppm
Individual SVOs	50 ppm
Total Pesticides	10 ppm

The groundwater criteria which were applied to this ESI study were the NYSDEC Class GA Standards and Guidelines. Because New York State has promulgated the Class GA standards, they are legally enforceable.

Surface water criteria were the most stringent criteria from the following guidelines:

- NYSDEC Water Quality Regulations for Surface Water and Groundwaters (6NYCRR Parts 700-705)
- USEPA Water Quality Criteria Summary and Updates. These include the freshwater acute and chronic criteria.

All values, including NYSDEC surface water criteria, EPA freshwater acute criteria, and EPA freshwater chronic criteria, were listed in the surface water data tables in this section.

For the metals chromium, copper, lead, nickel, and zinc, the EPA chronic and acute criteria values were developed from equations in the Updates #1 and 2 which are based on the surface water hardness. The standards for the hardness dependent values were calculated using an average hardness of 300 mg/l, which was derived from calcium and magnesium concentrations at surface water locations in SEADs-4, 13, 26, and 45 where:

$$\text{total hardness} = 2.5(Ca^{+2)} + 4.1\,(Mg^{+2}).$$

and Ca^{+2} and Mg^{+2} concentrations were values from Tables 4.1-3, 4.6-3, and 4.7-3

The average water hardness for the SEDA site was calculated to be 300 ppm.

Sediment criteria were guidance values from the NYSDEC Bureau of Environmental Protection Division of Fish and Wildlife. The most stringent of the sediment criteria for wildlife, human health, or for aquatic life were used as the criteria. All of these values were listed in the sediment data tables in this section. For metals, the criteria were the more stringent of the criteria for aquatic life or the Limit of Tolerance (LOT) values (listed in the same document as the criteria), which are defined as concentrations which would be detrimental to the majority of species, potentially eliminating most.

The data tables included in this Section list only those constituents which were detected in the samples from that AOC. The complete data tables, which include all the constituents which were analyzed, are included in Appendix E.

4.1 SEAD-4

4.1.1 Introduction

A total of 17 surface soil and 25 subsurface soil samples were collected at SEAD-4. To evaluate the extent of runoff contamination, 4 surface water and 9 sediment samples were collected from the pond and the drainage ditches present at the site. Additionally, 5 monitoring wells were installed and sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-4.

4.1.2 Soil

The analytical results for the 17 surface soil samples and 25 subsurface soil samples collected as part of the SEAD-4 investigation are presented in Table 4.1-1. The sample locations were shown in Figure 2.3-2. The following sections describe the nature and extent of contamination in SEAD-4 soils.

4.1.2.1 Volatile Organic Compounds

Surface Soils

The volatile organic compound acetone was the only VOC detected in the surface soil samples collected at SEAD-4. Acetone, which is considered to be a laboratory contaminant, was detected at a concentration of 2J μg/kg in only one sample, SB4-4.1 (collected from the 0-to 2-foot depth interval). This reported concentration of acetone is below the TAGM value of 200 μg/kg.

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 0-0.5 12/13/93 SS4-1 206836	SOIL SEAD-4 0-0.5 12/13/93 SS4-2 206837	SOIL SEAD-4 0-0.5 12/13/93 SS4-3 206838	SOIL SEAD-4 0-0.5 12/13/93 SS4-4 206839	SOIL SEAD-4 0-0.5 12/13/93 SS4-5 206840	SOIL SEAD-4 0-0.5 12/13/93 SS4-6 206841	SOIL SEAD-4 0-0.5 12/13/93 SS4-7 206842	SOIL SEAD-4 0-2 12/06/93 SB4-1.1 206265	SOIL SEAD-4 0-2 12/06/93 SB4-1.5 206268 SB4-1.1DUP
CS														
	ug/kg	2	2.4%	200	0	14 U	12 U	13 U	14 U	13 U	13 U	24 U	12 U	12 U
	ug/kg	15	16.7%	300	0	14 U	12 U	13 U	14 U	13 U	13 U	24 U	12 U	12 U
	ug/kg	23	2.4%	NA	NA	6.1 U	6 U	6.3 U	6.3 U	6.1 U	6.7 U	11 UJ	5.9 U	6 U
ne	ug/kg	120	2.4%	NA	NA	120 J	130 U	130 U	130 U	130 U	130 U	130 UJ	130 U	130 U
	ug/kg	67	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 UJ	130 U	130 U
e	ug/kg	72	2.4%	NA	NA	72 J	130 U	130 U	130 U	130 U	130 U	130 UJ	130 U	130 U
trotoluene	ug/kg	90	2.4%	NA	NA	90 J	130 U	130 U	130 U	130 U	130 U	130 UJ	130 U	130 U
GANICS														
	ug/kg	45	4.8%	41000	0	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	380	4.8%	50000 *	0	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	380	4.8%	6200	0	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	380	4.8%	50000 *	0	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	1400	9.5%	50000 *	0	110 J	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	340	7.1%	50000 *	0	25 J	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	380	4.8%	50000 *	0	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
e	ug/kg	380	40.5%	8100	0	85 J	400 U	410 U	410 U	400 U	440 U	720 UJ	56 J	50 J
	ug/kg	2400	23.8%	50000 *	0	230 J	18 J	410 U	19 J	400 U	23 J	64 J	390 U	390 U
	ug/kg	1800	14.3%	50000 *	0	210 J	400 U	410 U	410 U	400 U	440 U	66 J	390 U	390 U
e	ug/kg	380	4.8%	50000 *	0	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
)	ug/kg	1100	11.9%	220	1	110 J	400 U	410 U	410 U	400 U	440 U	48 J	390 U	390 U
	ug/kg	1000	14.3%	400	1	140 J	400 U	410 U	410 U	400 U	440 U	67 J	390 U	390 U
thalate	ug/kg	2000	33.3%	50000 *	0	45 J	400 U	410 U	23 J	33 J	440 U	86 J	390 U	390 U
ne	ug/kg	730	16.7%	1100	0	150 J	400 U	410 U	24 J	400 U	440 U	90 J	390 U	390 U
ne	ug/kg	890	11.9%	1100	0	65 J	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
	ug/kg	880	11.9%	61	3	100 J	400 U	410 U	410 U	400 U	440 U	56 J	390 U	390 U
rene	ug/kg	260	7.1%	3200	0	75 J	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
ne	ug/kg	32	2.4%	14	1	400 U	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U
e	ug/kg	270	7.1%	50000 *	0	66 J	400 U	410 U	410 U	400 U	440 U	720 UJ	390 U	390 U

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 0-0.5 12/13/93 SS4-1 206836	SOIL SEAD-4 0-0.5 12/13/93 SS4-2 206837	SOIL SEAD-4 0-0.5 12/13/93 SS4-3 206838	SOIL SEAD-4 0-0.5 12/13/93 SS4-4 206839	SOIL SEAD-4 0-0.5 12/13/93 SS4-5 206840	SOIL SEAD-4 0-0.5 12/13/93 SS4-6 206841	SOIL SEAD-4 0-0.5 12/13/93 SS4-7 206842	SOIL SEAD-4 0-2 12/06/93 SB4-1.1 206265	SOIL SEAD-4 0-2 12/06/93 SB4-1.5 206268 SB4-1.1DUP
	ug/kg	5.9	2.4%	300	0	2.1 U	2 U	2.1 U	2.1 U	2.1 U	2.3 U	3.7 UJ	2 UJ	2 U
	ug/kg	8.2	4.8%	41	0	2.2 J	2 U	2.1 U	2.1 U	2.1 U	2.3 U	3.7 UJ	2 UJ	2 U
	ug/kg	11	2.4%	900	0	2.1 U	2 U	2.1 U	2.1 U	2.1 U	2.3 U	3.7 UJ	2 UJ	2 U
	ug/kg	5.4	2.4%	44	0	4 U	4 U	4.1 U	4.1 U	4 U	5.4 J	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	21	9.5%	2100	0	8.5 J	4 U	4.1 U	4.1 U	4 U	4.4 U	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	34	2.4%	100	0	4 U	4 U	4.1 U	4.1 U	4 U	4.4 U	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	3.1	2.4%	900	0	3.1 J	4 U	4.1 U	4.1 U	4 U	4.4 U	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	2.5	2.4%	2900	0	2.5 J	4 U	4.1 U	4.1 U	4 U	4.4 U	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	3.8	2.4%	1000	0	3.8 J	4 U	4.1 U	4.1 U	4 U	4.4 U	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	6.2	2.4%	2100	0	6.2 J	4 U	4.1 U	4.1 U	4 U	4.4 U	7.2 UJ	3.9 UJ	3.9 U
	ug/kg	10	16.7%	540	0	4.9 J	2 U	2.1 U	2.1 U	2.1 U	2.3 U	3.7 UJ	2 UJ	2 U
	ug/kg	2	14.3%	540	0	1.1 J	2 U	2.1 U	2.1 U	2.1 U	2.3 U	3.7 UJ	2 UJ	2 U
	ug/kg	38	14.3%	1000(a)	0	40 U	40 U	41 U	41 U	40 U	44 U	72 UJ	39 UJ	39 U
	ug/kg	1600	28.6%	1000(a)	1	250 J	40 U	41 U	38 J	28 J	44 U	70 J	39 UJ	39 U
	ug/kg	110	14.3%	1000(a)	0	40 U	40 U	41 U	41 U	40 U	44 U	110 J	39 UJ	39 U
	mg/kg	21000	100.0%	15523	19	15600	18700	10300	15100	15900	18800	14100 J	14800	21000
	mg/kg	96.1	31.0%	5	10	3.9 UJ	4.3 UJ	37.1 J	76.9 J	98.1 J	5.9 J	7.8 UJ	4.8 UJ	3.8 UJ
	mg/kg	21.5	100.0%	7.5	4	5.9	5.9	7	6.1	9.8	7	13.1 J	8.2	4.2
	mg/kg	277	100.0%	300	0	62	76.1	34.4	58.2	92.1	129	277 J	72	97.7
	mg/kg	1.8	100.0%	1	1	0.69 J	0.84 J	0.53 J	0.7 J	0.73 J	1 J	1.8 J	0.73 J	0.64 J
	mg/kg	1.8	9.5%	1	2	0.38 U	0.42 U	0.36 U	0.51 U	0.48 U	0.54 U	1.8 J	0.47 U	0.37 U
	mg/kg	196000	100.0%	120725	1	14300	3480	11200	6930	7210	5410	196000 J	4280	2460
	mg/kg	4870	66.7%	24	18	25.3 J	56.1 J	1790 J	4200 J	4870 J	395 J	34.1 J	23.2	27.9
	mg/kg	29.1	100.0%	30	0	12.7	15.3	10.2	12.8	14.9	17.7	12.4 J	11.3	5.9 J
	mg/kg	3410	100.0%	25	20	20 J	40.6 J	1350 J	3410 J	3120 J	234 J	335 J	14.1	15.1
	mg/kg	64600	100.0%	28988	19	29800	33800	21900	31000	31000	34300	64600 J	27500	19500
	mg/kg	116	83.3%	30	2	23.7 R	12 R	27.3 R	19 R	27.2 R	22.7 R	102 J R	17.7 J	9.8 J
	mg/kg	32000	100.0%	12308	4	6850	8100	4400	5950	5470	5030	8550 J	4270	4460
	mg/kg	1340	68.7%	759	6	708	638	335	339	533	1080	1220 J	615 J R	119 J R
	mg/kg	0.27	73.8%	0.1	4	0.02 J	0.04 J	0.15	0.21	0.15	0.04 J	0.27 J	0.05 J	0.04 J
	mg/kg	228	100.0%	37	15	36.8	40.1	25.9	34.3	35.3	37.2	228 J	27.8	25.1
	mg/kg	2490	100.0%	1548	12	1650	1930	861	1310	1870	2080	2340 J	1250	2490
	mg/kg	3.4	59.5%	2	1	0.27 J	0.15 U	0.2 J	0.16 J	0.21 J	0.55 J	3.4 J	0.4 J	0.23 J
	mg/kg	1.2	11.9%	0.5	5	0.76 U	0.84 U	0.72 U	1 U	0.98 U	1.1 U	1.5 UJ	0.93 U	0.74 U
	mg/kg	1270	95.2%	114	9	61.8 J	49.2 J	57.8 J	50.4 J	47.7 J	54.9 J	1270 J	43.8 U	39.2 J
	mg/kg	1250	100.0%	150	1	22.9	27.2	14.7	24.1	28.7	31.7	1250 J	28.6	31
	mg/kg	1010	100.0%	90	18	65.9	96.5	566	755	636	140	859 J	79.6	72.1
gen	mg/kg	3.3	100.0%	NA	NA	0.05	0.1	0.1	1.51	0.07	0.08	0.11	0.07	0.04
	%W/W	94.9		NA	NA	82	83.2	79.8	79.7	81.8	75.1	45.8	85.2	83.8

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 8-10 12/06/93 SB4-1.6 206269	SOIL SEAD-4 0-2 11/10/93 SB4-2.1 204099	SOIL SEAD-4 2-4 11/10/93 SB4-2.2 204100	SOIL SEAD-4 0-2 11/10/93 SB4-3.1 204101	SOIL SEAD-4 4-6 11/10/93 SB4-3.3 204102	SOIL SEAD-4 6-8 11/10/93 SB4-3.4 204103	SOIL SEAD-4 0-2 12/05/93 SB4-4.1 206144	SOIL SEAD-4 0-2 12/05/93 SB4-4.5 206148 SB4-4.1DUP
CS													
	ug/kg	2	2.4%	200	0	11 U	19 U	11 U	11 U	11 U	10 U	2 J	13 U
	ug/kg	15	16.7%	300	0	11 U	12 U	11 U	11 U	11 U	10 U	13 U	13 U
	ug/kg	23	2.4%	NA	NA	5.5 U	6.2 U	5.3 U	5.5 U	5.5 UJ	5.4 U	23	6.4 U
ne	ug/kg	120	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	67	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
e	ug/kg	72	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
trotoluene	ug/kg	90	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
GANICS													
	ug/kg	45	4.8%	41000	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
	ug/kg	380	4.8%	50000 *	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
	ug/kg	380	4.8%	6200	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
	ug/kg	380	4.8%	50000 *	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
	ug/kg	1400	9.5%	50000 *	0	360 U	400 U	340 U	26 J	350 U	350 U	450 U	410 UJ
	ug/kg	340	7.1%	50000 *	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
	ug/kg	380	4.8%	50000 *	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
e	ug/kg	380	40.5%	8100	0	46 J	28 J	18 J	29 J	19 J	19 J	450 UJ	410 UJ
	ug/kg	2400	23.6%	50000 *	0	360 U	400 U	340 U	62 J	350 U	350 U	450 U	410 UJ
	ug/kg	1800	14.3%	50000 *	0	360 U	400 U	340 U	52 J	350 U	350 U	450 U	410 UJ
e	ug/kg	380	4.6%	50000 *	0	360 U	400 U	340 U	360 U	350 U	350 U	450 UJ	410 UJ
	ug/kg	1100	11.9%	220	1	360 U	400 U	340 U	26 J	350 U	350 U	450 U	410 UJ
	ug/kg	1000	14.3%	400	1	360 U	400 U	340 U	39 J	350 U	350 U	450 U	410 UJ
thalate	ug/kg	2000	33.3%	50000 *	0	360 U	1900	1100	2000	1500	1400	47 J	130 J
ne	ug/kg	730	16.7%	1100	0	360 U	400 U	340 U	32 J	350 U	350 U	450 U	410 UJ
ne	ug/kg	890	11.9%	1100	0	360 U	400 U	340 U	31 J	350 U	350 U	450 U	410 UJ
	ug/kg	880	11.9%	61	3	360 U	400 U	340 U	27 J	350 U	350 U	450 U	410 UJ
rene	ug/kg	260	7.1%	3200	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
ne	ug/kg	32	2.4%	14	1	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ
e	ug/kg	270	7.1%	50000 *	0	360 U	400 U	340 U	360 U	350 U	350 U	450 U	410 UJ

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

...UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 8-10 12/06/93 SB4-1.6 206269	SOIL SEAD-4 0-2 11/10/93 SB4-2.1 204099	SOIL SEAD-4 2-4 11/10/93 SB4-2.2 204100	SOIL SEAD-4 0-2 11/10/93 SB4-3.1 204101	SOIL SEAD-4 4-6 11/10/93 SB4-3.3 204102	SOIL SEAD-4 6-8 11/10/93 SB4-3.4 204103	SOIL SEAD-4 0-2 12/05/93 SB4-4.1 206144	SOIL SEAD-4 0-2 12/05/93 SB4-4.5 206148 SB4-4.1DUP
	ug/kg	5.9	2.4%	300	0	1.9 UJ	2.1 U	1.8 U	1.9 U	1.8 U	1.8 U	2.3 U	2.2 UJ
	ug/kg	8.2	4.8%	41	0	1.9 UJ	2.1 U	1.8 U	1.9 U	1.8 U	1.8 U	2.3 U	2.2 UJ
	ug/kg	11	2.4%	900	0	1.9 UJ	2.1 U	1.8 U	1.9 U	1.8 U	1.8 U	2.3 U	2.2 UJ
	ug/kg	5.4	2.4%	44	0	3.6 UJ	4.1 U	3.5 U	3.6 U	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	21	9.5%	2100	0	3.6 UJ	4.1 U	3.5 U	3.2 J	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	34	2.4%	100	0	3.6 UJ	4.1 U	3.5 U	3.6 U	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	3.1	2.4%	900	0	3.6 UJ	4.1 U	3.5 U	3.6 U	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	2.5	2.4%	2900	0	3.6 UJ	4.1 U	3.5 U	3.6 U	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	3.8	2.4%	1000	0	3.6 UJ	4.1 U	3.5 U	3.6 U	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	6.2	2.4%	2100	0	3.6 UJ	4.1 U	3.5 U	3.6 U	3.6 U	3.5 U	4.5 U	4.2 UJ
	ug/kg	10	16.7%	540	0	1.9 UJ	2.1 U	1.8 U	1.9 U	1.8 U	1.8 U	2.3 U	2.2 UJ
	ug/kg	2	14.3%	540	0	1.9 UJ	2.1 U	1.8 U	1.9 U	1.8 U	1.8 U	2.3 U	2.2 UJ
	ug/kg	38	14.3%	1000(a)	0	36 UJ	41 U	27 J	36 U	36 U	35 U	45 U	42 UJ
	ug/kg	1600	28.6%	1000(a)	1	36 UJ	41 U	35 U	28 J	36 U	35 U	29 J	42 UJ
	ug/kg	110	14.3%	1000(a)	0	36 UJ	41 U	35 U	36 U	36 U	35 U	45 U	42 UJ
	mg/kg	21000	100.0%	15523	19	19200	16300	15600	9590	9680	9730	16100	16200
	mg/kg	96.1	31.0%	5	10	2.8 UJ	10.5 U	7.6 U	5.8 U	10.1 U	5.8 U	16.1 J	57.8 J
	mg/kg	21.5	100.0%	7.5	4	21.5	5.8 J	4.2 J	4.9 J	6.6 J	9.5 J	6.9	7.1
	mg/kg	277	100.0%	300	0	81.2	133	46	29.8	49.6	39.7	107	122
	mg/kg	1.8	100.0%	1	1	1	1	0.72 J	0.48 J	0.43 J	0.52 J	0.8 J	0.8 J
	mg/kg	1.8	9.5%	1	2	0.27 U	0.66 U R	0.48 U R	0.37 U R	0.63 U R	0.36 U R	0.51 U	0.34 U
	mg/kg	196000	100.0%	120725	1	14400	2900	12700	24700	59600	31400	4500	6840
	mg/kg	4870	66.7%	24	18	32.7	22.9	27.5	19.1	17.3	17.2	936 R	2670 R
	mg/kg	29.1	100.0%	30	0	29.1	12.5	14.3	11.1	9.9	12.5	11.8 J	15.2
	mg/kg	3410	100.0%	25	20	21.6	17 J	27.5 J	27.8 J	19.1 J	17.5 J	1290 J	1520 J
	mg/kg	64600	100.0%	28986	19	37900	28600	33900	21900	22300	21200	28400	33700
	mg/kg	116	83.3%	30	2	9.1 J	14.4	8.3	19.7	5.4	10.1	20.9 J	19.1 J
	mg/kg	32000	100.0%	12308	4	8040	3770	7160	4920	12100	5610	4380	5110
	mg/kg	1340	66.7%	759	6	795 R	1340	436	338	388	373	564	917
	mg/kg	0.27	73.8%	0.1	4	0.04 J	0.03 U	0.02 U	0.03 J	0.02 U	0.04 U	0.03 U	0.04 J
	mg/kg	228	100.0%	37	15	62.3	27.3	42.7	36.6	28.6	28.5	39.6	35.4
	mg/kg	2490	100.0%	1548	12	2030	1270	1210	923	1090	1050	1510	1430
	mg/kg	3.4	59.5%	2	1	0.14 U	0.32 J	0.21 UJ	0.36 J	0.2 UJ	0.22 UJ	0.73 J	0.76 J
	mg/kg	1.2	11.9%	0.5	5	0.64 J	1.3 UJ	0.97 UJ	0.74 UJ	1.3 UJ	0.73 UJ	1 U	0.68 U
	mg/kg	1270	95.2%	114	9	91.6 J	39.3 J	71.1 J	78.8 J	126 J	96 J	51.3 J	49.2 J
	mg/kg	1250	100.0%	150	1	29.3	29.3	22.5	15	15.5	13.8	25.3	27.7
	mg/kg	1010	100.0%	90	18	115	61.3 J	95 J	45.5 J	87.3 J	69.4 J	1010	423
...gen	mg/kg	3.3	100.0%	NA	NA	0.02	0.58	0.04	0.15	0.06	0.05	0.05	0.01
	%W/W	94.9		NA	NA	91.1	80.8	94.9	90.8	90.9	93.6	73.3	78.3

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 4-6 12/05/93 SB4-4.2 206145	SOIL SEAD-4 6-8 12/05/93 SB4-4.3 206147	SOIL SEAD-4 0-2 12/05/93 SB4-5.1 206149	SOIL SEAD-4 2-4 12/05/93 SB4-5.2 206150	SOIL SEAD-4 0-2 12/06/93 SB4-6.1 206270	SOIL SEAD-4 2-4 12/06/93 SB4-6.2 206271
CS											
	ug/kg	2	2.4%	200	0	11 U	11 U	11 U	11 U	13 U	11 U
	ug/kg	15	16.7%	300	0	11 U	11 U	11 U	11 U	13 U	11 U
	ug/kg	23	2.4%	NA	NA	5.4 U	5.5 U	5.9 U	5.8 U	6.7 U	5.4 U
ne	ug/kg	120	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	67	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
e	ug/kg	72	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
trotoluene	ug/kg	90	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
GANICS											
	ug/kg	45	4.8%	41000	0	350 UJ	370 U	30 J	370 UJ	440 U	350 U
	ug/kg	380	4.8%	50000 *	0	350 UJ	370 U	380 UJ	370 UJ	440 U	350 U
	ug/kg	380	4.8%	6200	0	350 UJ	370 U	380 UJ	370 UJ	440 U	350 U
	ug/kg	380	4.8%	50000 *	0	350 UJ	370 U	380 UJ	370 UJ	440 U	350 U
	ug/kg	1400	9.5%	50000 *	0	350 UJ	370 U	120 J	370 UJ	440 U	350 U
	ug/kg	340	7.1%	50000 *	0	350 UJ	370 U	33 J	370 UJ	440 U	350 U
	ug/kg	380	4.8%	50000 *	0	350 UJ	370 U	380 UJ	370 UJ	440 U	350 U
e	ug/kg	380	40.5%	8100	0	350 UJ	370 UJ	380 UJ	370 UJ	51 J	35 J
	ug/kg	2400	23.8%	50000 *	0	350 UJ	370 U	280 J	370 UJ	440 U	350 U
	ug/kg	1800	14.3%	50000 *	0	350 UJ	370 U	380 J	370 UJ	440 U	350 U
e	ug/kg	380	4.8%	50000 *	0	350 UJ	370 UJ	380 UJ	370 UJ	440 U	350 U
	ug/kg	1100	11.9%	220	1	350 UJ	370 U	210 J	370 UJ	440 U	350 U
	ug/kg	1000	14.3%	400	1	350 UJ	370 U	260 J	370 UJ	440 U	350 U
thalate	ug/kg	2000	33.3%	50000 *	0	110 J	370 UJ	37 J	370 UJ	440 U	350 U
ne	ug/kg	730	16.7%	1100	0	350 UJ	370 U	130 J	370 UJ	440 U	350 U
e	ug/kg	890	11.9%	1100	0	350 UJ	370 U	150 J	370 UJ	440 U	350 U
	ug/kg	880	11.9%	61	3	350 UJ	370 U	180 J	370 UJ	440 U	350 U
rene	ug/kg	260	7.1%	3200	0	350 UJ	370 U	59 J	370 UJ	440 U	350 U
ne	ug/kg	32	2.4%	14	1	350 UJ	370 U	32 J	370 UJ	440 U	350 U
e	ug/kg	270	7.1%	50000 *	0	350 UJ	370 U	120 J	370 UJ	440 U	350 U

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 4-6 12/05/93 SB4-4.2 206145	SOIL SEAD-4 6-8 12/05/93 SB4-4.3 206147	SOIL SEAD-4 0-2 12/05/93 SB4-5.1 206149	SOIL SEAD-4 2-4 12/05/93 SB4-5.2 206150	SOIL SEAD-4 0-2 12/06/93 SB4-6.1 206270	SOIL SEAD-4 2-4 12/06/93 SB4-6.2 206271
	ug/kg	5.9	2.4%	300	0	1.8 U	1.9 U	5.9 J	2 U	2.3 UJ	1.8 UJ
	ug/kg	8.2	4.8%	41	0	1.8 U	1.9 U	8.2 J	2 U	2.3 UJ	1.8 UJ
	ug/kg	11	2.4%	900	0	1.8 U	1.9 U	11	2 U	2.3 UJ	1.8 UJ
	ug/kg	5.4	2.4%	44	0	3.6 U	3.7 U	19 U	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	21	9.5%	2100	0	3.6 U	3.7 U	21 J	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	34	2.4%	100	0	3.6 U	3.7 U	34 J	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	3.1	2.4%	900	0	3.6 U	3.7 U	19 U	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	2.5	2.4%	2900	0	3.6 U	3.7 U	19 U	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	3.8	2.4%	1000	0	3.6 U	3.7 U	19 U	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	6.2	2.4%	2100	0	3.6 U	3.7 U	19 U	3.8 U	4.4 UJ	3.5 UJ
	ug/kg	10	16.7%	540	0	1.8 U	1.9 U	10 J	2 U	2.3 UJ	1.8 UJ
	ug/kg	2	14.3%	540	0	1.8 U	1.9 U	9.8 U	2 U	2.3 UJ	1.8 UJ
	ug/kg	38	14.3%	1000(a)	0	36 U	37 U	190 U	38 U	44 UJ	35 UJ
	ug/kg	1600	28.6%	1000(a)	1	36 U	37 U	1600	38 U	44 UJ	35 UJ
	ug/kg	110	14.3%	1000(a)	0	36 U	37 U	190 U	38 U	44 UJ	35 UJ
	mg/kg	21000	100.0%	15523	19	9500	10200	15000	15700	17100	12800
	mg/kg	96.1	31.0%	5	10	3.4 UJ	4.4 UJ	6.3 J	3.5 J	4.8 UJ	4 UJ
	mg/kg	21.5	100.0%	7.5	4	4.5	5	3.3	6.9	7.3	5.5
	mg/kg	277	100.0%	300	0	45.4	50.5	92.7	99.8	132	37.1 J
	mg/kg	1.8	100.0%	1	1	0.37 J	0.38 J	0.65 J	0.65 J	0.96 J	0.64 J
	mg/kg	1.8	9.5%	1	2	0.33 U	0.42 U	0.66 J	0.3 U	0.46 U	0.39 U
	mg/kg	196000	100.0%	120725	1	65300	61300	42800	55000	3750	12400
	mg/kg	4870	66.7%	24	18	21.8 R	75.8 R	23.5 R	26.5 R	25.7	24.4
	mg/kg	29.1	100.0%	30	0	10.5	9.8 J	12.3	9.5	12.5	14.9
	mg/kg	3410	100.0%	25	20	19.6 J	52.8 J	26.2 J	28.1 J	25.7	19.5
	mg/kg	64600	100.0%	28986	19	20500	24400	27900	26700	28600	28600
	mg/kg	116	83.3%	30	2	8.7 J	6.8 J	116	11.8 J	18.8 J	11 J
	mg/kg	32000	100.0%	12308	4	11700	8390	10200	11800	4560	5820
	mg/kg	1340	66.7%	759	6	543	540	648	436	1260 R	415 R
	mg/kg	0.27	73.8%	0.1	4	0.03 J	0.04 U	0.03 J	0.04 U	0.08 J	0.02 J
	mg/kg	228	100.0%	37	15	24.6	27.2	34.9	32.4	35.2	39.3
	mg/kg	2490	100.0%	1548	12	1040	1090	1720	1400	2000	1250
	mg/kg	3.4	59.5%	2	1	0.1 UJ	0.23 J	0.32 J	0.45 J	0.86 J	0.12 U
	mg/kg	1.2	11.9%	0.5	5	0.67 U	0.85 U	0.75 U	0.6 U	1 J	0.78 U
	mg/kg	1270	95.2%	114	9	116 J	132 J	90.1 J	106 J	43.7 U	49.1 J
	mg/kg	1250	100.0%	150	1	13.1	14.4	23.8	24.4	29	18.5
	mg/kg	1010	100.0%	90	18	61.6	112	238	67.3	87.4	91.5
gen	mg/kg	3.3	100.0%	NA	NA	0.03	0.01	0.01	0.14	0.16	0.04
	%W/W	94.9		NA	NA	92.2	89.9	85.1	86.4	75.3	93.1

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 0-2 12/05/93 SB4-7.1 206151	SOIL SEAD-4 4-6 12/05/93 SB4-7.3 206152	SOIL SEAD-4 6-8 12/05/93 SB4-7.4 206153	SOIL SEAD-4 0-2 12/05/93 SB4-8.1 206154	SOIL SEAD-4 2-4 12/05/93 SB4-8.2 206155
CS										
	ug/kg	2	2.4%	200	0	12 U	11 U	11 U	12 U	12 U
	ug/kg	15	16.7%	300	0	12 U	11 U	11 U	12 U	14
	ug/kg	23	2.4%	NA	NA	5.5 U	5.7 U	5.5 U	5.8 U	5.8 U
ne	ug/kg	120	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U
	ug/kg	67	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U
e	ug/kg	72	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U
trotoluene	ug/kg	90	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U
GANICS										
	ug/kg	45	4.8%	41000	0	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	380	4.8%	50000 *	0	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	380	4.8%	6200	0	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	380	4.8%	50000 *	0	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	1400	9.5%	50000 *	0	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	340	7.1%	50000 *	0	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	380	4.8%	50000 *	0	360 UJ	370 UJ	350 UJ	380 U	380 U
e	ug/kg	380	40.5%	8100	0	360 UJ	370 UJ	350 UJ	380 UJ	380 UJ
	ug/kg	2400	23.8%	50000 *	0	22 J	370 UJ	350 UJ	380 U	380 U
	ug/kg	1800	14.3%	50000 *	0	19 J	370 UJ	350 UJ	380 U	380 U
e	ug/kg	380	4.8%	50000 *	0	360 UJ	370 UJ	350 UJ	380 UJ	380 UJ
	ug/kg	1100	11.9%	220	1	360 UJ	370 UJ	350 UJ	380 U	380 U
	ug/kg	1000	14.3%	400	1	20 J	370 UJ	350 UJ	380 U	380 U
thalate	ug/kg	2000	33.3%	50000 *	0	21 J	370 UJ	350 UJ	380 UJ	32 J
ne	ug/kg	730	16.7%	1100	0	20 J	370 UJ	350 UJ	380 U	380 U
e	ug/kg	890	11.9%	1100	0	19 J	370 UJ	350 UJ	380 U	380 U
	ug/kg	880	11.9%	61	3	360 UJ	370 UJ	350 UJ	380 U	380 U
rene	ug/kg	260	7.1%	3200	0	360 UJ	370 UJ	350 UJ	380 U	380 U
ne	ug/kg	32	2.4%	14	1	360 UJ	370 UJ	350 UJ	380 U	380 U
e	ug/kg	270	7.1%	50000 *	0	360 UJ	370 UJ	350 UJ	380 U	380 U

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 0-2 12/05/93 SB4-7.1 206151	SOIL SEAD-4 4-6 12/05/93 SB4-7.3 206152	SOIL SEAD-4 6-8 12/05/93 SB4-7.4 206153	SOIL SEAD-4 0-2 12/05/93 SB4-8.1 206154	SOIL SEAD-4 2-4 12/05/93 SB4-8.2 206155
	ug/kg	5.9	2.4%	300	0	1.9 U	1.9 U	1.8 U	2 U	1.9 U
	ug/kg	8.2	4.8%	41	0	1.9 U	1.9 U	1.8 U	2 U	1.9 U
	ug/kg	11	2.4%	900	0	1.9 U	1.9 U	1.8 U	2 U	1.9 U
	ug/kg	5.4	2.4%	44	0	3.6 U	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	21	9.5%	2100	0	3.6 J	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	34	2.4%	100	0	3.6 U	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	3.1	2.4%	900	0	3.6 U	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	2.5	2.4%	2900	0	3.6 U	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	3.8	2.4%	1000	0	3.6 U	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	8.2	2.4%	2100	0	3.6 U	3.7 U	3.5 U	3.8 U	3.8 U
	ug/kg	10	16.7%	540	0	1.9 U	1.9 U	1.8 U	2 U	1.9 U
	ug/kg	2	14.3%	540	0	1.9 U	1.9 U	1.8 U	2 U	1.9 U
	ug/kg	38	14.3%	1000(a)	0	36 U	37 U	35 U	38 U	38 U
	ug/kg	1600	28.6%	1000(a)	1	36 U	37 U	35 U	38 U	38 U
	ug/kg	110	14.3%	1000(a)	0	36 U	37 U	35 U	38 U	38 U
	mg/kg	21000	100.0%	15523	19	14600	11400	6410	13300	16700
	mg/kg	96.1	31.0%	5	10	6.4 J	2.9 J	3 J	2.7 UJ	4.2 UJ
	mg/kg	21.5	100.0%	7.5	4	5.1	3.4	5.7	5.6	5.1
	mg/kg	277	100.0%	300	0	61.5	77.3	45.4	69.4	116
	mg/kg	1.8	100.0%	1	1	0.62 J	0.46 J	0.38 J	0.65	0.72 J
	mg/kg	1.8	9.5%	1	2	0.39 U	0.27 U	0.29 U	0.27 J	0.41 U
	mg/kg	196000	100.0%	120725	1	38600	71600	87500	25200	9320
	mg/kg	4870	66.7%	24	18	25.4 R	21.4 R	14 R	21.4 R	24.9 R
	mg/kg	29.1	100.0%	30	0	12.7	9.1	8.3	11.7	15.3
	mg/kg	3410	100.0%	25	20	27.5 J	21 J	19.5 J	25.6 J	21.6 J
	mg/kg	64600	100.0%	28986	19	29400	21800	19100	25900	29700
	mg/kg	116	83.3%	30	2	16.6 J	9.4 J	16.6 J	19.7 J	10.3 J
	mg/kg	32000	100.0%	12308	4	6650	15200	11900	6380	5870
	mg/kg	1340	66.7%	759	6	622	423	383	418	1240
	mg/kg	0.27	73.8%	0.1	4	0.03 J	0.02 U	0.03 U	0.03 J	0.03 J
	mg/kg	228	100.0%	37	15	40.2	29.3	22.3	31.7	37.3
	mg/kg	2490	100.0%	1548	12	1420	1470	1030	1470	2090
	mg/kg	3.4	59.5%	2	1	0.36 J	0.11 UJ	0.1 UJ	0.42 J	0.53 J
	mg/kg	1.2	11.9%	0.5	5	0.79 U	0.55 U	0.57 U	0.52 U	0.82 U
	mg/kg	1270	95.2%	114	9	100 J	120 J	133 J	64.4 J	53.3 J
	mg/kg	1250	100.0%	150	1	23.4	18.1	13	22	28.7
	mg/kg	1010	100.0%	90	18	93.2	72.1	84	71.7	73.9
gen	mg/kg	3.3	100.0%	NA	NA	0.16	0.02	0.01	1	0.36
	%W/W	94.9		NA	NA	89.9	88.4	91.9	85.8	85.6

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 4-6 12/05/93 SB4-8.3 206156	SOIL SEAD-4 0-2 12/05/93 SB4-9.1 206157	SOIL SEAD-4 2-4 12/05/93 SB4-9.2 206158	SOIL SEAD-4 4-6 12/05/93 SB4-9.3 206159	SOIL SEAD-4 0-2 12/06/93 SB4-10.1 206272	SOIL SEAD-4 2-4 12/06/93 SB4-10.2 206273
CS											
	ug/kg	2	2.4%	200	0	11 U	11 U	12 U	11 U	12 U	11 U
	ug/kg	15	16.7%	300	0	2 J	11 U	2 J	3 J	12 U	11 U
	ug/kg	23	2.4%	NA	NA	5.6 U	5.9 U	6.1 U	5.4 U	5.8 U	5.3 U
ne	ug/kg	120	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	67	2.4%	NA	NA	130 U	130 U	67 J	130 U	130 U	130 U
e	ug/kg	72	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
trotoluene	ug/kg	90	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
GANICS											
	ug/kg	45	4.8%	41000	0	360 UJ	45 J	380 UJ	340 UJ	390 U	350 U
	ug/kg	380	4.8%	50000 *	0	360 UJ	72 J	380 UJ	340 UJ	390 U	350 U
	ug/kg	380	4.8%	6200	0	360 UJ	33 J	380 UJ	340 UJ	390 U	350 U
	ug/kg	380	4.8%	50000 *	0	360 UJ	110 J	380 UJ	340 UJ	390 U	350 U
	ug/kg	1400	9.5%	50000 *	0	360 UJ	1400	380 UJ	340 UJ	390 U	350 U
	ug/kg	340	7.1%	50000 *	0	360 UJ	340 J	380 UJ	340 UJ	390 U	350 U
	ug/kg	380	4.8%	50000 *	0	360 UJ	160 J	380 UJ	340 UJ	390 U	350 U
e	ug/kg	380	40.5%	8100	0	360 UJ	390 UJ	380 UJ	340 UJ	58 J	41 J
	ug/kg	2400	23.8%	50000 *	0	360 UJ	2400	380 UJ	340 UJ	390 U	350 U
	ug/kg	1800	14.3%	50000 *	0	360 UJ	1800	380 UJ	340 UJ	390 U	350 U
e	ug/kg	380	4.8%	50000 *	0	360 UJ	390 UJ	18 J	340 UJ	390 U	350 U
)	ug/kg	1100	11.9%	220	1	360 UJ	1100	380 UJ	340 UJ	390 U	350 U
	ug/kg	1000	14.3%	400	1	360 UJ	1000	380 UJ	340 UJ	390 U	350 U
thalate	ug/kg	2000	33.3%	50000 *	0	360 UJ	390 UJ	380 UJ	340 UJ	390 U	350 U
ne	ug/kg	730	16.7%	1100	0	360 UJ	730	380 UJ	340 UJ	390 U	350 U
ne	ug/kg	890	11.9%	1100	0	360 UJ	890	380 UJ	340 UJ	390 U	350 U
	ug/kg	880	11.9%	61	3	360 UJ	880	380 UJ	340 UJ	390 U	350 U
rene	ug/kg	260	7.1%	3200	0	360 UJ	260 J	380 UJ	340 UJ	390 U	350 U
ne	ug/kg	32	2.4%	14	1	360 UJ	390 U	380 UJ	340 UJ	390 U	350 U
e	ug/kg	270	7.1%	50000 *	0	360 UJ	270 J	380 UJ	340 UJ	390 U	350 U

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 4-6 12/05/93 SB4-8.3 206156	SOIL SEAD-4 0-2 12/05/93 SB4-9.1 206157	SOIL SEAD-4 2-4 12/05/93 SB4-9.2 206158	SOIL SEAD-4 4-6 12/05/93 SB4-9.3 208159	SOIL SEAD-4 0-2 12/06/93 SB4-10.1 206272	SOIL SEAD-4 2-4 12/06/93 SB4-10.2 206273
	ug/kg	5.9	2.4%	300	0	1.9 U	2 U	2.1 U	1.8 U	2 U	1.8 U
	ug/kg	8.2	4.8%	41	0	1.9 U	2 U	2.1 U	1.8 U	2 U	1.8 U
	ug/kg	11	2.4%	900	0	1.9 U	2 U	2.1 U	1.8 U	2 U	1.8 U
	ug/kg	5.4	2.4%	44	0	3.6 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	21	9.5%	2100	0	3.8 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	34	2.4%	100	0	3.6 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	3.1	2.4%	900	0	3.6 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	2.5	2.4%	2900	0	3.6 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	3.8	2.4%	1000	0	3.6 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	6.2	2.4%	2100	0	3.6 U	3.9 U	4 U	3.5 U	3.9 U	3.5 U
	ug/kg	10	16.7%	540	0	1.9 U	2 U	2.1 U	1.8 U	2 U	1.8 U
	ug/kg	2	14.3%	540	0	1.9 U	2 U	2.1 U	1.8 U	2 U	1.8 U
	ug/kg	38	14.3%	1000(a)	0	36 U	39 U	40 U	35 U	39 U	35 U
	ug/kg	1600	28.6%	1000(a)	1	36 U	39 U	40 U	35 U	39 U	35 U
	ug/kg	110	14.3%	1000(a)	0	36 U	39 U	40 U	35 U	39 U	35 U
	mg/kg	21000	100.0%	15523	19	9180	12800	20400	13500	15600	17000
	mg/kg	96.1	31.0%	5	10	2.5 UJ	3.7 J	4.1 UJ	3.3 UJ	4.7 UJ	43.8 J
	mg/kg	21.5	100.0%	7.5	4	4.9	4.5	6.5	4.6	6.5	5.8
	mg/kg	277	100.0%	300	0	63.5	94.1	102	51.3	126	58.4
	mg/kg	1.8	100.0%	1	1	0.37 J	0.75 J	0.97	0.69 J	0.82 J	0.87 J
	mg/kg	1.8	9.5%	1	2	0.24 U	0.35 U	0.4 U	0.32 U	0.46 U	0.37 U
	mg/kg	196000	100.0%	120725	1	77000	3660	2770	2350	3250	6540
	mg/kg	4870	66.7%	24	18	14.1 R	17.8 R	33.2 R	23.3 R	178	2560
	mg/kg	29.1	100.0%	30	0	7.9	9	17.3	14.8	19.5	18.7
	mg/kg	3410	100.0%	25	20	21.1 J	13.1 J	24.9 J	11 J	28	1790
	mg/kg	64600	100.0%	28986	19	18500	20600	39000	29800	34700	37200
	mg/kg	116	83.3%	30	2	44.2	26.4 J	12.2 J	8.3 J	12.8 J	9 J
	mg/kg	32000	100.0%	12308	4	17700	3090	7870	5950	5370	7870
	mg/kg	1340	66.7%	759	6	420	794	633	252	1390 R	299 R
	mg/kg	0.27	73.8%	0.1	4	0.01 U	0.07 J	0.03 U	0.02 U	0.06 J	0.03 J
	mg/kg	228	100.0%	37	15	23.1	18.3	57.1	42.2	51.3	56
	mg/kg	2490	100.0%	1548	12	1380	1020	1800	980	1170	1090
	mg/kg	3.4	59.5%	2	1	0.22 J	0.47 J	0.47 J	0.11 J	0.23 J	0.31 J
	mg/kg	1.2	11.9%	0.5	5	0.48 U	0.7 U	0.79 U	0.63 U	0.91 U	0.73 U
	mg/kg	1270	95.2%	114	9	134 J	49.1 J	44.1 J	39.3 J	42.9 U	55.7 J
	mg/kg	1250	100.0%	150	1	14.8	22.6	28.4	17.8	26.9	24.6
	mg/kg	1010	100.0%	90	18	58.5	56.6	93.6	80.5	89.8	576
gen	mg/kg	3.3	100.0%	NA	NA	0.04	0.86	0.44	0.02	0.13	0.03
	%W/W	94.9		NA	NA	89.1	83.9	81.6	92.9	84.6	93.1

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 4-6 12/06/93 SB4-10.3 206274	SOIL SEAD-4 3 11/10/93 TP4-1 204020- 204022	SOIL SEAD-4 3 11/10/93 TP4-2 204023- 204025	SOIL SEAD-4 4 12/05/93 TP4-3 206190	SOIL SEAD-4 4 12/05/93 TP4-4 206191	SOIL SEAD-4 4 12/05/93 TP4-5 206192	SOIL SEAD-4 6 12/05/93 TP4-6 206276	SOIL SEAD-4 5 12/05/93 TP4-7 206193	SOIL SEAD-4 3 12/05/93 TP4-8 206194
CS														
	ug/kg	2	2.4%	200	0	11 U	11 U	11 U	11 U	13 U	11 U	11 U	11 U	12 U
	ug/kg	15	16.7%	300	0	11 U	11 U	11 U	15	12 U	11 U	11 U	5 J	12 U
	ug/kg	23	2.4%	NA	NA	5.4 U	5.7 U	5.6 U	5.9 U	5.9 U	5.8 U	5.5 U	5.8 U	6 U
ne	ug/kg	120	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	67	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
e	ug/kg	72	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
trotoluene	ug/kg	90	2.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
GANICS														
	ug/kg	45	4.8%	41000	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	380	4.8%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	380	4.8%	6200	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	380	4.8%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	1400	9.5%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	340	7.1%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	380	4.8%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
e	ug/kg	380	40.5%	8100	0	63 J	33 J	370 U	380 U	380 U	380 U	55 J	380 UJ	390 U
	ug/kg	2400	23.8%	50000 *	0	350 U	19 J	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	1800	14.3%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
e	ug/kg	380	4.8%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	1100	11.9%	220	1	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	1000	14.3%	400	1	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
thalate	ug/kg	2000	33.3%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
ne	ug/kg	730	16.7%	1100	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
e	ug/kg	890	11.9%	1100	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
	ug/kg	880	11.9%	61	3	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
rene	ug/kg	260	7.1%	3200	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
ne	ug/kg	32	2.4%	14	1	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U
e	ug/kg	270	7.1%	50000 *	0	350 U	370 U	370 U	380 U	380 U	380 U	370 U	380 UJ	390 U

TABLE 4.1-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

IND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-4 4-8 12/06/93 SB4-10.3 206274	SOIL SEAD-4 3 11/10/93 TP4-1 204020-204022	SOIL SEAD-4 3 11/10/93 TP4-2 204023-204025	SOIL SEAD-4 4 12/05/93 TP4-3 206190	SOIL SEAD-4 4 12/05/93 TP4-4 206191	SOIL SEAD-4 4 12/05/93 TP4-5 206192	SOIL SEAD-4 6 12/05/93 TP4-6 206276	SOIL SEAD-4 5 12/05/93 TP4-7 206193	SOIL SEAD-4 3 12/05/93 TP4-8 206194
	ug/kg	5.9	2.4%	300	0	1.8 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	2 U
	ug/kg	8.2	4.8%	41	0	1.8 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	2 U
	ug/kg	11	2.4%	900	0	1.8 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	2 U
	ug/kg	5.4	2.4%	44	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	21	9.5%	2100	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	34	2.4%	100	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	3.1	2.4%	900	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	2.5	2.4%	2900	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	3.8	2.4%	1000	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	6.2	2.4%	2100	0	3.5 U	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.7 U	3.8 U	3.9 U
	ug/kg	10	16.7%	540	0	1.8 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	2 U
	ug/kg	2	14.3%	540	0	1.8 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	2 U
	ug/kg	38	14.3%	1000(a)	0	35 U	37 U	37 U	38 U	38 U	38 U	37 U	38 U	39 U
	ug/kg	1600	28.6%	1000(a)	1	35 U	37 U	37 U	38 U	38 U	38 U	37 U	38 U	39 U
	ug/kg	110	14.3%	1000(a)	0	35 U	37 U	37 U	38 U	38 U	38 U	37 U	38 U	39 U
	mg/kg	21000	100.0%	15523	19	17200	18200	17700	10200	12100	10800	6100	10500	12500
	mg/kg	96.1	31.0%	5	10	40.9 J	11.1 U	11.2 U	3.5 UJ	4 UJ	4.6 UJ	4.6 UJ	3.5 UJ	3.5 UJ
	mg/kg	21.5	100.0%	7.5	4	8.4	7.2 J	6.4 J	5.1	4.3	5.2	5.6	4.2	3.5
	mg/kg	277	100.0%	300	0	54.3	91.9	86.3	65.4	74.9	60.6	37.4 J	64.8	71.8
	mg/kg	1.8	100.0%	1	1	0.83	0.83 J	0.83 J	0.46 J	0.53 J	0.53 J	0.29 J	0.52 J	0.61 J
	mg/kg	1.8	9.5%	1	2	0.34 U	0.69 U R	0.7 U R	0.34 U	0.39 U	1.5	0.45 U	0.34 U	0.34 U
	mg/kg	196000	100.0%	120725	1	2140	6450	3130	88300	76800	86400	64300	59500	2130
	mg/kg	4870	66.7%	24	18	2470	27.1	27.6	15.1	19.4	16.5	10.8	18.3	20.4
	mg/kg	29.1	100.0%	30	0	14.7	13.5	13.9	9.1	10.3	6.6 J	5.9 J	8.3	11.9
	mg/kg	3410	100.0%	25	20	2030	21.3 J	23.8 J	17.3	23	20	12	21.7	14.9
	mg/kg	64600	100.0%	28988	19	35100	33500	35400	18900	24100	20000	13900	21400	27300
	mg/kg	116	83.3%	30	2	5.2 J	11.3	13.4	11 J	10.9 J	11.2 J	8 J	13.1 J	10.8 J
	mg/kg	32000	100.0%	12308	4	7530	5920	5500	32000	10700	24600	11400	10000	4170
	mg/kg	1340	66.7%	759	6	267 R	687	714	510 R	488 R	349 R	309 R	435 R	658 R
	mg/kg	0.27	73.8%	0.1	4	0.02 J	0.04 J	0.04 J	0.04 J	0.03 J	0.02 U	0.03 J	0.03 J	0.03 J
	mg/kg	228	100.0%	37	15	49.8	33.7	38	22.6	32.1	25.2	17.7	25.5	27.8
	mg/kg	2490	100.0%	1548	12	1320	1680	1480	1130	1470	1130	690 J	1020	807
	mg/kg	3.4	59.5%	2	1	0.21 J	0.21 UJ	0.18 UJ	0.15 U	0.12 U	0.13 U	0.13 U	0.14 U	0.12 J
	mg/kg	1.2	11.9%	0.5	5	0.92 J	1.4 UJ	1.4 UJ	0.68 U	0.92 J	1.2 J	0.89 U	0.67 U	0.68 U
	mg/kg	1270	95.2%	114	9	57.6 J	64.7 J	53.8 J	128 J	88.3 J	111 J	118 J	107 J	31.8 U
	mg/kg	1250	100.0%	150	1	25.1	28.8	27.2	17.9	21.4	19.3	10.3 J	18.3	19.9
	mg/kg	1010	100.0%	90	18	440	73.4 J	72.7 J	48.8	68.4	84.1	46.5	75.4	87.8
en	mg/kg	3.3	100.0%	NA	NA	0.02	3.3	1.2	0.1	1.99	0.12	0.02	0.16	0.89
	%W/W	94.9		NA	NA	92.9	88.3	89	86.4	85.9	85.9	89.8	87.3	84

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) U = Compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.

Subsurface Soils

The volatile organic compound chloroform was the only VOC detected in the subsurface soils collected at SEAD-4. Chloroform was found at concentrations ranging from 2J to 15 μg/kg in six of the 25 subsurface soil samples analyzed. The highest concentration of chloroform detected (15 μg/kg) was reported from sample TP4-3. The TAGM for chloroform is 300 μg/kg.

4.1.2.2 Semivolatile Organic Compounds

Surface Soils

A total of 19 semivolatile organic compounds were found at varying concentrations in the 17 surface soil samples analyzed. The compounds benzo(a)anthracene, Chrysene, benzo(a)pyrene, and dibenz(a,h)anthracene were reported in three surface soil samples at concentrations exceeding their associated TAGM values. Figure 4.1-1 shows the total SVO concentration in the surface soil samples.

The three compounds benzo(a)anthracene, chrysene, and benzo(a)pyrene were found at their maximum concentrations of 1100 μg/kg, 1000 μg/kg, and 880 μg/kg, respectively, in the surface soil sample SB4-9.1 collected from the 0-to 2-foot depth. The soil boring SB4-9 was located just to the southeast of the loading dock at building 2084. The maximum reported concentration of dibenz(a,h)anthracene, 32J μg/kg, was found in the surface soil sample SB4-5.1. This sample was collected from the 0-to 2-foot depth in soil boring SB4-5 located directly southwest of the central berm and near the footprint of the former munitions washout facility. The soil samples SB4-3.1, SS4-1, SS4-7, and SB4-7.1, located in the same area of the site, also had wide distributions of low concentration SVOs identified.

Subsurface Soils

Three phthalates and fluoranthene were the only compounds detected in the subsurface soil samples collected at SEAD-4. Phthalate compounds, which are considered to be common laboratory contaminants, were detected at concentrations ranging from 18J to 1500 μg/kg in 12 of the 25 subsurface soil samples analyzed. A trace amount of fluoranthene (19J μg/kg) was detected in subsurface soil sample TP4-1. All of the reported concentrations for these compounds were below their associated TAGM values.

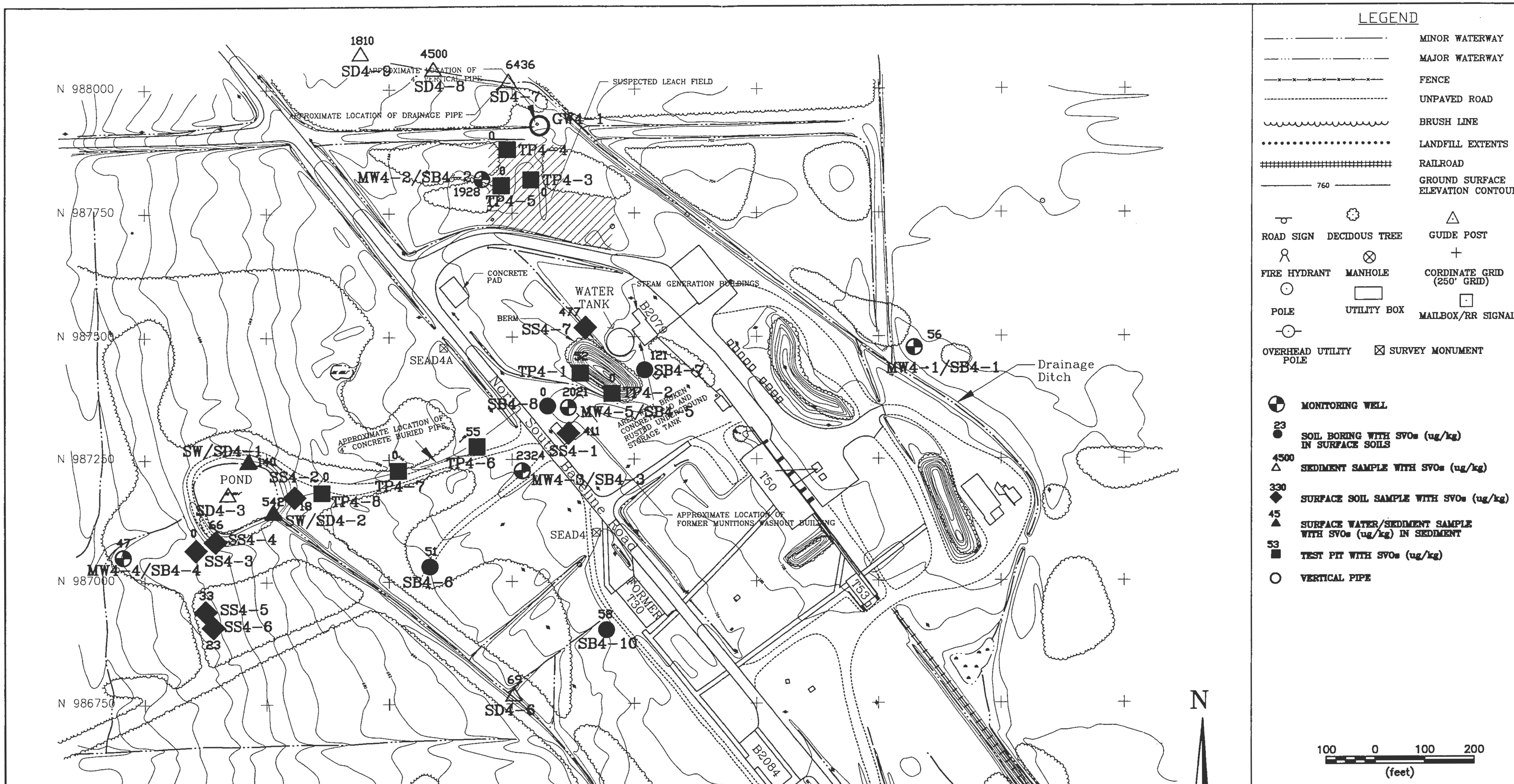
4.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses the nature and extent of contaminants at each site based on the chemical analysis results for each sample. To evaluate whether each media (soil, groundwater, surface water, and sediment) is being impacted, the chemical analysis data were compared to available New York State and Federal standards, guidelines, and criteria. Only those state standards which are more stringent than federal requirements were used as criteria. For organic contaminants, the organic carbon normalized criteria were adjusted by applying a total organic carbon (TOC) content of one percent to the criteria. Specific TOC data were not collected during this ESI. A TOC content of 1% was used as an estimated value for the purposes of organic analyte concentration reporting.

The criteria for soils are listed in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) titled "Determination of Soil Cleanup Objectives and Cleanup Levels" (HWR-92-4046) issued in November 1992. This document, which contains the criteria for soil clean-up levels, has not been promulgated and the criteria are guidelines only. NYSDEC took into account the Contract Required Quantitation Limits (CRQLs) when they developed the guideline concentrations for the TAGM.

For the metals, the criteria used in this report were the greater of two values: the listed TAGM guideline or the SEDA background concentration. Site background values were calculated as the 95th UCL (Upper Confidence Level) of the mean for background concentrations of metals in the soil located at SEDA. The data for the site background concentrations were compiled from the background samples collected at the Ash Landfill site, the OB ground site, and the AOCs investigated for this ESI. Table 1.1-3 lists the 95th UCL of the mean for the metals analyzed in this investigation. The TAGM guidelines were used for the following metals: antimony, arsenic, barium, beryllium, cadmium, cobalt, lead, mercury, selenium, and vanadium. The SEDA background soil concentrations were used for the following metals: aluminum, calcium, chromium, copper, iron, magnesium, manganese, nickel, potassium, silver, sodium, thallium, and zinc.

In addition to guidelines for specific compounds, the TAGM also lists soil cleanup objectives for groups of compounds and SVOs that do not have a specific guideline:



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 4.1-1
SEAD-4 MUNITIONS WASHOUT FACILITY
TOTAL SVOs IN SURFACE SOILS (ug/kg)

SCALE 1" = 200' | DATE MAY 1995 | REV C

4.1.2.3 Pesticides and PCBs

Surface Soils

A variety of Pesticide/PCB compounds were found in 9 of the 17 surface soil samples collected at SEAD-4. The PCB Aroclor-1254 was reported in sample SB4-5.1 at a maximum concentration of 1600 μg/kg. This was the only reported compound concentration that exceeded the TAGM value. The remaining pesticide and PCB detections were all reported at concentrations well below their associated TAGM values.

Subsurface Soils

Aroclor-1248 was the only compound detected in the 25 subsurface soil samples analyzed for pesticides and PCBs. The only reported concentration of 27J μg/kg was detected in subsurface soil sample SB4-2.2, which was collected from the 2-to 4-foot depth interval. The TAGM for Aroclor-1248 in subsurface soils is 10,000 μg/kg. No pesticide compounds were detected in the subsurface soil samples analyzed.

4.1.2.4 Herbicides

Surface Soils

The herbicide Dicamba was found in a single surface soil sample, SB4-4.1, at a concentration of 23 μg/kg. There is no TAGM for reported concentrations of Dicamba in soils. No other herbicide compounds were reported.

Subsurface Soils

No herbicide compounds were detected in the subsurface soils analyzed.

4.1.2.5 Metals

Surface Soils

A total of 24 metals were detected in the surface soil samples collected at SEAD-4. Of the 24 metals reported, 18 of these were found in one or more samples at concentrations which were above their associated TAGM values. Of particular note are the metals chromium, copper, and zinc, which were detected in a large percentage of the samples at concentrations which exceeded their respective TAGM values by at least an order of magnitude. Figure 4.1-2 shows the concentration of copper in the surface soils.

Ten of the 17 surface soil samples analyzed had chromium concentrations above the TAGM value of 24 mg/kg. The highest chromium concentration was identified in the surface soil sample SS4-5, where 4870 mg/kg was reported. This surface soil sample was collected from the area downgradient of the pond. This sample also had elevated concentrations of antimony (96.1J μg/kg), copper (3120 mg/kg) and zinc (636 mg/kg). In general, these four metals appear to be found together at elevated concentrations in a number of surface soil samples collected at the site. The highest concentration of copper, 3410 mg/kg, was identified in the surface soil sample SS4-4 which was collected on the southwest side of the berm that surrounds the pond. This sample also had elevated concentrations of antimony (76.9J μg/kg), chromium (4200 mg/kg) and zinc (755 mg/kg). The highest concentration of zinc, 1010 mg/kg, was identified in the surface soil sample SB4-4.1, collected from the 0-to 2-foot depth from soil boring SB4-4. This boring is located south of the pond and in the same vicinity as the surface soil samples SS4-5 and SS4-4.

Highly elevated metal concentrations in areas that are downgradient of the facility suggests movement of metals due to surface water runoff events.

Subsurface Soils

The distribution of the metals detected in the subsurface soil samples is similar to that found in the surface soil analysis results. A total of 15 metals were found in the subsurface soil samples at concentrations which exceeded TAGM values. In particular, antimony, copper, chromium, and zinc were each detected at concentrations which significantly exceeded their respective TAGM values. The highest concentrations of these metals were detected in subsurface soil samples SB4-10.2 and SB4-10.3, which were collected from the 2-to 4-foot and 4-to 6-foot depth intervals, respectively. Soil boring SB4-10 was located approximately 60 feet west of former building T30.

The pattern of elevated concentrations of antimony, copper, chromium, and zinc occurring together, which was observed in the surface soil results, was also observed in the subsurface soil results. The presence of these metals is consistent with the past use of the Munitions Washout Facility.

4.1.3.1 Volatile Organic Compounds

No volatile organic compounds were found in the 5 groundwater samples collected at SEAD-4.

4.1.3.2 Semivolatile Organic Compounds

The semivolatile organic compound diethylphthalate was detected in 3 of the 5 groundwater samples analyzed. The maximum value was reported in monitoring well MW4-1 at an estimated concentration of 0.9J μg/L which is well below the criteria value of 50 μg/L. Two other estimated concentrations of diethylphthalate were found at MW4-3 (0.5J μg/L), and MW4-5 (0.6J μg/L). All of these reported concentrations are well below the NYS AWQS standard of 50 μg/L for class GA water.

4.1.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the 5 groundwater samples collected at SEAD-4.

4.1.3.4 Herbicides

No herbicides were found in the 5 groundwater samples collected at SEAD-4.

4.1.3.5 Metals

Seven metals: antimony, beryllium, cadmium, iron, magnesium, manganese, and sodium were found in one or more of the groundwater samples at concentrations above the criteria value. Iron was found in 4 of the 5 monitoring wells, the exception being MW4-5, at concentrations above the criteria value of 300 μg/L. The maximum iron concentration, 2270 μg/L, was found in the sample collected from MW4-4. Manganese was found in the samples collected from monitoring wells MW4-1 and MW4-5 at concentrations of 346 μg/L and 477 μg/L, respectively. The metals beryllium, cadmium, and sodium were found at concentrations above the criteria values in the sample collected from monitoring well MW4-3. The highest concentration of magnesium, 57600 μg/L, was found in the groundwater sample collected from monitoring well MW4-1. Antimony was found in samples from MW4-2 and MW4-4 of concentrations of 39.3J and 33.8J μg/L, respectively. While no other criteria values were

4.1.2.6 Nitroaromatics

Surface Soils

The nitroaromatic compounds 1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, and 2-amino-4,6-dinitrotoluene were detected at concentrations of 120J, 72J, and 90J, respectively, in surface soil sample SS4-1. TAGMs do not exist for the occurrence of these compounds in surface soils. Nitroaromatic compounds were undetected in the remaining 16 surface soil samples.

Subsurface Soils

Tetryl was detected at a concentration of 67J μg/kg in sample SB4-9.2. A TAGM does not exist for the occurrence of tetryl in soils. Nitroaromatic compounds were undetected in the remaining 24 subsurface soil samples.

4.1.2.7 Indicator Compounds

Surface Soils

The surface soil samples at SEAD-4 were analyzed for nitrate/nitrite nitrogen. Nitrate/nitrite nitrogen was detected in all of the surface soil samples, with the maximum concentration (1.51 mg/kg) being detected in sample SS4-4.

Subsurface Soils

Nitrate/nitrite nitrogen was detected in all of the subsurface soil samples analyzed. The highest concentration (3.3 mg/kg) was detected in sample TP4-1.

4.1.3 Groundwater

Five monitoring wells were installed and sampled as part of the SEAD-4 investigation. The summary results of the chemical analysis of these samples is presented in Table 4.1-2. The locations of the monitoring wells are shown in Figure 2.3-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-4.

TABLE 4.1-2

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

POUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-4 01/21/94 MW4-1 209252	WATER SEAD-4 02/04/94 MW4-2 210478	WATER SEAD-4 01/20/94 MW4-3 209091	WATER SEAD-4 02/01/94 MW4-4 210061	WA SE 01/ MW4 20 20
ORGANICS											
	ug/L	0.9	60.0%	50	NA	0	0.9 J	10 U	0.5 J	10 U	
	ug/L	1240	80.0%	NA	NA	NA	41.9 U	435	725	1240	
	ug/L	39.3	40.0%	3	6	2	21.6 U	39.3 J	21.4 U	33.8 J	2
	ug/L	2.2	40.0%	25	50	0	2.2 J	1.4 U	1 J	1.4 U	
	ug/L	46.7	100.0%	1000	2000	0	19.6 J	19.3 J	42.7 J	46.7 J	3
	ug/L	6.3	20.0%	3	4	1	0.4 U	0.4 U	6.3	0.4 U	
	ug/L	5.6	20.0%	10	5	1	2.1 U	2.1 U	5.6	2.1 U	
	ug/L	147000	100.0%	NA	NA	NA	137000	66300	122000	123000	147
	ug/L	21.3	40.0%	50	100	0	2.6 U	2.6 U	6.9 J	21.3	
	ug/L	8.2	60.0%	NA	NA	NA	4.6 J	4.4 U	8.2 J	4.4 U	
	ug/L	37.6	40.0%	200	1300(g)	0	3.1 U	3.1 U	6.6 J	37.6	
	ug/L	2270	100.0%	300	NA	4	332	471	745	2270	
	ug/L	0.56	60.0%	25	15(h)	0	0.5 U	1.9 J	0.56 J	2.2 J	
	ug/L	57600	100.0%	35000	NA	1	57600	10100	32800	19100	31
	ug/L	477	100.0%	300	NA	2	346	60.5	229	263	
	ug/L	0.04	40.0%	2	2	0	0.04 U	0.04 U	0.04 J	0.04 U	0
	ug/L	6.4	40.0%	NA	100	0	4 U	4 U	4.4 J	6.4 J	
	ug/L	7380	100.0%	NA	NA	NA	7380	1840 J	5250	4540 J	7
	ug/L	2.1	60.0%	10	50	0	2.1 J	0.7 U	1.4 J	0.7 U	
	ug/L	6.7	20.0%	50	NA	0	4.2 U	4.2 U	6.7 J	4.2 U	
	ug/L	31100	100.0%	20000	NA	1	11700	12400	31100	11200	14
	ug/L	7.7	60.0%	NA	NA	NA	3.7 U	3.7 U	7.7 J	4.9 J	
	ug/L	NA	100.0%	300	NA	0	19.1 J	15.2 J	17.7 J	95	4
ES											
ogen	mg/L	0.25	100.0%	10	10	0	0.12	0.23	0.25	0.11	0
	standard units	7.76	NA				7.2	7.46	7.46	7.76	7
vity	umhos/cm	600	NA				600	228	550	400	
	NTU	72.7	NA				3.1	72.7	12.4	6.2	

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) The value listed is an Action Level for copper, and not an MCL Standard
h) The value listed is an Action Level for lead at the tap, and not an MCL Standard

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exceeded, it should be noted that the sample from the furthest downgradient well, MW4-4, generally had the highest concentrations of 7 of 16 metals reported.

4.1.3.6 Nitroaromatics

No nitroaromatic compounds were found in the 5 groundwater samples collected at SEAD-4.

4.1.3.7 Indicator Parameters

The groundwater samples were analyzed for nitrate/nitrite nitrogen. The maximum concentration, 0.25 mg/L in sample MW4-3, was well below the NYSDEC Class GA groundwater standard (10 mg/L) and the Federal MCL Standard (10 mg/L).

4.1.4 Surface Water

Three surface water samples were collected as part of the SEAD-4 investigation. The summary results of the chemical analyses are presented in Table 4.1-3. The sample locations were shown in Figure 2.3-2. Two of the surface water samples were collected from the pond on the west side of the site. The final sample was collected from a vertical pipe located adjacent to the suspected leach field location. One duplicate sample was also collected at location SW4-1. The following sections describe the nature and extent of surface water contamination identified at SEAD-4.

4.1.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the four surface water samples collected at SEAD-4.

4.1.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the four surface water samples collected at SEAD-4.

4.1.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the surface water samples collected at SEAD-4.

TABLE 4.1-3

SURFACE WATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

OMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS D (a)	EPA AWQC ACUTE (b)	EPA AWQC CHRONIC (b)	NO. ABOVE CRITERIA	WATER SEAD-4 11/02/93 SW4-1 203210	WATER SEAD-4 11/02/93 SW4-3 203213 SW4-1DUP	WATER SEAD-4 11/02/93 SW4-2 203212
TICS										
nzene	ug/L	0.07	33.3%	5	NA	NA	0	0.13 UJ	0.13 U	0.13 U
	ug/L	314	100.0%	NA	750	87	3	237	194 J	314
	ug/L	49.6	100.0%	NA	NA	NA	NA	21.3 J	21.5 J	24.9 J
	ug/L	115000	100.0%	NA	NA	NA	NA	45600	46800	51200
	ug/L	44.8	66.7%	4270	4270	509	0	19.2	19.7	44.8
	ug/L	66.9	100.0%	50	50	30.2	3	47.3	50.9	66.9
	ug/L	657	100.0%	300	NA	1000	4	443 J	349 J	630 J
	ug/L	10.7	66.7%	330	330.6	12.9	0	0.79 UJ	10.7 J	3.1
	ug/L	21100	100.0%	NA	NA	NA	NA	10500	10700	10800
	ug/L	45.6	100.0%	NA	NA	NA	NA	28.1	25	45.6
	ug/L	1830	100.0%	NA	NA	NA	NA	1680 J	1830 J	1720 J
	ug/L	21700	100.0%	NA	NA	NA	NA	12800	13300	13200
	ug/L	2.4	33.3%	NA	1400	40	0	1.2 U	1.2 U	1.2 U
	ug/L	20.3	100.0%	800	296.8	268.9	0	10.7 J	9.2 J	20.3
YSES										
Nitrogen	mg/L	0.33	100.0%	NA	NA	NA	NA	0.03	0.02	0.03

Notes:
a) The New York State Ambient Water Quality Standards and Guidelines for Class "D" Water.
b) EPA Water Quality Criteria Summary (1991), Quality Criteria for Water 1986 Updates # 1 and # 2.
c) Hardness dependent values assume a hardness of 300 mg/l.
d) NA = Not Available
e) U = Compound was not detected.
f) J = the reported value is an estimated concentration.
g) R = the data was rejected in the data validating process.
h) UJ = the compound was not detected; the associated reporting limit is approximate.

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4.1.4.4 Herbicides

No herbicide compounds were found in the surface water samples collected at SEAD-4.

4.1.4.5 Metals

The standards for the hardness dependent values were calculated using an average hardness of 300 mg/l, which was derived from calcium and magnesium concentrations at surface water locations in SEADs-4, 13, 26, and 45 where:

$$\text{total hardness} = 2.5(Ca^{+2)} + 4.1\ (Mg^{+2})$$

and Ca^{+2} and Mg^{+2} concentrations were values from Tables 4.1-3, 4.6-3, and 4.7-3

The three metals aluminum, copper, and iron were found in three of the four surface water samples at concentrations above the associated criteria value. The highest concentrations of aluminum, 314 μg/L, and copper, 66.9 μg/L, were found in the sample SW4-2, collected on the southwest side of the pond adjacent to the influent point of the southern drainage swale.

4.1.4.6 Nitroaromatics

The nitroaromatic compound, 1,3-Dinitrobenzene, was reported at an estimated concentration of 0.07J μg/L in the sample labelled 4PIPE collected from the vertical pipe located adjacent to the suspected leach field location. No other nitroaromatic compounds were detected in the surface water samples collected at SEAD-4.

4.1.4.7 Indicator Compounds

Nitrate-nitrite nitrogen was detected in the surface water samples with a maximum concentration of 0.33 mg/L in the sample from the pipe.

4.1.5 <u>Sediment</u>

A total of nine sediment samples were collected as part of the SEAD-4 investigation. The summary chemical analyses are presented in Table 4.1-4. The sample locations were shown

TABLE 4.1-4

SEDIMENT ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

D	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NO. ABOVE CRITERIA	SOIL SEAD-4 0-0.5 11/02/93 SD4-1 203271	SOIL SEAD-4 0-0.5 11/02/93 SD4-2 203272	SOIL SEAD-4 0-0.5 11/02/93 SD4-3 203273	SOIL SEAD-4 0-0.5 12/14/93 SD4-4 206905	SOIL SEAD-4 0-0.5 12/14/93 SD4-5 206906	SOIL SEAD-4 0-0.5 12/14/93 SD4-6 206907	SOIL SEAD-4 0-0.5 12/14/93 SD4-7 206908	SOIL SEAD-4 0-0.5 12/14/93 SD4-8 206909
	ug/kg	11	22.2%	NA	NA	NA	NA	NA	36 UJ	33 U	23 U	18 U	17 U	18 UJ	2 J	11 J
	ug/kg	210	44.4%	NA	NA	NA	NA	NA	210 J	51	23 U	18 U	17 U	18 UJ	21 U	180 J
	ug/kg	18	33.3%	NA	NA	NA	NA	NA	10 J	33 U	12 J	18 U	17 U	18 UJ	14 U	56 UJ
	ug/kg	49	11.1%	NA	NA	NA	NA	NA	49 J	33 U	23 U	18 U	17 U	18 UJ	14 U	28 UJ
	ug/kg	3	22.2%	NA	NA	NA	NA	NA	36 UJ	33 U	23 U	18 U	3 J	3 J	14 U	56 UJ
	ug/kg	7	22.2%	NA	NA	NA	NA	NA	36 UJ	33 U	23 U	18 U	7 J	4 J	14 U	56 UJ
	ug/kg	21	11.1%	NA	NA	NA	NA	NA	21 J	8.7 U	6.2 U	8.8 U	9.6 U	12 UJ	8 U	15 UJ
oluene	ug/kg	140	11.1%	NA	NA	NA	NA	NA	130 UJ	140 J	130 U	130 U	130 U	130 UJ	130 U	130 UJ
NICS																
	ug/kg	140	11.1%	6(d)	NA	NA	NA	1	140 J	580 U	410 U	580 U	630 U	780 UJ	1000 UJ	3900 UJ
pylamine	ug/kg	410	11.1%	NA	NA	NA	NA	NA	1200 UJ	410 J	410 U	580 U	630 U	780 UJ	1000 UJ	3900 UJ
	ug/kg	56	11.1%	7300	NA	NA	NA	0	1200 UJ	580 U	410 U	580 U	630 U	780 UJ	56 J	3900 UJ
	ug/kg	63	11.1%	NA	NA	NA	NA	NA	1200 UJ	580 U	410 U	580 U	630 U	780 UJ	63 J	3900 UJ
	ug/kg	85	22.2%	NA	NA	NA	NA	NA	1200 UJ	29 J	410 U	580 U	630 U	780 UJ	85 J	3900 UJ
ne	ug/kg	760	11.1%	NA	NA	NA	NA	NA	1200 UJ	580 U	410 U	580 U	630 U	780 UJ	760 J	3900 UJ
	ug/kg	490	33.3%	1390	NA	NA	NA	0	1200 UJ	580 U	410 U	86 J	630 U	780 UJ	490 J	3900 UJ
	ug/kg	170	11.1%	NA	13	NA	NA	1	1200 UJ	580 U	410 U	580 U	630 U	780 UJ	170 J	3900 UJ
	ug/kg	250	33.3%	1197(c)	NA	NA	NA	0	1200 UJ	580 U	410 U	580 U	630 U	69 J	83 J	250 J
	ug/kg	560	55.6%	NA	NA	NA	NA	NA	1200 UJ	31 J	410 U	190 J	630 U	780 UJ	560 J	330 J
	ug/kg	480	55.6%	NA	NA	NA	NA	NA	1200 UJ	26 J	410 U	180 J	630 U	780 UJ	480 J	320 J
	ug/kg	300	22.2%	NA	13	NA	NA	2	1200 UJ	580 U	410 U	95 J	630 U	780 UJ	300 J	3900 UJ
	ug/kg	290	33.3%	NA	13	NA	NA	3	1200 UJ	580 U	410 U	160 J	630 U	780 UJ	290 J	3900 UJ
late	ug/kg	3600	44.4%	1197(c)	NA	NA	NA	2	1200 UJ	580 U	410 U	500 J	630 U	780 UJ	2200 J	3600 J
	ug/kg	46	11.1%	NA	NA	NA	NA	NA	1200 UJ	46 J	410 U	580 U	630 U	780 UJ	1000 UJ	3900 UJ
	ug/kg	330	33.3%	NA	13	NA	NA	3	1200 UJ	580 U	410 U	250 J	630 U	780 UJ	330 J	3900 UJ
	ug/kg	120	22.2%	NA	13	NA	NA	2	1200 UJ	580 U	410 U	95 J	630 U	780 UJ	120 J	3900 UJ
	ug/kg	240	22.2%	NA	13	NA	NA	2	1200 UJ	580 U	410 U	140 J	630 U	780 UJ	240 J	3900 UJ
e	ug/kg	130	22.2%	NA	13	NA	NA	2	1200 UJ	580 U	410 U	86 J	630 U	780 UJ	130 J	3900 UJ
	ug/kg	79	22.2%	NA	NA	NA	NA	NA	1200 UJ	580 U	410 U	65 J	630 U	780 UJ	79 J	3900 UJ
	ug/kg	2.5	11.1%	84	1	7.7	NA	1	6.1 UJ	3 U	2.1 U	2.9 U	3.3 U	4 UJ	2.7 U	2.5 J
	ug/kg	4.6	11.1%	195	13	7.7	NA	1	12 UJ	5.8 U	4.1 U	5.7 U	6.3 U	7.9 UJ	5.2 U	4.6 J
	ug/kg	86	44.4%	500	0.1	10	NA	4	12 UJ	4.1 J	4.1 U	9.4 J	6.3 U	7.9 UJ	9.8 J	86 J
	ug/kg	90	33.3%	500	0.1	10	NA	3	12 UJ	5.8 U	4.1 U	5.1 J	6.3 U	7.9 UJ	9.1 J	90 J
	ug/kg	11	33.3%	NA	NA	NA	NA	NA	12 UJ	3 J	4.1 U	5.7 U	6.3 U	7.9 UJ	3.2 J	11 J
	ug/kg	18	44.4%	0.06	0.01	0.06	NA	4	6.1 UJ	3 U	2.1 U	4.5 J	3.3 U	4 UJ	7.5 J	12 J
	ug/kg	12	44.4%	NA	NA	NA	NA	NA	6.1 UJ	3 U	2.1 U	3.2 J	3.3 U	4 UJ	6.8 J	11 J
	ug/kg	430	77.8%	NA	0.008	195	NA	7	120 UJ	280	29 J	360 J	130 J	79 UJ	95	430 J
	ug/kg	230	22.2%	NA	0.008	195	NA	2	120 UJ	58 U	41 U	57 U	63 U	79 UJ	46 J	230 J

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TABLE 4.1-4

SEDIMENT ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-4 EXPANDED SITE INSPECTION

...D	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NO. ABOVE CRITERIA	SOIL SEAD-4 0-0.5 11/02/93 SD4-1 203271	SOIL SEAD-4 0-0.5 11/02/93 SD4-2 203272	SOIL SEAD-4 0-0.5 11/02/93 SD4-3 203273	SOIL SEAD-4 0-0.5 12/14/93 SD4-4 206905	SOIL SEAD-4 0-0.5 12/14/93 SD4-5 206906	SOIL SEAD-4 0-0.5 12/14/93 SD4-6 206907	SOIL SEAD-4 0-0.5 12/14/93 SD4-7 206908	SOIL SEAD-4 0-0.5 12/14/93 SD4-8 206909
	mg/kg	19700	100.0%	NA	NA	NA	NA	NA	17500 J	12000	15000	19700	18200	16500 J	9720	13000 J
	mg/kg	82.7	66.7%	NA	NA	NA	NA	NA	24.5 UJ	30.1	50.4	7.2 UJ	7 J	82.7 J	36.2 J	14.1 J
	mg/kg	8.1	100.0%	5	NA	NA	33	6	7.4 J	3.8	8.1	4.5	5.2	5.6 J	5.9	4.9 J
	mg/kg	311	100.0%	NA	NA	NA	NA	NA	102 J	61.3	68.8	121	130	120 J	311	121 J
	mg/kg	NA	100.0%	NA	NA	NA	NA	NA	0.58 J	0.54 J	0.65 J	1 J	0.99 J	0.82 J	0.91 J	0.87 J
	mg/kg	34.1	55.6%	0.8	NA	NA	10	5	1.5 UJ	0.92 U	0.59 U	3.1	2.8	0.78 UJ	34.1	8.3 J
	mg/kg	127000	100.0%	NA	NA	NA	NA	NA	68100 J	26200	11800	13600	19800	7720 J	127000	15500 J
	mg/kg	4170	100.0%	26	NA	NA	111	9	536 J	2230	3310	89.3 J	59.9 J	4170 J	61.3	49.7 J
	mg/kg	NA	100.0%	NA	NA	NA	NA	NA	14.1 J	9.5 J	12.4	17.3	15.1	11.3 J	14 J	12.2 J
	mg/kg	2640	100.0%	19	NA	NA	114	9	411 J	1560	2640	46.5 J	33 J	497 J	112	151 J
	mg/kg	37200	100.0%	24000	NA	NA	40000	7	25400 J	21100	29200	35200	37200	30200 J	23300	24700 J
	mg/kg	374	66.7%	27	NA	NA	250	2	13.5 J	18.6	16.6	535 R	236 R	30.7 J R	254	374 J
	mg/kg	9130	100.0%	NA	NA	NA	NA	NA	7630 J	4830	6070	9130	7750	4420 J	4220	5080 J
	mg/kg	1790	100.0%	428	NA	NA	1100	4	569 J	363	430	299	337	525 J	1790	274 J
	mg/kg	0.55	88.9%	0.11	NA	NA	2	6	0.07 J	0.16	0.13	0.07 J	0.04 U	0.55 J	0.55	0.52 J
	mg/kg	53.1	100.0%	22	NA	NA	90	9	32.8 J	26.5	33.4	53.1	47.7	27 J	28.7	42.4 J
	mg/kg	NA	100.0%	NA	NA	NA	NA	NA	2760 J	1640	1410	2540	1580	1660 J	1370 J	1750 J
	mg/kg	2.5	66.7%	NA	NA	NA	NA	NA	0.64 UJ	0.27 U	0.26 U	0.93 J	0.53 J	0.58 J	2.1	2.2 J
	mg/kg	1.7	11.1%	NA	NA	NA	NA	NA	3.1 UJ	1.9 U	1.2 U	1.4 U	1.2 U	1.7 J	1.2 U	1.9 UJ
	mg/kg	NA	100.0%	NA	NA	NA	NA	NA	207 J	97 J	78 J	184 J	127 J	96.3 J	575 J	183 J
	mg/kg	49.9	100.0%	NA	NA	NA	NA	NA	28.2 J	19.5	23.7	35.6	27.7	35.1 J	29.6	49.9 J
	mg/kg	685	100.0%	85	NA	NA	800	9	180 J	526	630	667	674	330 J	685	484 J
...n	mg/kg	0.05	55.6%	NA	NA	NA	NA	NA	0.05	0.02 U	0.02	0.05	0.02	0.05	0.02 U	0.03 U
	%W/W	62.8							NS	NS	NS	57.5	51.5	42.2	62.8	33.9

NOTES:

a) NYSDEC Sediment Criteria – 1989.
b) LOT = limit of tolerance; represents point at which significant toxic effects on benthic species occur.
c) Used NYSDEC 1989 guideline for phthalates (bis(2–Ethylhexyl)phthalate.
d) NYSDEC 1989 guidelines for total phenols
e) NA = Not Available
f) U = compound was not detected
g) J = the reported value is an estimated concentration
h) R = the data was rejected in the data validation process
i) UJ = the compound was not detected; the associated reporting limit is approximate.

in Figure 2.3-2. Three sediment samples were collected from the pond on the west side of the site, three from the southern drainage ditch, and three from the ditch north of the suspected leachfield location. The following sections describe the nature and extent of sediment contamination identified at SEAD-4.

4.1.5.1 Volatile Organic Compounds

A total of six volatile organic compounds were identified in the nine sediment samples collected at SEAD-4. Two of these compounds, methylene chloride and acetone, are considered to be laboratory contaminants. The maximum VOC concentration was identified in sample SD4-1 where 49J μg/kg of 2-butanone were reported. This sediment sample, which was collected at the waters edge on the north side of the pond, had the only detection of 2-butanone. The compound carbon disulfide was found in three sediment samples at a maximum concentration of 18J μg/kg. The compounds styrene and xylene were found at very low concentrations in samples SD4-5 and SD4-6 collected from the southern drainage ditch.

4.1.5.2 Semivolatile Organic Compounds

A total of nine semivolatile organic compounds were identified in the nine sediment samples collected at SEAD-4. The maximum SVO concentration reported for the compound bis(2-ethylhexyl)phthalate was 3600J μg/kg and was found in the sample SD4-8 collected from the drainage ditch north of the leachfield. This value was above the sediment criteria for aquatic life of 1197 μg/kg. The three sediment samples collected in this ditch, i.e., SD4-7, SD4-8, and SD4-9, had the highest total SVO concentrations of the nine samples analyzed. A wide distribution of low concentration SVOs were also found in sample SD4-4, collected from the southern drainage ditch.

4.1.5.3 Pesticides and PCBs

A total of seven pesticide or PCB compounds were identified at concentrations above the criteria value in one or more of the nine sediment samples collected at SEAD-4. Aroclor-1254 was found in seven of the nine sediment samples at concentrations ranging from 29J μg/kg to a maximum of 430J μg/kg found in sample SD4-8. This was also the maximum on-site pesticide/PCB concentration detected. These are all above the sediment criteria for human health of 0.008 μg/kg. The compounds 4,4'-DDE and alpha-chlordane were each detected in 4 of the 9 samples analyzed at concentrations above the sediment criteria for human health of 0.1 and 0.01 μg/kg, respectively.

4.1.5.4 Herbicides

The compound 2,4,5-T was identified in one sample, SD4-1, at an estimated concentration of 21J μg/kg in the sample SD4-1 collected from the north side of the pond. This was the only herbicide reported on-site. There are no NYSDEC sediment criteria for this compounds.

4.1.5.5 Metals

A variety of metals were found at concentrations above the NYSDEC Sediment Criteria for Aquatic Life values. Of these metals, chromium, copper, and zinc appear in a large number of samples and/or at concentrations an order of magnitude or greater than the criteria value. The maximum concentration of chromium, 4170J mg/kg, was reported in the sample SD4-6, collected from the central portion of the southern drainage ditch. The maximum copper concentration, 2640 mg/kg, was reported in the sample SD4-3, collected from the bottom of the pond. The maximum zinc concentration, 685 mg/kg, was reported in the sample SD4-7, collected from the northern drainage ditch. All of the sediment samples collected from the pond had elevated concentrations of chromium, copper, and zinc. Surface water runoff events appear to have deposited high concentrations of these metals within this pond and partially within the northern and southern drainage ditches.

4.1.5.6 Nitroaromatics

No nitroaromatic compounds were found in the sediment samples collected at SEAD-4.

4.1.5.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in 55.6% of the sediment samples. The maximum concentration detected was 0.05 mg/kg in samples SD4-1, SD-4, and SD4-6.

4.1.6 Tentatively Identified Compounds

Tentatively Identified Compounds (TICs) were reported at total concentrations exceeding 50 mg/kg in only three of the samples analyzed from SEAD-4. A total TIC concentration of 105.7 mg/kg was reported in sediment sample SD4-1, which was collected from sediment along the northern edge of the pond situated in the western portion of SEAD-4. Nonacosane, hentriacontane, and vitamin E were the primary compounds contributing to the elevated TIC total in sediment sample SD4-1. Total TIC concentrations of 137.3 and 283.9 mg/kg were reported in sediment samples SD4-8 and SD4-9, respectively. Each of these sediment samples was collected from the drainage ditch located along the northern boundary of SEAD-4. Nonacasane, hentriacontane, and pentadecane were the primary compounds contributing to the elevated TIC totals in these 2 samples.

4.2 SEAD-16

4.2.1 Introduction

During the investigation of SEAD-16 a total of 16 surface soil samples were collected from the area surrounding the Abandoned Deactivation Furnace building. To evaluate the nature and extent of contamination inside the building, 8 soil and debris samples, referred to as floor samples, were collected from soil materials which have been transported onto, or settled onto, the surfaces in the building. Two water samples were collected from standing water present in the building, and 9 building material and furnace scale samples were collected to determine if asbestos materials were present. Finally, 3 monitoring wells were installed and sampled to evaluate whether impacts to groundwater have occurred at the site. The following sections describe the nature and extent of contamination identified at SEAD-16.

4.2.2 Soil

The analytical results for the 16 surface soil and 8 floor samples collected as part of the SEAD-16 investigation are presented in Table 4.2-1. The sample locations were shown in Figures 2.4-2 and 2.4-4. The following sections describe the nature and extent of contamination in SEAD-16 soils.

4.2.2.1 Volatile Organic Compounds

Surface Soils

A total of 5 VOCs were found in the 16 surface soil samples collected at SEAD-16. None of these volatile organic compounds were detected at concentrations above the associated TAGM values. A maximum VOC concentration of 43J μg/kg of acetone, which is considered to be a laboratory contaminant, was found in the sample SS16-15. The remainder of the VOC detections were all at extremely low μg/kg levels.

TABLE 4.2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-16 0-0.2 10/20/93 SS16-1 201680	SOIL SEAD-16 0-0.2 10/20/93 SS16-2 201881	SOIL SEAD-16 0-0.2 10/22/93 SS16-3 202032	SOIL SEAD-16 0-0.2 10/20/93 SS16-4 201882	SOIL SEAD-16 0-0.2 10/20/93 SS16-5 201883	SOIL SEAD-16 0-0.2 10/20/93 SS16-6 201884	SOIL SEAD-16 0-0.2 10/20/93 SS16-7 201885	SOIL SEAD-16 0-0.2 10/20/93 SS16-8 201886
CS													
	ug/kg	3	12.5%	100	0	11 U	12 U	11 U	11 U	2 J	10 U	53 U	10 U
	ug/kg	43	8.3%	200	0	11 U	12 U	11 U	17	11 U	10 U	53 U	10 U
	ug/kg	1	4.2%	2700	0	11 U	1 J	11 U	11 U	11 U	10 U	53 U	10 U
	ug/kg	2	4.2%	300	0	11 U	12 U	11 U	11 U	11 U	2 J	53 U	10 U
	ug/kg	5	25.0%	1500	0	11 U	12 U	4 J	11 U	5 J	3 J	53 U	2 J
	ug/kg	160	4.2%	500	0	54 U	63 U	60 U	55 U	57 U	53 U	53 U	53 U
	ug/kg	130	4.2%	NA	NA	54 U	63 U	60 U	55 U	57 U	53 U	53 U	53 U
	ug/kg	13	16.7%	1900	0	5.4 U	6.3 U	7.2	5.5 U	5.7 U	5.3 U	5.3 U	5.3 U
	ug/kg	7.9	4.2%	700	0	5.4 U	6.3 U	6 U	5.5 U	5.7 U	5.3 U	5.3 U	5.3 U
	ug/kg	61	4.2%	NA	NA	54 U	63 U	60 U	55 U	57 U	53 U	53 U	53 U
	ug/kg	6000	4.2%	NA	NA	5400 U	6300 U	6000 U	5500 U	5700 U	5300 U	5300 U	5300 U
	ug/kg	22000	8.3%	NA	NA	5400 U	6300 U	6000 U	5500 U	16000	5300 U	5300 U	5300 U
	ug/kg	220	4.2%	NA	NA	130 U	130 U	220 J	130 U	130 U	130 U	130 U	130 U
e	ug/kg	170	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
trotoluene	ug/kg	430	4.2%	NA	NA	130 U	130 U	430 J	130 U	130 U	130 U	130 U	130 U
	ug/kg	3100	62.5%	NA	NA	320	500	1100	170	780 J	130 U	130 U	770
GANICS													
	ug/kg	37000	12.5%	30	3	710 U R	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U
	ug/kg	1600	25.0%	13000	0	710 U R	230 J	320 J	7200 U	750 U	14000 U	1300 U	1800 U
ne	ug/kg	19000	37.5%	36400	0	710 U R	350 J	510 J	7200 U	97 J	14000 U	1300 U	1800 U
	ug/kg	70	8.3%	4100	0	70 J	65 J	1100 U	7200 U	750 U	14000 U	1300 U	1800 U
	ug/kg	370	16.7%	1000	0	180 J	410 U	310 J	7200 U	750 U	14000 U	1300 U	1800 U
	ug/kg	4500	16.7%	50000 *	0	710 U R	410 U	1100 U	7200 U	44 J	14000 U	1300 U	1800 U
	ug/kg	1500	29.2%	6200	0	710 U R	100 J	110 J	7200 U	82 J	14000 U	1300 U	1800 U
	ug/kg	7100	25.0%	NA	NA	2200 J	760	7100	7200 U	530 J	14000 U	1300 U	1800 U
	ug/kg	530	4.2%	7100	0	710 U R	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U
	ug/kg	6100	12.5%	50000 *	0	710 U R	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U
amine	ug/kg	1400	37.5%	50000 *	0	680 J	150 J	1400	7200 U	130 J	14000 U	1300 U	350 J
	ug/kg	22000	70.8%	50000 *	0	140 J	420	360 J	7200 U	410 J	14000 U	1300 U	1800 U
	ug/kg	2900	37.5%	50000 *	0	82 J	55 J	1100 U	7200 U	70 J	14000 U	1300 U	1800 U
	ug/kg	740	29.2%	50000 *	0	710 U R	48 J	1100 U	7200 U	78 J	14000 U	1300 U	1800 U
e	ug/kg	1400	41.7%	6100	0	1300 J	710	1200	7200 U	350 J	14000 U	1300 U	1400 J
	ug/kg	3900	70.8%	50000 *	0	470 J	580	200 J	7200 U	710 J	14000 U	1300 U	1800 U
	ug/kg	5000	75.0%	50000 *	0	980 J	520	200 J	7200 U	550 J	14000 U	1300 U	1800 U
	ug/kg	1600	66.7%	220	6	420 J	260 J	110 J	7200 U	240 J	14000 U	1300 U	1800 U
	ug/kg	1900	70.8%	400	5	500 J	470	200 J	7200 U	340 J	14000 U	1300 U	1800 U
thalate	ug/kg	5000	41.7%	50000 *	0	710 U R	410 U	390 J	7200 U	450 J	14000 U	1300 U	1800 U
ne	ug/kg	1600	66.7%	1100	2	480 J	500	170 J	7200 U	350 J	14000 U	1300 U	1800 U
ne	ug/kg	1600	66.7%	1100	2	740 J	310 J	97 J	7200 U	330 J	14000 U	1300 U	1800 U
	ug/kg	1500	66.7%	61	10	560 J	300 J	120 J	7200 U	270 J	14000 U	1300 U	1800 U
rene	ug/kg	1100	37.5%	3200	0	710 U R	30 J	1100 U	7200 U	200 J	14000 U	1300 U	1800 U
ne	ug/kg	5100	8.3%	14	2	710 U R	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U
e	ug/kg	870	45.8%	50000 *	0	160 J	130 J	1100 U	7200 U	180 J	14000 U	1300 U	1800 U

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TABLE 4.2–1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD–16 EXPANDED SITE INSPECTION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD–16 0–0.2 10/20/93 SS16–1 201880	SOIL SEAD–16 0–0.2 10/20/93 SS16–2 201881	SOIL SEAD–16 0–0.2 10/22/93 SS16–3 202032	SOIL SEAD–16 0–0.2 10/20/93 SS16–4 201882	SOIL SEAD–16 0–0.2 10/20/93 SS16–5 201883	SOIL SEAD–16 0–0.2 10/20/93 SS16–6 201884	SOIL SEAD–16 0–0.2 10/20/93 SS16–7 201885	SOIL SEAD–16 0–0.2 10/20/93 SS16–8 201886
	ug/kg	39	4.2%	200	0	1.8 UJ	2.1 U R	1.3 J	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U
ane)	ug/kg	39	4.2%	60	0	1.8 UJ	2.1 U R	2 UJ	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U
	ug/kg	39	4.2%	41	0	1.8 UJ	2.1 U R	2.8 J	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U
	ug/kg	2.6	12.5%	20	0	1.8 UJ	2.1 U R	2 UJ	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U
	ug/kg	39	29.2%	900	0	14 J	3.4 J	2 UJ	19 U	6.2 J	1.8 UJ	1.8 U	1.9 J
	ug/kg	28	8.3%	44	0	3.5 UJ	4.1 U R	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U
	ug/kg	1400	91.7%	2100	0	19 J	9.4 J	32 J	1400	130	3.5 UJ	6.3	84 J
	ug/kg	76	4.2%	100	0	3.5 UJ	4.1 U R	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U
	ug/kg	76	25.0%	900	0	4.4 J	4.1 U R	4.6 J	36 U	19 U	3.5 UJ	2.2 J	7 U
	ug/kg	76	16.7%	2900	0	5 J	4.1 U R	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U
	ug/kg	870	95.8%	2100	0	12 J	8.1 J	18 J	180	29	1.8 J	5.6	79 J
	ug/kg	76	8.3%	NA	NA	3.4 J	4.1 U R	3.3 J	38 U	19 U	3.5 UJ	3.5 U	7 U
	ug/kg	76	8.3%	NA	NA	3 J	4.1 U R	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U
	ug/kg	47	37.5%	540	0	1.8 UJ	2.1 U R	4.7 J	19 U	9.7 U	1.8 UJ	6.1	3.6 U
	ug/kg	36	33.3%	540	0	1.8 UJ	2.1 U R	4.7 J	19 U	9.7 U	1.8 UJ	7	3.6 U
	ug/kg	1400	29.2%	1000(a)	1	30 NJ	41 U R	39 UJ	360 U	190 U	35 UJ	35 U	57 NJ
	ug/kg	630	41.7%	1000(a)	0	35 UN	41 U R	110 J	360 U	190 U	35 UJ	35 U	70 UN
	mg/kg	17200	100.0%	15523	2	6550	6340	7250	11900	13600	9650	8670	7600
	mg/kg	1560	50.0%	5	8	17.1	55.6	121 R	26.3	27.3	7.9 U	8.8 U	8.2 U
	mg/kg	47.3	100.0%	7.5	8	4.9	16.8	23.6	11.3	10.8	5.1	5	5.2
	mg/kg	15600	95.8%	300	5	102	1200	1540 R	227	630	45.1	41.2	72.2
	mg/kg	1.1	100.0%	1	1	0.32 J	0.42 J	0.39 J	0.45 J	0.56 J	0.24 J	0.29 J	0.39 J
	mg/kg	127	44.0%	1	8	0.44 U	1.6	2.5	0.55 U	2.8	0.49 U	0.55 U	0.52 U
	mg/kg	215000	100.0%	120725	3	147000	11700	21400	55600	37100	25600	36600	107000
	mg/kg	220	100.0%	24	6	12.6	16.5	33.3	24	43.3	12.9	11.9	15.9
	mg/kg	40.6	100.0%	30	1	6.2 J	8.7 J	9.1	11.9	13.4	7.9	7.5 J	8.1
	mg/kg	81400	100.0%	25	15	44	911	1730	399	635	26.2	28.9	88.9
	mg/kg	49300	100.0%	28986	6	12300	25900	25700	27700	36500	22100	20000	16700
	mg/kg	527000	100.0%	30	14	269	3780	9140	2940	2860	8.5	81.2	1890
	mg/kg	56000	100.0%	12308	5	34900	4400	4300	8890	7930	7710	13800	9940
	mg/kg	4140	100.0%	759	1	355 J	178 J	4140	411 J	444 J	305 J	478 J	333 J
	mg/kg	39.3	91.7%	0.1	10	0.2	4	11.4 J	0.21	0.99	0.03 U	0.04 U	0.08
	mg/kg	148	100.0%	37	5	23	21.7	37.3	41.6	148	22.7	21.7	28.7
	mg/kg	10500	100.0%	1548	5	1290	673 J	886	1250	1410	720 J	794 J	1150
	mg/kg	5.8	20.8%	2	1	0.15 UJ	0.4 J	0.22 UJ	0.2 UJ	0.22 UJ	0.13 UJ	0.13 UJ	0.21 UJ
	mg/kg	22.7	8.3%	0.5	6	0.9 U	1.5 U	1.1 UJ	1.1 U	1 U	1 U	1.1 U	1 U
	mg/kg	3690	100.0%	114	10	213 J	121 J	147 J	128 J	132 J	79.6 J	109 J	170 J
	mg/kg	1.4	8.3%	0.3	2	1.6 U	0.19 U	0.24 U	0.22 U	0.24 U	0.14 U	0.14 U	0.23 U
	mg/kg	61.9	100.0%	150	0	38.9	14.5	17.9	20.3	23.9	38.1	35.7	34.5
	mg/kg	35700	100.0%	90	12	219	478	929	416	562	65.8	68.1	105
	mg/kg	4.4	16.7%	NA	NA	0.64 U	0.74 U	0.68 U	0.8 U	0.63 U	0.58 U	0.6 U	0.58 U
gen	mg/kg	151	95.8%	NA	NA	0.05	0.9	0.28	0.45	0.5	0.42	0.05	0.23
	%W/W	96.3		NA	NA	92.9	80.3	84.4	90.6	88.3	94.5	94.2	94.2

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TABLE 4.2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION

OUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-16 0-0.2 11/09/93 SS16-10 204034	SOIL SEAD-16 0-0.2 10/20/93 SS16-11 201889	SOIL SEAD-16 0-0.2 10/20/93 SS16-12 201890	SOIL SEAD-16 0-0.2 10/20/93 SS16-13 201891	SOIL SEAD-16 0-0.2 10/20/93 SS16-14 201892	SOIL SEAD-16 0-0.2 10/20/93 SS16-15 201893	SOIL SEAD-16 0-0.2 10/20/93 SS16-16 201894
CS												
	ug/kg	3	12.5%	100	0	11 U	13 U	3 J	11 UJ	3 J	11 UJ	11 U
	ug/kg	43	8.3%	200	0	11 U	13 U	11 UJ	11 UJ	11 U	43 J	11 U
	ug/kg	1	4.2%	2700	0	11 U	13 U	11 UJ	11 UJ	11 U	11 UJ	11 U
	ug/kg	2	4.2%	300	0	11 U	13 U	11 UJ	11 UJ	11 U	11 UJ	11 U
	ug/kg	5	25.0%	1500	0	11 U	13 U	2 J	11 UJ	1 J	11 UJ	11 U
	ug/kg	160	4.2%	500	0	54 U	67 U	55 U	57 U	56 U	54 U	56 U
	ug/kg	130	4.2%	NA	NA	54 U	67 U	55 U	57 U	56 U	54 U	56 U
	ug/kg	13	16.7%	1900	0	5.4 U	6.7 U	5.5 U	5.7 U	8.3	5.4 U	5.6 U
	ug/kg	7.9	4.2%	700	0	5.4 U	6.7 U	5.5 U	5.7 U	5.6 U	5.4 U	5.6 U
	ug/kg	61	4.2%	NA	NA	54 U	67 U	55 U	57 U	56 U	54 U	56 U
	ug/kg	6000	4.2%	NA	NA	5400 U	8700 U	5500 U	5700 U	5600 U	5400 U	5600 U
	ug/kg	22000	8.3%	NA	NA	5400 U	6700 U	5500 U	5700 U	5600 U	5400 U	5600 U
s												
	ug/kg	220	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
ne	ug/kg	170	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
itrotoluene	ug/kg	430	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	3100	62.5%	NA	NA	130 U	130 U	130 U	130 U	1200	130 U	150
GANICS												
	ug/kg	37000	12.5%	30	3	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	1600	25.0%	13000	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
ne	ug/kg	19000	37.5%	36400	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	70	8.3%	4100	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	370	16.7%	1000	0	1800 U	440 U	360 U	750 U	58 J	350 U	1800 UJ
	ug/kg	4500	16.7%	50000 *	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	1500	29.2%	6200	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	7100	25.0%	NA	NA	1800 U	440 U	360 U	750 U	370	350 U	1800 UJ
	ug/kg	530	4.2%	7100	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	6100	12.5%	50000 *	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
amine	ug/kg	1400	37.5%	50000 *	0	1800 U	22 J	360 U	43 J	17 J	350 U	1800 UJ
	ug/kg	22000	70.8%	50000 *	0	1800 U	130 J	45 J	81 J	36 J	25 J	1800 UJ
	ug/kg	2900	37.5%	50000 *	0	1600 U	27 J	360 U	750 U	370 U	350 U	1800 UJ
	ug/kg	740	29.2%	50000 *	0	1800 U	22 J	380 U	750 U	370 U	350 U	1800 UJ
te	ug/kg	1400	41.7%	8100	0	120 J	250 J	19 J	750 U	78 J	350 U	1800 UJ
	ug/kg	3900	70.8%	50000 *	0	1800 U	240 J	83 J	120 J	68 J	23 J	1800 UJ
	ug/kg	5000	75.0%	50000 *	0	1800 U	200 J	68 J	97 J	54 J	19 J	1800 UJ
e	ug/kg	1600	66.7%	220	6	1800 U	110 J	31 J	45 J	26 J	350 U	1800 UJ
	ug/kg	1900	70.8%	400	5	1800 U	130 J	49 J	72 J	44 J	16 J	1800 UJ
hthalate	ug/kg	5000	41.7%	50000 *	0	1800 U	540 J	380 U	320 J	370 J	350 U	1800 UJ
ne	ug/kg	1600	66.7%	1100	2	1800 U	100 J	31 J	49 J	33 J	350 U	1800 UJ
ne	ug/kg	1600	66.7%	1100	2	1800 U	98 J	34 J	53 J	30 J	350 U	1800 UJ
	ug/kg	1500	66.7%	61	10	1800 U	99 J	27 J	40 J	24 J	350 U	1800 UJ
yrene	ug/kg	1100	37.5%	3200	0	1800 U	30 J	360 U	750 U	370 U	350 U	1800 UJ
ene	ug/kg	5100	8.3%	14	2	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
ne	ug/kg	870	45.8%	50000 *	0	1800 U	62 J	360 U	750 U	19 J	350 U	1800 UJ

TABLE 4.2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION

OUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-16 0-0.2 11/09/93 SS16-10 204034	SOIL SEAD-16 0-0.2 10/20/93 SS16-11 201889	SOIL SEAD-16 0-0.2 10/20/93 SS16-12 201890	SOIL SEAD-16 0-0.2 10/20/93 SS16-13 201891	SOIL SEAD-16 0-0.2 10/20/93 SS16-14 201892	SOIL SEAD-16 0-0.2 10/20/93 SS16-15 201893	SOIL SEAD-16 0-0.2 10/20/93 SS16-16 201894
	ug/kg	39	4.2%	200	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.8 U	1.8 U	3.8 U
dane)	ug/kg	39	4.2%	60	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.8 U	1.8 U	3.8 U
	ug/kg	39	4.2%	41	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.8 U	1.8 U	3.8 U
	ug/kg	2.6	12.5%	20	0	1.8 UJ	2.3 U	1.6 J	2.1 J	3.8 U	1.8 U	3.8 U
	ug/kg	39	29.2%	900	0	1.8 UJ	2.3 U	1.4 J	1.9 U	3.8 U	0.96 J	3.8 U
	ug/kg	28	8.3%	44	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
	ug/kg	1400	91.7%	2100	0	3.6 UJ	15 J	38	6	59	28 J	38
	ug/kg	76	4.2%	100	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
	ug/kg	76	25.0%	900	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
	ug/kg	76	16.7%	2900	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
	ug/kg	870	95.8%	2100	0	3.6 UJ	6.3 J	5	2.6 J	19	2.1 J	89
	ug/kg	76	8.3%	NA	NA	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
	ug/kg	76	8.3%	NA	NA	3.6 UJ	6.5 J	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
	ug/kg	47	37.5%	540	0	1.8 UJ	2.3 U	1.9 U	1.9 U	4.8	1.8 U	3.8 U
e	ug/kg	36	33.3%	540	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.4 J	1.8 U	3.8 U
	ug/kg	1400	29.2%	1000(a)	1	36 UJ	44 U	36 U	37 U	73 U	35 U	74 U
	ug/kg	630	41.7%	1000(a)	0	36 UJ	110	36 U	37 U	73 U	22 J	74 U
	mg/kg	17200	100.0%	15523	2	9720	17200	10400	14100	7680	7510	6310
	mg/kg	1560	50.0%	5	8	6.6 U	13.9 U	6.6 U	8.2 U	8.4	6.2 U	9 U
	mg/kg	47.3	100.0%	7.5	6	5.2 J	7.7	5.2	6.8	9.9	4.8	3.8
	mg/kg	15600	95.8%	300	5	33.6	195	52	88.2	211	35.1	56.8
	mg/kg	1.1	100.0%	1	1	0.36 J	0.91 J	0.46 J	0.59 J	0.41 J	0.34 J	0.37 J
	mg/kg	127	44.0%	1	8	0.41 U R	0.87 U	0.41 U	0.51 U	0.61 J	0.39 U	0.58 U
	mg/kg	215000	100.0%	120725	3	13800	9820	30300	28700	178000	26800	135000
	mg/kg	220	100.0%	24	6	13.9	25.5	19.2	26.7	14.4	15.6	14.1
	mg/kg	40.6	100.0%	30	1	7.6	16.7	10.6	13.7	8.2	8.1	10.4
	mg/kg	81400	100.0%	25	15	29 J	199	54.8	204	163	42.6	69.2
	mg/kg	49300	100.0%	28986	6	23200	30600	22700	30400	16500	17500	11700
	mg/kg	527000	100.0%	30	14	18.1	616	195	460	720	210	643
	mg/kg	56000	100.0%	12308	5	5500	5200	5630	7350	5990	4770	56000
	mg/kg	4140	100.0%	759	1	342	706 J	329 J	417 J	270 J	227 J	310 J
	mg/kg	39.3	91.7%	0.1	10	0.02 U	0.73	0.24	1	0.07 J	0.05 J	0.04 J
	mg/kg	148	100.0%	37	5	22.4	35.2	39.5	50.8	29.4	30.5	28.5
	mg/kg	10500	100.0%	1548	5	813	1600	1080	1320	1100	802	2300
	mg/kg	5.8	20.8%	2	1	0.22 UJ	0.24 UJ	0.25 J	0.21 J	0.41 J	0.22 UJ	0.21 UJ
	mg/kg	22.7	8.3%	0.5	6	0.84 UJ	1.8 U	0.84 U	1 U	0.93 U	0.79 U	1.1 U
	mg/kg	3690	100.0%	114	10	49.7 J	72.2 J	108 J	125 J	176 J	90.1 J	240 J
	mg/kg	1.4	8.3%	0.3	2	0.24 UJ	0.26 U	0.25 U	0.16 U	0.14 U	0.24 U	0.23 U
	mg/kg	81.9	100.0%	150	0	18.9	28.6	15	21.1	13.4	10.8	61.9
	mg/kg	35700	100.0%	90	12	65.8 J	1270	89	128	104	68.6	93.8
	mg/kg	4.4	16.7%	NA	NA	0.53 U	0.69 U	0.64 U	0.63 U	0.64 U	0.63 U	0.87 U
gen	mg/kg	151	95.8%	NA	NA	0.07	0.23	0.04	0.05	0.05	0.04	0.2
	%W/W	98.3		NA	NA	91.7	75	90.9	88.3	90.5	93.4	88.9

SWMU\TABLES\SD16SLF.WK3

TABLE 4.2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION

OUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-16 12/06/93 FS16-1 206161	SOIL SEAD-16 12/06/93 FS16-2 206162	SOIL SEAD-16 12/06/93 FS16-3 206164	SOIL SEAD-16 12/06/93 FS16-4 206165	SOIL SEAD-16 12/06/93 FS16-5 206139	SOIL SEAD-16 12/06/93 FS16-6 206140	SOIL SEAD-16 12/06/93 FS16-7 206141	SOIL SEAD-16 12/06/93 FS16-8 206142
CS													
	ug/kg	3	12.5%	100	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
	ug/kg	43	8.3%	200	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
	ug/kg	1	4.2%	2700	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
	ug/kg	2	4.2%	300	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
	ug/kg	5	25.0%	1500	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
	ug/kg	160	4.2%	500	0	55 U	52 U	69 U	94 U	58 U	55 U	120 UJ	160 J
	ug/kg	130	4.2%	NA	NA	130 J	52 U	69 U	94 U	58 U	55 U	120 UJ	120 UJ
	ug/kg	13	16.7%	1900	0	3.9 J	5.2 U	6.9 U	9.4 U	5.8 U	5.5 U	12 UJ	13 J
	ug/kg	7.9	4.2%	700	0	7.9 J	5.2 U	6.9 U	9.4 U	5.8 U	5.5 U	12 UJ	12 UJ
	ug/kg	61	4.2%	NA	NA	61 J	52 U	69 U	94 U	58 U	55 U	120 UJ	120 UJ
	ug/kg	6000	4.2%	NA	NA	6000 J	5200 U	6900 U	9400 U	5800 U	5500 U	12000 UJ	12000 UJ
	ug/kg	22000	8.3%	NA	NA	22000 J	5200 U	6900 U	9400 U	5800 U	5500 U	12000 UJ	12000 UJ
s													
	ug/kg	220	4.2%	NA	NA	190 U	130 U	130 U	130 U	130 U	130 U	130 UJ	130 UJ
ne	ug/kg	170	4.2%	NA	NA	170 J	130 UJ	130 U	130 U	130 U	130 U	130 UJ	130 UJ
itrotoluene	ug/kg	430	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 UJ	130 UJ
	ug/kg	3100	62.5%	NA	NA	130 U	72 J	130 U	2900	130 U	610	3100 J	610 J
GANICS													
	ug/kg	37000	12.5%	30	3	81 J	340 U	37000	150 J	380 U	360 U	2600 UJ	5100 UJ
	ug/kg	1600	25.0%	13000	0	360 U	43 J	1600 J	620 U	19 J	360 U	410 J	5100 UJ
ne	ug/kg	19000	37.5%	36400	0	25 J	21 J	19000	49 J	40 J	360 U	180 J	5100 UJ
	ug/kg	70	8.3%	4100	0	360 U	340 U	5700 U	620 U	380 U	360 U	2600 UJ	5100 UJ
	ug/kg	370	16.7%	1000	0	360 U	340 U	5700 U	620 U	380 U	370 J	2600 UJ	5100 UJ
	ug/kg	4500	16.7%	50000 *	0	23 J	340 U	4500 J	620 U	380 U	360 U	560 J	5100 UJ
	ug/kg	1500	29.2%	6200	0	360 U	46 J	1500 J	620 U	22 J	360 U	390 J	5100 UJ
	ug/kg	7100	25.0%	NA	NA	360 U	340 U	5700 U	620 U	380 U	2700	2600 UJ	5100 UJ
	ug/kg	530	4.2%	7100	0	360 U	340 U	530 J	620 U	380 U	360 U	2600 UJ	5100 UJ
	ug/kg	6100	12.5%	50000 *	0	25 J	340 U	6100	620 U	380 U	360 U	560 J	5100 UJ
amine	ug/kg	1400	37.5%	50000 *	0	360 U	340 U	5700 U	620 U	380 U	450	2600 UJ	5100 UJ
	ug/kg	22000	70.8%	50000 *	0	130 J	550	22000	120 J	100 J	110 J	4100 J	1400 J
	ug/kg	2900	37.5%	50000 *	0	22 J	340 U	2900 J	620 U	22 J	360 U	670 J	300 J
	ug/kg	740	29.2%	50000 *	0	24 J	340 U	5700 U	620 U	36 J	21 J	740 J	5100 UJ
te	ug/kg	1400	41.7%	6100	0	360 U	340 U	5700 U	620 U	720 UJ	710 UJ	2600 UJ	5100 UJ
	ug/kg	3900	70.8%	50000 *	0	160 J	920	3100 J	140 J	140 J	210 J	3900 J	3200 J
	ug/kg	5000	75.0%	50000 *	0	200 J	570	5000 J	120 J	140 J	160 J	3200 J	2300 J
e	ug/kg	1600	66.7%	220	6	81 J	40 J	1000 J	44 J	54 J	92 J	1600 J	1200 J
	ug/kg	1900	70.8%	400	5	110 J	150 J	1400 J	74 J	120 J	110 J	1900 J	1400 J
hthalate	ug/kg	5000	41.7%	50000 *	0	360 U	340 U	5700 U	440 J	5000 J	52 J	270 J	1300 J
ne	ug/kg	1600	66.7%	1100	2	91 J	130 J	500 J	73 J	78 J	99 J	1600 J	1200 J
ne	ug/kg	1600	66.7%	1100	2	73 J	77 J	630 J	60 J	63 J	92 J	1600 J	1200 J
	ug/kg	1500	66.7%	61	10	70 J	45 J	770 J	61 J	61 J	90 J	1500 J	1000 J
yrene	ug/kg	1100	37.5%	3200	0	360 U	92 J	450 J	620 U	380 U	49 J	400 J	360 J
ene	ug/kg	5100	6.3%	14	2	360 U	26 J	500 J	620 U	380 U	360 U	2600 UJ	5100 UJ
ne	ug/kg	670	45.8%	50000 *	0	360 U	120 J	870 J	620 U	34 J	61 J	360 J	580 J

TABLE 4.2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION

OUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-16 12/06/93 FS16-1 206161	SOIL SEAD-16 12/06/93 FS16-2 206162	SOIL SEAD-16 12/06/93 FS16-3 206164	SOIL SEAD-16 12/06/93 FS16-4 206165	SOIL SEAD-16 12/06/93 FS16-5 206139	SOIL SEAD-16 12/06/93 FS16-6 206140	SOIL SEAD-16 12/06/93 FS16-7 206141	SOIL SEAD-16 12/06/93 FS16-8 206142
	ug/kg	39	4.2%	200	0	1.9 U	1.6 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
lane)	ug/kg	39	4.2%	60	0	0.93 J	1.6 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
	ug/kg	39	4.2%	41	0	1.9 U	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
	ug/kg	2.6	12.5%	20	0	1.9 U	1.6 U	2.6 J	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
	ug/kg	39	29.2%	900	0	1.9 U	1.6 U	4.7 U	8.4 U	3.9 U	1.8 U	22 J	39 UJ
	ug/kg	28	8.3%	44	0	4.2 J	3.4 U	9.2 U	12 U	7.5 U	3.6 U	28 J	76 UJ
	ug/kg	1400	91.7%	2100	0	13 J	17 J	73 J	17	750	6.3 J	97 J	180 J
	ug/kg	76	4.2%	100	0	3.6 U	3.4 U	9.2 J	12 U	7.5 U	3.6 U	39 UJ	76 UJ
	ug/kg	76	25.0%	900	0	3.6 U	3.4 J	5.7 J	12 U	3.9 J	3.6 U	39 UJ	76 UJ
	ug/kg	76	16.7%	2900	0	5.2 J	3.1 J	9.2 U	12 U	35 J	3.6 U	39 UJ	76 UJ
	ug/kg	870	95.8%	2100	0	6.1 J	6.1 J	61 J	140	610	7.2	360 J	870 J
	ug/kg	76	8.3%	NA	NA	3.6 U	3.4 U	9.2 U	12 U	7.5 U	3.6 U	39 UJ	76 UJ
	ug/kg	76	8.3%	NA	NA	3.6 U	3.4 U	9.2 U	12 U	7.5 U	3.6 U	39 UJ	76 UJ
	ug/kg	47	37.5%	540	0	1.2 J	2.1 J	3.8 J	6.4 U	3.1 J	1.8 U	13 J	47 J
	ug/kg	36	33.3%	540	0	1.9 U	2.1 J	4.8 J	6.4 U	2.9 J	1.8 U	12 J	36 J
	ug/kg	1400	29.2%	1000(a)	1	36 J	56	130	120 U	75 U	36 U	360 J	1400 J
	ug/kg	630	41.7%	1000(a)	0	37	51	97	120 U	89	36 U	390 UJ	630 J
	mg/kg	17200	100.0%	15523	2	9540	16500	6610	9550	2960	11300	7960 J	13700 J
	mg/kg	1560	50.0%	5	8	4.6 U	1250	1560	31.5	11.9 J	11.2 J	21.8 J	93.2 J
	mg/kg	47.3	100.0%	7.5	6	3.4	47.3	26.9	7.1	1.9	6.5	8 J	15.9 J
	mg/kg	15600	95.8%	300	5	145	15600	6950	466	88.2	289	392 J	2110 J
	mg/kg	1.1	100.0%	1	1	0.51 J	0.09 J	0.08 U	1.1 J	0.19 J	0.49 J	0.32 J	0.27 J
	mg/kg	127	44.0%	1	6	22.2 R	36.8 R	156 R	1 J R	3	1.2	72.8 J	127 J
	mg/kg	215000	100.0%	120725	3	19600	13600	21200	23000	215000	41800	41600 J	67400 J
	mg/kg	220	100.0%	24	6	15.6	220	33.2	6.4	33.2 R	21.3 R	22.1 J R	174 J R
	mg/kg	40.6	100.0%	30	1	15	20.9	9.7 J	3.3 J	5.6 J	9.9	6 J	40.6 J
	mg/kg	81400	100.0%	25	15	211 J	36900 J	81400 J	129 J	90 J	198 J	593 J	757 J
	mg/kg	49300	100.0%	26966	6	19700	49300	30500	8420	41300	25000	17200 J	48600 J
	mg/kg	527000	100.0%	30	14	610	437000	527000	596	309	885	1560 J	12100 J
	mg/kg	56000	100.0%	12306	5	4650	18400	19700	2470	15700	16400	10500 J	15700 J
	mg/kg	4140	100.0%	759	1	486 J	334 J	214 J	194 J	480	456	301 J	458 J
	mg/kg	39.3	91.7%	0.1	10	0.61	39.3	1.8	0.34	0.1	1.2	2.4 J	3.7 J
	mg/kg	148	100.0%	37	5	21.1	119	66.6	7.9 J	16.8	30.5	21.5 J	124 J
	mg/kg	10500	100.0%	1548	5	10500	1570	636 J	1550 J	704 J	1480	1430 J	1360 J
	mg/kg	5.8	20.8%	2	1	5.8 J	1.3 UJ	1.6 UJ	0.28 UJ	0.13 UJ	0.72 J	1.8 J	0.91 J
	mg/kg	22.7	8.3%	0.5	6	0.9 U	13.4	22.7	1.5 U	0.73 U	0.8 U	1.3 UJ	1.7 UJ
	mg/kg	3690	100.0%	114	10	3690	2650	152 J	365 J	179 J	200 J	97.9 J	302 J
	mg/kg	1.4	6.3%	0.3	2	0.36 J	2.2 UJ	1.4 J	0.44 UJ	0.22 U	0.25 U	0.45 UJ	0.39 UJ
	mg/kg	61.9	100.0%	150	0	17.7	12.9	6.2 J	7 J	8.3 J	18.3	20.6 J	44 J
	mg/kg	35700	100.0%	90	12	715 J	12400 J	35700 J	178 J	318	293	1310 J	11600 J
	mg/kg	4.4	16.7%	NA	NA	1.1	1.4	0.74 U	1 U	0.61 U	0.58 U	2.3 J	4.4 J
gen	mg/kg	151	95.6%	NA	NA	151	13.7	0.21	0.27	2	104	0.89	0.05
	%W/W	96.3		NA	NA	90.7	96.3	72.4	52.6	66.8	92.3	41.8	42.9

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b)* = As per proposed TAGM, total VOCs < 10 ppm; total Semi-VOCs < 500 ppm; individual semi-VOCs < 50ppm.
c) NA = Not Available
d) U = compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.

Floor Samples

Volatile organic compounds were undetected in the floor samples collected in the Abandoned Deactivation Furnace Building.

4.2.2.2 Semivolatile Organic Compounds

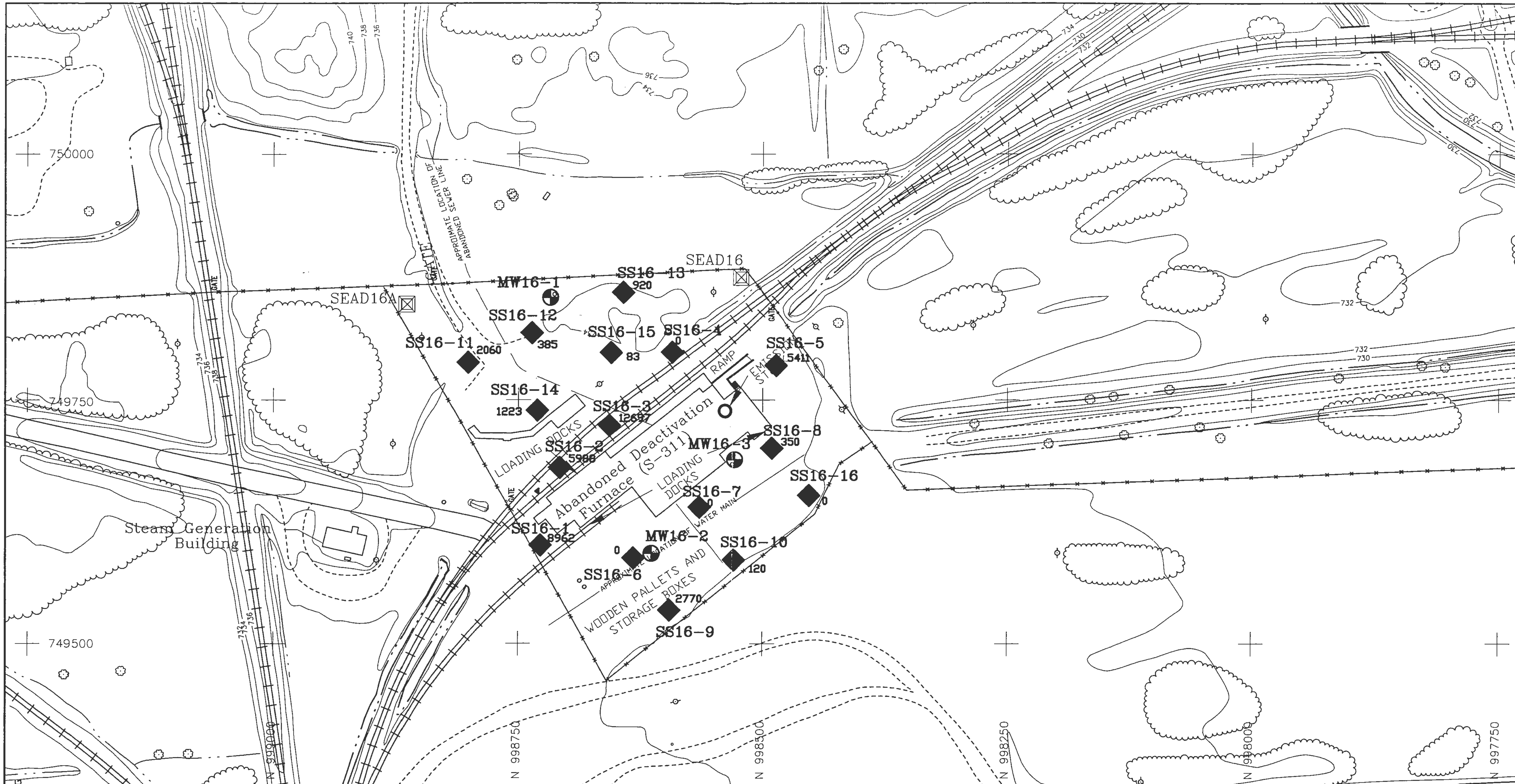
Surface Soils

A total of three SVOs were found at concentrations above the associated TAGM values in one or more of the surface soil samples collected at SEAD-16. These three compounds were benzo(a)anthracene, chrysene and benzo(a)pyrene. For the 16 surface soil samples collected outside the building, the maximum total SVO concentrations were identified in sample SS16-3 where 12697 μg/kg of total SVOs were reported. This sample was collected on the northeast side of the building in the area between the two sets of railroad tracks. Other samples with notably elevated total SVO concentrations were SS16-1, 8962 μg/kg, SS16-2, 5988 μg/kg, and SS16-5, 5411 μg/kg. While only 3 of the 16 surface soil samples did not have any SVOs detected, the remaining samples generally had low total SVO concentrations. Based upon the distribution of these samples, the soils to the north and east of the building appear to be the most impacted by SVO compounds. Figure 4.2-1 shows the concentration of SVOs in surface soils.

Floor Samples

A total of seven SVOs were found at concentrations which exceeded TAGM values. The seven SVO compounds were benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, and Phenol.

The maximum concentrations of phenol, 37,000 μg/kg, and dibenz(a,h)anthracene, 500J μg/kg, were identified in the floor sample FS16-3. This sample, which was collected within the central portion of the building, had a wide variety of SVOs detected and had total SVOs of greater than 100 mg/kg. The maximum concentrations of the five remaining SVOs were all found in the floor sample FS16-7, which was also collected from the central area within the Abandoned Deactivation Furnace Building. In general, all eight floor samples collected within the building had a wide range of SVOs detected at low to very high concentrations.



ACAD:\SENECA\7SWMU\ACADFIG\SD16SVO.DWG

LEGEND

MINOR WATERWAY	SURVEY MONUMENT
MAJOR WATERWAY	ROAD SIGN
FENCE	DECIDOUS TREE
UNPAVED ROAD	FIRE HYDRANT
BRUSH LINE	MANHOLE
LANDFILL EXTENTS	GUIDE POST
RAILROAD	POLE
760 GROUND SURFACE ELEVATION CONTOUR	UTILITY BOX
	CORDINATE GRID (250' GRID)
	OVERHEAD UTILITY POLE
	MAILBOX/RR SIGNAL

MONITORING WELL

16 SURFACE SOIL SAMPLE AND TOTAL SVOs IN SURFACE SOILS (mg/kg)

50 0 50 100 (feet)

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 4.2-1

SEAD-16 ABANDONED DEACTIVATION FURNACE TOTAL SVOs IN SURFACE SOILS (mg/kg)

SCALE 1" = 100' | DATE MAY 1995 | REV C

4.2.2.3 Pesticides and PCBs

Surface Soils

A wide distribution of pesticides and PCB compounds were identified in the surface soil samples collected at SEAD-16. Pesticide compounds were detected in all but one (SS16-10) of the surface soil samples collected. The reported concentrations of pesticides ranged from .96J μg/kg (of Endosulfan I) to 1400 μg/kg (of 4-4'-DDE). All of the reported concentrations of pesticides were below their respective TAGM values. Aroclor-1260 was the only PCB compound detected in the surface soil samples collected at SEAD-16. It was detected in three samples at concentrations ranging from 22J to 110 μg/kg. The TAGM for Aroclor-1260 is 1,000 μg/kg in surface soils.

Floor Samples

Pesticide compounds were detected in all eight of the floor samples collected from within the Abandoned Deactivation Furnace Building. All of the reported concentrations of pesticides in the floor samples were below TAGM values. Two PCB compounds were detected in six floor samples. The compound Aroclor-1254 was detected in sample FS16-8 at a concentration of 1400J μg/kg. This concentration of Aroclor-1254 exceeded its TAGM value of 1000 μg/kg. All of the remaining occurrences of PCB compounds were at concentrations below their associated TAGM values.

4.2.2.4 Herbicides

Surface Soils

Two herbicides were identified in three surface soil samples collected at SEAD-16. 2,4,5-T was detected at a concentration of 7.2 μg/kg in surface soil sample SS16-3 and at a concentration of 8.3 μg/kg in surface soil sample SS16-4. The TAGM for 2,4,5-T is 1,900 μg/kg. MCPP was detected in a single surface soil sample, SS16-5, at a concentration of 16,000 μg/kg. No TAGM exists for reported concentrations of MCPP in surface soils.

Floor Samples

A combined total of seven herbicides were detected in two of the eight floor samples collected in the Abandoned Deactivation Furnace Building. The herbicides 2,4-DB, 2,4,5-T, 2,4,5-TP, Dichloroprop, MCPA and MCPP were detected in floor sample FS16-1. The reported concentrations of these compounds ranged from 3.9J μg/kg (of 2,4,5-T) to 22,000J μg/kg of MCPP. 2,4-D and 2,4,5-T were detected in floor sample FS16-8 at concentrations of 160J and 13J μg/kg, respectively. The TAGM values for 2,4,5-T and 2,4,5-TP were not exceeded in either of these samples. The remaining 5 herbicides which were detected in floor samples FS16-1 or FS16-8 do not have any associated TAGM values.

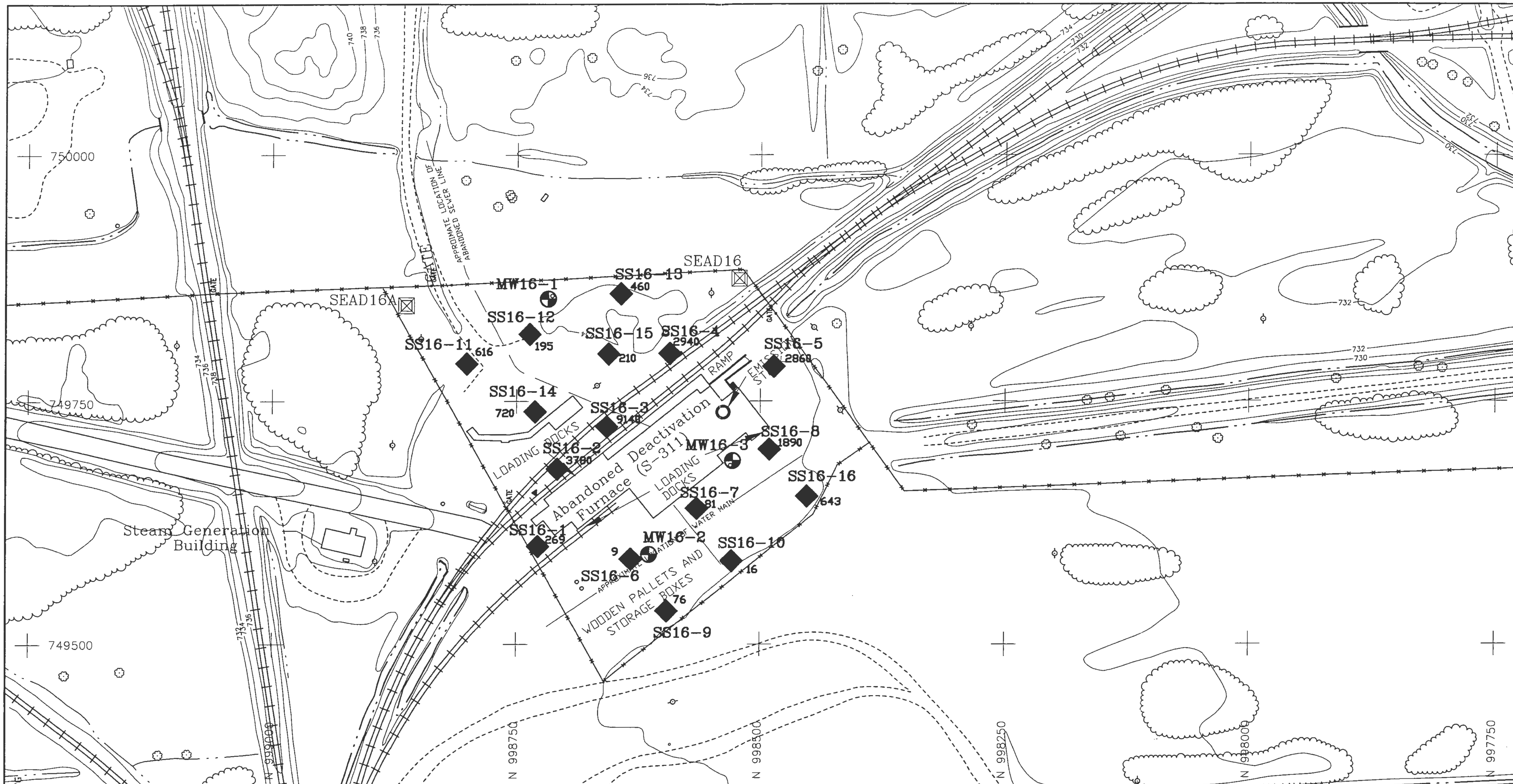
4.2.2.5 Metals

Surface Soils

Eighteen of the 21 metals detected in the surface soil samples were found in one on more samples at concentrations exceeding the associated TAGM values. Significant concentrations of antimony, copper, lead, mercury and zinc were identified in approximately half of the 16 surface soil samples collected. Figure 4.2-2 shows the concentration of lead in surface soil samples. The highest concentrations of copper (1730 mg/kg), lead (9140 mg/kg), mercury (11.4J mg/kg) and zinc (929 mg/kg) were identified in the surface soil sample SS16-3. Other surface soil samples with elevated lead levels include SS16-2 (3780 mg/kg), SS16-4 (2940 mg/kg), SS16-5 (2860 mg/kg), and SS16-8 (1890 mg/kg). In general, these samples also had elevated levels of copper and zinc. The levels of mercury and antimony in the surface soil samples appear to be somewhat erratic with only a few samples showing highly elevated concentrations of these elements.

Floor Samples

A total of 24 metals were detected in the floor samples collected within the Abandoned Deactivation Furnace. Eight of these were found at concentrations which exceeded their respective TAGMS by at least an order of magnitude. In particular, extremely high levels of antimony (1,560 μg/kg), barium (15,600 mg/kg), cadmium (127J μg/kg) copper (81,400J mg/kg), lead (527,000 mg/kg), mercury (39.3 mg/kg), silver (22.7 V8.25 mg/kg) and zinc (35,700J mg/kg) were found in the two floor samples FS16-2 and FS16-3.



ACAD\SENECA\7SWMU\ACADFIG\SD16LEAD.DWG

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- SURVEY MONUMENT
- ROAD SIGN
- DECIDOUS TREE
- FIRE HYDRANT
- MANHOLE
- GUIDE POST
- POLE
- UTILITY BOX
- CORDINATE GRID (250' GRID)
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MONITORING WELL
- 16 SURFACE SOIL SAMPLE AND LEAD IN SURFACE SOILS (mg/kg)

50 0 50 100
(feet)

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 4.2-2
SEAD-16 ABANDONED DEACTIVATION FURNACE
LEAD IN SURFACE SOILS (mg/kg)

SCALE	DATE	REV
1" = 100'	MAY 1995	C

4.2.2.6 Nitroaromatics

Surface Soils

The three nitroaromatic compounds: tetryl, 2-amino-4,6-dinitrotoluene, and 2,4-dinitrotoluene were identified in one or more of the 16 surface soil samples collected at SEAD-16. The compounds tetryl and 2-amino-4,6-dinitrotoluene were found only once in the samples SS16-3 and SS16-3, respectively. These compounds were identified at concentrations of 220J μg/kg and 430J μg/kg, respectively. 2,4-DNT was found in 9 of the 16 surface soil samples. The maximum concentration was identified in sample SS16-14 where 1200 μg/kg was found. Other surface soil samples with elevated 2,4-DNT concentrations included SS16-3 (1100 μg/kg), SS16-5 (780J μg/kg), and SS16-8 (770 μg/kg).

Floor Samples

Two nitroaromatic compounds were detected in the floor samples analyzed. 2,4,6-Trinitrotoluene was found in only one floor sample, FS16-1, at a concentration or 170J μg/kg. The nitroaromatic compound 2,4-dinitrotoluene was identified in 5 of the 8 floor samples. The maximum concentration of 3100J μg/kg was found in floor sample FS16-7. Other floor samples with elevated 2,4-dinitrotoluene concentrations included FS16-4 (2900 μg/kg), FS16-6 (610 μg/kg), and FS16-8 (610J μg/kg).

4.2.2.7 Indicator Compounds

Surface Soils

The surface soil samples were analyzed for nitrate/nitrite nitrogen. All but one (SS16-9) of the surface soil samples had concentrations of nitrate/nitrite nitrogen above the .01 mg/kg detection limit. All had very low nitrate/nitrite concentrations and none exceeded a concentration of 0.9 mg/kg.

Floor Samples

Nitrate/nitrite nitrogen was detected in all eight of the floor samples analyzed. The concentrations reported in floor samples FS16-3 (0.21 mg/kg), FS16-4 (0.27 mg/kg) FS16-5 (2 mg/kg), FS16-7 (0.89 mg/kg), and FS16-8 (0.05 mg/kg) were all similar to the concentration of nitrate/nitrite nitrogen detected in the surface soil samples. The concentrations of nitrate/nitrite nitrogen detected in floor samples FS16-2, FS16-16, and FS16-1 were considerably higher with reported concentrations of 13.7, 104 and 151 mg/kg, respectively.

4.2.3 Groundwater

Three monitoring wells were installed and sampled as part of the SEAD-16 investigation. The summary chemical results are presented in Table 4.2-2. The monitoring well locations were shown in Figure 2.4-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-16.

4.2.3.1 Volatile Organic Compounds

No volatile organic compounds were identified within the four groundwater samples collected at SEAD-16.

4.2.3.2 Semivolatile Organic Compounds

The semivolatile organic compound diethylphthalate was detected at an estimated concentration of 0.5J μg/L in the groundwater sample collected from monitoring well MW16-3. This concentration is well below the criteria value of 50 μg/L for diethylphthalate.

4.2.3.3 Pesticides and PCBs

No pesticides or PCB compounds were identified within the four groundwater samples collected at SEAD-16.

4.2.3.4 Herbicides

No herbicide compounds were detected in the four groundwater samples collected at SEAD-16.

4.2.3.5 Metals

Groundwater concentrations for a variety of metals were found at concentrations above the criteria value in 2 of the 3 monitoring wells sampled. The highest concentrations of many of these metals were found in the groundwater sample collected from monitoring well MW16-3

TABLE 4.2-2

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-16 11/19/93 MW16-1 205058	WATER SEAD-16 11/17/93 MW16-2 204977	WATER SEAD-16 11/17/93 MW16-41 204980 W16-2DUP	WATER SEAD-16 11/17/93 MW16-3 204978
NITROAROMATICS										
2,4-Dinitrotoluene	ug/L	0.07	33.3%	5	NA	0	0.13 U	0.13 U	0.13 U	0.07 J
SEMIVOLATILE ORGANICS										
Diethylphthalate	ug/L	0.5	33.3%	50	NA	0	11 U	11 U	11 U	0.5 J
METALS										
Aluminum	ug/L	149000	100.0%	NA	NA	NA	53600	3500	4540	149000
Antimony	ug/L	89.6	33.3%	3	6	1	52.5 U	52.4 U	52.7 U	89.6
Arsenic	ug/L	33.2	100.0%	25	50	1	15.4	1 U	1.3 J	33.2
Barium	ug/L	1170	100.0%	1000	2000	1	401	43 J	48.4 J	1170
Beryllium	ug/L	8.1	66.7%	3	4	2	3.1 J	0.3 U	0.3 U	8.1
Cadmium	ug/L	3.9	33.3%	10	5	0	3.3 U	3.3 U	3.3 U	3.9 J
Calcium	ug/L	477000	100.0%	NA	NA	NA	239000	114000	117000	477000
Chromium	ug/L	293	100.0%	50	100	2	88.5	6 J	6.9 J	293
Cobalt	ug/L	166	66.7%	NA	NA	NA	59.9	4.9 U	4.9 U	166
Copper	ug/L	2150	100.0%	200	1300(g)	1	64.2	12.1 J	14.8 J	2150
Iron	ug/L	246000	100.0%	300	NA	4	88100	5310	6400	246000
Lead	ug/L	3240	100.0%	25	15(h)	4	71.1	27.3	34.5	3240
Magnesium	ug/L	92000	100.0%	35000	NA	2	42000	15200	15900	92000
Manganese	ug/L	6300	100.0%	300	NA	2	2110	167	189	6300
Mercury	ug/L	3.9	33.3%	2	2	1	0.07 UJ	0.07 UJ	0.07 UJ	3.9 J
Nickel	ug/L	406	100.0%	NA	100	2	135	10.2 J	11.5 J	406
Potassium	ug/L	24800	100.0%	NA	NA	NA	10200	4810 J	4520 J	24800
Selenium	ug/L	10.3	66.7%	10	50	1	2.5 J	0.8 U	0.99 J	10.3
Sodium	ug/L	11700	100.0%	20000	NA	0	7710	11400	11700	10500
Vanadium	ug/L	257	100.0%	NA	NA	NA	86.5	7.2 J	9.3 J	257
Zinc	ug/L	3370	100.0%	300	NA	2	460	30.4	33.4	3370
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/L	0.86		10	10	0	0.11	0.86	0.77	0.23
pH	standard units	7.7					7.3	7.57		7.7
Specific Conductivity	umhos/cm	575					575	525		260
Turbidity	NTU						NA(Cloudy)	NA(Clear)		NA(Silty)

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) The value listed is an Action Level for copper, and not an MCL Standard
h) The value listed is an Action Level for lead at the tap, and not an MCL Standard

where the sample was silty during sampling. While it is difficult to ascertain the extent to which particulate matter has impacted these results, it appears that the high metal concentrations are most likely due to the high sample turbidity.

4.2.3.6 Nitroaromatics

The nitroaromatic compound 2,4-dinitrotoluene was detected in the groundwater sample collected from MW16-3 at an estimated concentration of 0.07J μg/L. This concentration is below the method detection limit of 0.13 μg/L. No other nitroaromatic compounds were detected.

4.2.3.7 Indicator Parameters

No exceedances were detected for nitrates and the pH and specific conductivity results indicate no adverse impacts to groundwater based upon these data.

4.2.4 Standing Water

Two standing water samples were collected within the Abandoned Deactivation Furnace Building as part of the SEAD-16 investigation. The summary chemical analyses are presented in Table 4.2-3. The locations of these sample points are shown in Figure 2.4-4.

4.2.4.1 Volatile Organic Compounds

No volatile organic compounds were detected in the two standing water samples collected at SEAD-16.

4.2.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the two standing water samples collected at SEAD-16.

4.2.4.3 Pesticides and PCBs

No pesticides or PCB compounds were detected in the two standing water samples collected at SEAD-16.

TABLE 4.2-3
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION
STANDING WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	WATER SEAD-16 12/06/93 SW16-1 206187	WATER SEAD-16 12/06/93 SW16-2 206188
METALS					
Aluminum	ug/L	261	100.0%	152 J	261
Barium	ug/L	84.5	100.0%	60.6 J	84.5 J
Calcium	ug/L	71700	100.0%	71700	53400
Copper	ug/L	67.6	100.0%	19.3 J	67.6
Lead	ug/L	178	100.0%	67.8	178
Magnesium	ug/L	9590	100.0%	9590	8170
Manganese	ug/L	33.9	100.0%	8.7 J	33.9
Mercury	ug/L	0.19	100.0%	0.1 J	0.19 J
Nickel	ug/L	5.2	50.0%	4.0 U	5.2 J
Potassium	ug/L	3120	100.0%	2560 J	3120 J
Selenium	ug/L	1.1	50.0%	1.1 J	0.7 U
Silver	ug/L	5.2	50.0%	4.2 U	5.2 J
Sodium	ug/L	9220	100.0%	9220	8850
Vanadium	ug/L	4.5	100.0%	3.7 J	4.5 J
Zinc	ug/L	380	100.0%	34.7	380
OTHER ANALYSES					
Nitrate/Nitrite-Nitrogen	mg/L	1.77	100.0%	1.27	1.77

4.2.4.4 Herbicides

No herbicide compounds were detected in the two standing water samples collected at SEAD-16.

4.2.4.5 Metals

A variety of metals were found in one or both of the standing water samples collected from inside the building at SEAD-16. The sample SW16-2, which was collected from standing water present on the north side of the building, generally had the higher metal concentrations. No criteria apply to these two samples because the water was from inside the building.

4.2.4.6 Nitroaromatics

No nitroaromatic compounds were detected in the two standing water samples collected at SEAD-16.

4.2.4.7 Indicator Compounds

The water samples were analyzed for nitrate/nitrite nitrogen. The concentrations detected were 1.27 mg/L in sample SW16-1 and 1.77 mg/L in sample SW16-2.

4.2.5 Building Material Sampling

A total of 9 building material and furnace scale samples were collected from inside the Abandoned Deactivation Furnace Building as part of the SEAD-16 investigation. The summary chemical results are presented in Table 4.2-4. The building material sample locations are shown in Figure 2.4-3. The following section describes the results of this sampling program.

4.2.5.1 Asbestos

Asbestos was detected in 5 of the 15 building material samples analyzed, AS16-1, AS16-3, AS16-5, AS16-6 and AS16-7. Both chrysotile and amosite asbestos were present in samples AS16-1 and AS16-3, while only chrysotile asbestos was present in the other 3 samples.

TABLE 4.2-4
SENECA ARMY DEPOT
SEAD-16 EXPANDED SITE INSPECTION
BULK SAMPLE ASBESTOS ANALYSIS RESULTS

ES Sample ID	Asbestos (% Type)	Other Material
AS16-1	15 – 25 % Chrysotile 35 – 45 % Amosite	Binder
AS16-2	Not Detected	25 – 35 % Cellulose Binder Carbonate
AS16-3	10 – 15 % Chrysotile 45 – 55 % Amosite	Binder
AS16-4	Not Detected	35 – 45 % Cellulose Binder Carbonate
AS16-5	25 – 35 % Chrysotile	Binder Carbonate
AS16-6	25 – 35 % Chrysotile	Binder Carbonate
AS16-7	5 – 10 % Chrysotile	10 – 15 % Cellulose Tar
AS16-8	Not Detected	< 1 % Cellulose Binder Quartz
AS16-9	Not Detected	< 1 % Fiberglass 10 – 15 % Cellulose Binder Quartz
AS16-10	Not Detected	75 – 85 % Fiberglass Binder
AS16-11	Not Detected	< 1 % Fiberglass Binder
AS16-12	Not Detected	25 – 35 % Cellulose Binder
AS16-13	Not Detected	10 – 15 % Cellulose Binder
AS16-14	Not Detected	25 – 35 % Cellulose Binder
AS16-15	Not Detected	25 – 35 % Cellulose Binder
AS16-16	Not Detected	15 – 25 % Cellulose Binder Carbonate

4.2.6 Tentatively Identified Compounds

Surface Soils

Tentatively Identified Compounds (TICs) were found at total concentrations greater than 50 mg/kg in 8 of the 16 surface soil samples analyzed. Seven of these samples were located in the western portion of SEAD-16 where all of the surface soil samples were collected from soils beneath broken asphalt. The total TIC concentrations reported in these samples ranged from 51.2 to 779 mg/kg. The remaining surface soil sample with a total TIC concentration greater than 50 mg/kg was SS16-4 (138.9 μg/kg) which was collected approximately 5 feet north of the SEDA railroad tracks crossing through the eastern portion of SEAD-16.

Floor Samples

Three floor samples had total TIC concentrations in excess of 50 mg/kg. Total TIC concentrations of 147.5, 274.6, and 285.3 mg/kg were reported in floor samples FS16-8, FS16-7, and FS16-3, respectively. Nonacosane, hentriacontane, hexadecanoic acid, and cholesterol were the primary compounds which contributed to the elevated TIC concentrations in floor samples FS16-7 and FS16-8. Naphthalenes and phenanthrenes were the primary constituents contributing to the elevated TIC concentrations in floor sample FS16-3.

4.3 SEAD-17

4.3.1 Introduction

During the investigation of SEAD-17 a total of 27 surface soil samples were collected from the area surrounding the new Deactivation Furnace Building. In addition, 5 subsurface soil samples were collected from 4 soil borings installed at SEAD-17. No surface water or sediment samples were collected at SEAD-17. Four monitoring wells were installed and sampled to analyze if impacts to groundwater have occurred at the site. The following section describes the results of the chemical analyses of these samples.

4.3.2 Soil

The analytical results for the 27 surface and 5 soil boring samples collected as part of the

SEAD-17 investigation are presented in Table 4.3-1. The sample locations were shown in Figure 2.5-2. The following sections describe the nature and extent of contamination in SEAD-17 soils.

4.3.2.1 Volatile Organic Compounds

Surface Soils

A total of 3 VOCs were found in 3 of the 27 surface soil samples collected at SEAD-17. None of these volatile organic compounds were detected above the associated TAGM values. A maximum VOC concentration of 15J μg/kg of acetone, which is considered to be a laboratory contaminant, was found in the surface soil sample SS17-24. The remainder of the VOC detections were all at extremely low μg/kg levels, well below the associated TAGM values.

Subsurface Soils

No VOCs were detected in the subsurface soil samples analyzed.

4.3.2.2 Semivolatile Organic Compounds

Surface Soils

A wide variety of SVOs were found at concentrations below the associated TAGM values in one or more of the surface soil samples collected at SEAD-17. Figure 4.3-1 shows the total SVO concentrations in surface soils. The compound dibenz(a,h)anthracene was detected in the sample SS17-1 at an estimated concentration of 40J μg/kg, which is above the TAGM value of 14 μg/kg. This was the only SVO identified in SEAD-17 soil samples above the TAGM value. The sample with the highest total SVO concentration, SS17-18 (2215 μg/kg) was collected from the area southwest of the building. This is well below the Total SVO TAGM guideline concentration of 500,000 μg/kg. In general, the samples collected from this area of the site appear to have the highest on-site SVO concentrations.

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/21/93 SS17-1 202037	SOIL SEAD-17 0-0.2 10/21/93 SS17-2 202038	SOIL SEAD-17 0-0.2 10/21/93 SS17-3 202039	SOIL SEAD-17 0-0.2 10/21/93 SS17-4 202040	SOIL SEAD-17 0-0.2 10/21/93 SS17-5 202041	SOIL SEAD-17 0-0.2 10/21/93 SS17-6 202042	SOIL SEAD-17 0-0.2 10/21/93 SS17-7 202043	SOIL SEAD-17 0-0.2 10/21/93 SS17-8 202044
S													
	ug/kg	8	3.1%	100	0	12 U	13 U	13 U	12 U	14 U	10 U	12 U	12 U
	ug/kg	15	3.1%	200	0	12 U	13 U	13 U	12 U	14 U	10 U	12 U	12 U
	ug/kg	4	6.3%	1500	0	12 U	13 U	13 U	12 U	14 U	10 U	12 U	12 U
	ug/kg	34000	12.5%	NA	NA	16000	6700 U	6500 U	6200 U	34000	5200 U	12000	6200 U
	ug/kg	330	9.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	170	130 U	130 U
ANICS													
	ug/kg	70	3.1%	1000	0	420 U	450 U	430 U	70 J	430 U	340 U	410 U	410 U
	ug/kg	1400	9.4%	NA	NA	420 U	450 U	430 U	1400	430 U	340 U	410 U	410 U
e	ug/kg	27	3.1%	50000 *	0	420 U	450 U	430 U	27 J	430 U	340 U	410 U	410 U
	ug/kg	120	28.1%	50000 *	0	120 J	450 U	430 U	33 J	430 U	36 J	410 U	46 J
	ug/kg	23	3.1%	50000 *	0	23 J	450 U	430 U	410 U	430 U	340 U	410 U	410 U
	ug/kg	1200	59.4%	8100	0	51 J	76 J	45 J	89 J	87 J	60 J	97 J	35 J
	ug/kg	190	43.8%	50000 *	0	190 J	47 J	430 U	54 J	33 J	48 J	21 J	71 J
	ug/kg	170	40.6%	50000 *	0	170 J	47 J	430 U	44 J	33 J	43 J	410 U	63 J
	ug/kg	46	6.3%	50000 *	0	420 U	450 U	430 U	410 U	430 U	37 J	410 U	410 U
	ug/kg	72	28.1%	220	0	72 J	23 J	430 U	22 J	430 U	19 J	410 U	30 J
	ug/kg	78	28.1%	400	0	75 J	29 J	430 U	32 J	430 U	31 J	410 U	36 J
ate	ug/kg	1300	56.3%	50000 *	0	530	330 J	290 J	390 J	600	340 U	650	410 U
	ug/kg	70	28.1%	1100	0	70 J	28 J	430 U	28 J	430 U	26 J	410 U	27 J
	ug/kg	49	21.9%	1100	0	49 J	450 U	430 U	410 U	430 U	18 J	410 U	23 J
	ug/kg	58	18.8%	61	0	58 J	24 J	430 U	410 U	430 U	340 U	410 U	24 J
	ug/kg	62	12.5%	3200	0	62 J	30 J	430 U	410 U	430 U	340 U	410 U	410 U
	ug/kg	40	3.1%	14	1	40 J	450 U	430 U	410 U	430 U	340 U	410 U	410 U
	ug/kg	63	18.8%	50000 *	0	63 J	31 J	430 U	28 J	22 J	340 U	410 U	410 U

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

D	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/21/93 SS17-1 202037	SOIL SEAD-17 0-0.2 10/21/93 SS17-2 202038	SOIL SEAD-17 0-0.2 10/21/93 SS17-3 202039	SOIL SEAD-17 0-0.2 10/21/93 SS17-4 202040	SOIL SEAD-17 0-0.2 10/21/93 SS17-5 202041	SOIL SEAD-17 0-0.2 10/21/93 SS17-6 202042	SOIL SEAD-17 0-0.2 10/21/93 SS17-7 202043	SOIL SEAD-17 0-0.2 10/21/93 SS17-8 202044
	ug/kg	1.1	3.1%	20	0	2.1 U	2.3 U	2.2 U	2.1 U	2.2 U	1.8 U	2.1 U	2.1 U
	ug/kg	0.76	3.1%	900	0	2.1 U	2.3 U	2.2 U	2.1 U	2.2 U	1.8 U	2.1 U	2.1 U
	ug/kg	62	3.1%	44	1	4.1 U	4.4 U	4.3 U	4.1 U	4.3 U	3.4 U	4 U	4.1 U
	ug/kg	37	37.5%	2100	0	5.2	4.4 U	4.3 U	22	4.3 U	11	3.2 J	3.4 J
	ug/kg	15	6.3%	2900	0	4.7 J	4.4 U	4.3 U	4.1 U	4.3 U	3.4 U	4 U	4.1 U
	ug/kg	10	15.6%	2100	0	4.1 U	4.4 U	4.3 U	2.6 J	4.3 U	1.9 J	4 U	4.1 U
	ug/kg	61	3.1%	1000(a)	0	41 U	44 U	43 U	41 U	43 U	34 U	40 U	41 U
	ug/kg	28	6.2%	1000(a)	0	41 U	44 U	43 U	41 U	43 U	34 U	40 U	41 U
	mg/kg	19300	100.0%	15523	11	11800	14900	15200	10800	17300	10900	16600	14300
	mg/kg	52	22.2%	5	3	12.9 U R	10.4 U R	13.6 U R	12.5 U R	10 U R	12.9 R	8.2 J R	7.4 J R
	mg/kg	16.1	100.0%	7.5	7	6	5.4	5	6.6	7.4	16.1	8.2	8.5
	mg/kg	447	53.1%	300	3	102 R	122 R	102 R	192 R	146 R	352 R	447 R	337 R
	mg/kg	0.99	100.0%	1	0	0.5 J	0.58 J	0.42 J	0.52 J	0.81 J	0.5 J	0.76 J	0.69
	mg/kg	14.3	59.4%	1	19	2.3	1.6	2.2	4.9	3.7	9.9	7.3	5.1
	mg/kg	209000	100.0%	120725	2	99300	2830	2180	117000	2740	89300	3780	110000
	mg/kg	27.9	100.0%	24	4	16.6	19	16.8	18.3	23.6	22.5	23.4	23.9
	mg/kg	21.9	100.0%	30	0	6.1 J	6.4 J	5.7 J	10.4 J	9.6	11.3	14.7	13.6
	mg/kg	654	100.0%	25	28	81	54.4	39.3	249	73	362	423	654
	mg/kg	38700	100.0%	28986	3	16400	20800	19300	19400	25000	24300	26400	27600
	mg/kg	3150	96.9%	30	25	594	371	375	1680	577	3150	2310	2190
	mg/kg	18100	100.0%	12308	2	7430	3110	2540	6900	3670	8840	4520	8380
	mg/kg	1160	100.0%	759	4	430	319	277	431	737	399	431	590
	mg/kg	1	90.6%	0.1	3	0.07 J	1 J	0.07 J	0.07 J	0.9 J	0.06 J	0.1 J	0.09 J
	mg/kg	43.7	100.0%	37	7	19.8	18.3	14.1	28	24.9	37.7	29.1	43.7
	mg/kg	2260	100.0%	1548	10	1500	1080	1060 J	1380	1520	1420	1370	1520
	mg/kg	1.6	43.8%	2	0	0.26 J	0.27 UJ	0.37 J	0.36 J	0.23 UJ	0.68 J	0.25 UJ	0.16 J
	mg/kg	5.5	28.1%	0.5	8	1.6 UJ	1.3 UJ	1.7 UJ	1.6 UJ	1.3 UJ	2.8 J	1 UJ	4 J
	mg/kg	249	100.0%	114	15	147 J	33.7 J	33.5 J	144 J	53.1 J	168 J	66.9 J	144 J
	mg/kg	0.25	9.4%	0.3	0	0.24 U	0.3 U	0.26 U	0.25 U	0.25 U	2 U	0.27 U	0.22 J
	mg/kg	30.7	100.0%	150	0	21	26.6	29.2	17.5	29.7	16.3	28.8	22.2
	mg/kg	1530	100.0%	90	23	200	136	129	324	237	497	437	613
	mg/kg	3.8	100.0%	NA	NA	0.21	0.67	0.13	0.51	0.17	3.8	0.15	0.08
	%W/W	96.5				79.5	73.7	76.8	81.3	76.9	95.7	80.9	79.8

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

ID	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 11/09/93 SS17-10 204035	SOIL SEAD-17 0-0.2 11/09/93 SS17-11 204037	SOIL SEAD-17 0-0.2 10/21/93 SS17-12 202047	SOIL SEAD-17 0-0.2 10/20/93 SS17-13 201896	SOIL SEAD-17 0-0.2 10/21/93 SS17-14 202048	SOIL SEAD-17 0-0.2 10/20/93 SS17-15 201897	SOIL SEAD-17 0-0.2 10/21/93 SS17-16 202049	SOIL SEAD-17 0-0.2 10/21/93 SS17-17 202050	S SE 1(SS1 2
	ug/kg	8	3.1%	100	0	11 U	13 U	12 U	4 J	11 U	11 U R	13 U	14 U	
	ug/kg	15	3.1%	200	0	11 U	13 U	12 U	7 J	11 U	11 U R	13 U	72 U	
	ug/kg	4	6.3%	1500	0	11 U	13 U	12 U	1 J	11 U	11 U R	13 U	14 U	
	ug/kg	34000	12.5%	NA	NA	5300 U	6300 U	5900 U	5400 U	5300 U	5300 U	6800 U	32000	6
	ug/kg	330	9.4%	NA	NA	330 J	130 U	130 U	130	130 U	130 U	130 U	130 U	
NICS														
	ug/kg	70	3.1%	1000	0	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	1400	9.4%	NA	NA	61 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	27	3.1%	50000 *	0	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	120	28.1%	50000 *	0	72 J	420 U	390 U	19 J	350 UJ	350 U R	450 U	430 U	
	ug/kg	23	3.1%	50000 *	0	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	1200	59.4%	8100	0	48 J	66 J	210 J	21 J	350 UJ	350 U R	340 J	480	
	ug/kg	190	43.8%	50000 *	0	150 J	420 U	390 U	19 J	350 UJ	350 U R	31 J	23 J	
	ug/kg	170	40.6%	50000 *	0	110 J	26 J	390 U	17 J	350 UJ	350 U R	28 J	430 U	
	ug/kg	46	6.3%	50000 *	0	46 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	72	28.1%	220	0	38 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	78	28.1%	400	0	78 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
te	ug/kg	1300	56.3%	50000 *	0	810 U	1300	390 U	460 J	50 J	350 U R	450 U	430 U	1
	ug/kg	70	28.1%	1100	0	50 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	49	21.9%	1100	0	38 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	58	18.8%	61	0	32 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	62	12.5%	3200	0	25 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	40	3.1%	14	1	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	
	ug/kg	63	18.8%	50000 *	0	27 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	

bles\TBL2-3.WK3

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 11/09/93 SS17-10 204035	SOIL SEAD-17 0-0.2 11/09/93 SS17-11 204037	SOIL SEAD-17 0-0.2 10/21/93 SS17-12 202047	SOIL SEAD-17 0-0.2 10/20/93 SS17-13 201896	SOIL SEAD-17 0-0.2 10/21/93 SS17-14 202048	SOIL SEAD-17 0-0.2 10/20/93 SS17-15 201897	SOIL SEAD-17 0-0.2 10/21/93 SS17-16 202049	SOIL SEAD-17 0-0.2 10/21/93 SS17-17 202050
ug/kg	1.1	3.1%	20	0	1.8 U	2.2 U	2 U	1.8 UJ	1.8 U	1.8 U	2.3 U	2.2 U
ug/kg	0.76	3.1%	900	0	1.8 U	2.2 U	2 U	0.76 J	1.8 U	1.8 U	2.3 U	2.2 U
ug/kg	62	3.1%	44	1	3.5 U	62	3.9 U	3.5 UJ	3.5 U	3.5 U	4.5 U	4.3 U
ug/kg	37	37.5%	2100	0	37	4.2 U	2.9 J	11 J	2.7 J	3.5 U	4.5 U	4.3 U
ug/kg	15	6.3%	2900	0	3.5 U	4.2 U	3.9 U	3.5 UJ	3.5 U	3.5 U	4.5 U	4.3 U
ug/kg	10	15.6%	2100	0	10	4.2 U	3.9 U	4.9 J	3.5 U	3.5 U	4.5 U	4.3 U
ug/kg	61	3.1%	1000(a)	0	35 U	42 U	39 U	35 UJ	35 U	35 U	45 U	43 U
ug/kg	28	6.2%	1000(a)	0	35 U	42 U	39 U	35 UJ	35 U	35 U	45 U	43 U
mg/kg	19300	100.0%	15523	11	9990 J	14200	13100	10700	4660	12600	17300	14100
mg/kg	52	22.2%	5	3	52 J	12.4 U	10.8 U R	39.2	11.4 J R	9.8 U	12.4 U R	11.6 U R
mg/kg	16.1	100.0%	7.5	7	7 J	4.5 J	6.5	6.7	10.6	6.1	6.5	5.7
mg/kg	447	53.1%	300	3	357 J	189	203 R	343	199 R	122	210 R	132 R
mg/kg	0.99	100.0%	1	0	0.48 J	0.73 J	0.59 J	0.5 J	0.34 J	0.54 J	0.82 J	0.74 J
mg/kg	14.3	59.4%	1	19	21.7 R	1.2 R	4.5	8.3	10.8	0.93 J	2.3	2
mg/kg	209000	100.0%	120725	2	113000 J	4670	88400	104000	209000	37800	4760	3400
mg/kg	27.9	100.0%	24	4	21.3 J	19.7	20	23.8	9.8	23.1	23	19.7
mg/kg	21.9	100.0%	30	0	9.9 J	9.3 J	12.3	8 J	5.6 J	12	7.7 J	21.9
mg/kg	654	100.0%	25	28	546 J	60.7 J	202	404	499	94.5	182	47.8
mg/kg	38700	100.0%	28986	3	21600 J	23100	23600	19500	11100	27500	24200	23400
mg/kg	3150	96.9%	30	25	6340 R	329	1210	2940	1310	472	595	373
mg/kg	18100	100.0%	12308	2	9830 J	3640	6600	8890	8330	8880	4170	3520
mg/kg	1160	100.0%	759	4	392 J	685	595	314 J	221	324 J	613	880
mg/kg	1	90.6%	0.1	3	0.03 UJ	0.07 J	0.07 J	0.03 J	0.1 J	0.05 J	0.36 J	0.07 J
mg/kg	43.7	100.0%	37	7	34.6 J	21.3	33.9	31.9	28.5	43.5	25.2	23.5
mg/kg	2260	100.0%	1548	10	1350 J	1210	1260	1610	1370	1810	1810	1070 J
mg/kg	1.6	43.8%	2	0	1.6 J	0.64 J	0.23 UJ	0.47 J	0.34 J	0.2 J	0.25 UJ	0.25 UJ
mg/kg	5.5	28.1%	0.5	8	4.6 J	1.6 UJ	1.4 UJ	5.2	3.8 J	1.2 U	1.6 UJ	1.5 UJ
mg/kg	249	100.0%	114	15	197 J	49.8 J	121 J	249 J	179 J	167 J	56.6 J	71.3 J
mg/kg	0.25	9.4%	0.3	0	0.22 UJ	0.22 UJ	0.25 U	0.21 U	1.3 U	0.21 U	0.27 U	0.28 U
mg/kg	30.7	100.0%	150	0	15.3 J	25.9	20	17.7	10.2 J	18.3	29.8	25.5
mg/kg	1530	100.0%	90	23	620 J	110 J	574	315	480	155	150	140
mg/kg	3.8	100.0%	NA	NA	0.1	2.4	0.06	0.81	1.1	0.84	0.21	0.14
%W/W	96.5				93.7	78.8	85	92.6	93.8	94.2	73.5	75.7

bles\TBL2-3.WK3

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

ID	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/22/93 SS17-24 202077 SS17-18DUP	SOIL SEAD-17 0-0.2 10/21/93 SS17-19 202053	SOIL SEAD-17 0-0.2 10/21/93 SS17-20 202054	SOIL SEAD-17 0-0.2 10/21/93 SS17-21 202055	SOIL SEAD-17 0-0.2 10/21/93 SS17-22 202075	SOIL SEAD-17 0-0.2 10/21/93 SS17-23 202076	SOIL SEAD-17 0-2 12/01/93 SB17-1.1 205914	SOIL SEAD-17 2-4 12/01/93 SB17-1.2 205915	SOI SEAD 4-6 12/01 SB17-1 2059
	ug/kg	8	3.1%	100	0	8 J	16 U	12 U	14 U	14 U	14 U	12 U	12 U	1
	ug/kg	15	3.1%	200	0	15 J	41 U	12 U	14 U	14 U	14 U	12 U	12 U	1
	ug/kg	4	6.3%	1500	0	13 UJ	16 U	12 U	14 U	14 U	14 U	12 U	12 U	1
	ug/kg	34000	12.5%	NA	NA	6600 U	6900 U	6500 U	6600 U	6500 U	6600 U	6400 U	5800 U	540
	ug/kg	330	9.4%	NA	NA	72 J	130 U	130 U	130 U	130 U	130 U	130 U	130 U	13
NICS														
	ug/kg	70	3.1%	1000	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	1400	9.4%	NA	NA	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	27	3.1%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	120	28.1%	50000 *	0	34 J	2300 U	420 U	430 U	20 J	430 U	420 U	380 U	36
	ug/kg	23	3.1%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	1200	59.4%	8100	0	430 U	1200 J	510	760	430 U	430 U	420 U	380 U	36
	ug/kg	190	43.8%	50000 *	0	52 J	2300 U	420 U	430 U	49 J	430 U	420 U	380 U	36
	ug/kg	170	40.6%	50000 *	0	38 J	2300 U	420 U	430 U	40 J	430 U	420 U	380 U	36
	ug/kg	46	6.3%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	72	28.1%	220	0	430 U	2300 U	420 U	430 U	21 J	430 U	420 U	380 U	36
	ug/kg	78	28.1%	400	0	38 J	2300 U	420 U	430 U	28 J	430 U	420 U	380 U	36
te	ug/kg	1300	56.3%	50000 *	0	1300	2300 U	420 U	200 J	430 U	430 U	42 J	380 U	2
	ug/kg	70	28.1%	1100	0	32 J	2300 U	420 U	430 U	28 J	430 U	420 U	380 U	36
	ug/kg	49	21.9%	1100	0	24 J	2300 U	420 U	430 U	21 J	430 U	420 U	380 U	36
	ug/kg	58	18.8%	61	0	430 U	2300 U	420 U	430 U	21 J	430 U	420 U	380 U	36
	ug/kg	62	12.5%	3200	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	40	3.1%	14	1	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36
	ug/kg	63	18.8%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	36

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/22/93 SS17-24 202077 SS17-18DUP	SOIL SEAD-17 0-0.2 10/21/93 SS17-19 202053	SOIL SEAD-17 0-0.2 10/21/93 SS17-20 202054	SOIL SEAD-17 0-0.2 10/21/93 SS17-21 202055	SOIL SEAD-17 0-0.2 10/21/93 SS17-22 202075	SOIL SEAD-17 0-0.2 10/21/93 SS17-23 202076	SOIL SEAD-17 0-2 12/01/93 SB17-1.1 205914	SOIL SEAD-17 2-4 12/01/93 SB17-1.2 205915	SOI SEAD 4-(12/01 SB17-1 2059
ID														
	ug/kg	1.1	3.1%	20	0	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	1.9 U	1.
	ug/kg	0.76	3.1%	900	0	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	1.9 U	1.
	ug/kg	62	3.1%	44	1	4.3 U	4.5 U	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.
	ug/kg	37	37.5%	2100	0	17	2.5 J	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.
	ug/kg	15	6.3%	2900	0	4.3 U	15	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.
	ug/kg	10	15.6%	2100	0	7.4	4.5 U	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.
	ug/kg	61	3.1%	1000(a)	0	43 U	45 U	42 U	43 U	43 U	43 U	42 U	61	3
	ug/kg	28	6.2%	1000(a)	0	43 U	45 U	21 J	28 J	43 U	43 U	42 U	38 U	3
	mg/kg	19300	100.0%	15523	11	18400	15500	13900	14400	18100	15700	13700	18100	870
	mg/kg	52	22.2%	5	3	17.4 J	9 U R	8.7 U R	11 U R	12.8 UJ	13.1 UJ	11.7 UJ	11.8 UJ	
	mg/kg	16.1	100.0%	7.5	7	9.1	6.3	6.5	8.9	5.9	5.3	4.3	5.2	3.
	mg/kg	447	53.1%	300	3	447	149 R	96.2 R	96.5 R	127	92.6	107	114	59.
	mg/kg	0.99	100.0%	1	0	0.87 J	0.83 J	0.71 J	0.74 J	0.8 J	0.72 J	0.7 J	0.9 J	0.4
	mg/kg	14.3	59.4%	1	19	14.3	2.9	0.54 U	0.69 U	1.5	0.82 U	0.73 U	0.74 U	0.5
	mg/kg	209000	100.0%	120725	2	27600	4210	6230	3910	6900	2510	2870	20900	7280
	mg/kg	27.9	100.0%	24	4	27.2	22.9	21.4	23.2	23.8	20.3	17.6	25.1	13.
	mg/kg	21.9	100.0%	30	0	12.5	10.2	11.1	12.4	9.9 J	9.4 J	9.9 J	13.3	8.
	mg/kg	654	100.0%	25	28	378 J	81.7	26.9	25.9	52 J	22.6 J	46.4	26.9	2
	mg/kg	38700	100.0%	28986	3	28000	25500	28700	28800	24700	22700	25100	29900	1880
	mg/kg	3150	96.9%	30	25	2310	402	69.2	44.9	226	111	266	11.4 J	7.
	mg/kg	18100	100.0%	12308	2	6910	4260	4770	4930	4880	3720	3330	8490	1810
	mg/kg	1160	100.0%	759	4	611	741	602	857	662	598	547	487	39
	mg/kg	1	90.6%	0.1	3	0.07	0.07 J	0.08 J	0.06 J	0.06 J	0.04 J	0.05 J	0.06 J	0.0
	mg/kg	43.7	100.0%	37	7	40.4	30.2	31	35.6	27	22.6	19.1	42	25.
	mg/kg	2260	100.0%	1548	10	2260	1610	1270	1410	1960	1430	628 J	1560	109
	mg/kg	1.6	43.8%	2	0	0.45 J	0.23 UJ	0.18 UJ	0.2 UJ	0.24 UJ	0.26 UJ	0.25 UJ	0.24 UJ	0.1
	mg/kg	5.5	28.1%	0.5	8	3.2	1.1 UJ	1.1 UJ	1.4 UJ	1.6 U	1.7 U	1.5 U	1.5 U	1.
	mg/kg	249	100.0%	114	15	129 J	59.5 J	40.4 J	36.3 J	87 J	46 J	46.2 J	74.6 J	13
	mg/kg	0.25	9.4%	0.3	0	0.27 U	0.25 U	0.2 U	0.22 U	0.26 U	0.29 U	0.28 UJ	0.26 UJ	0.1
	mg/kg	30.7	100.0%	150	0	30	26.3	24	24.1	30.1	26.4	23.1	27	13.
	mg/kg	1530	100.0%	90	23	1420	351	71.6	83.9	196	75.5	93.4	80.2	57.
	mg/kg	3.8	100.0%	NA	NA	0.08	0.2	0.22	0.24	0.09	0.07	0.15	0.33	0.2
	%W/W	96.5				75.6	73.3	78.3	76.4	75.8	76.2	78.4	86.6	92.

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

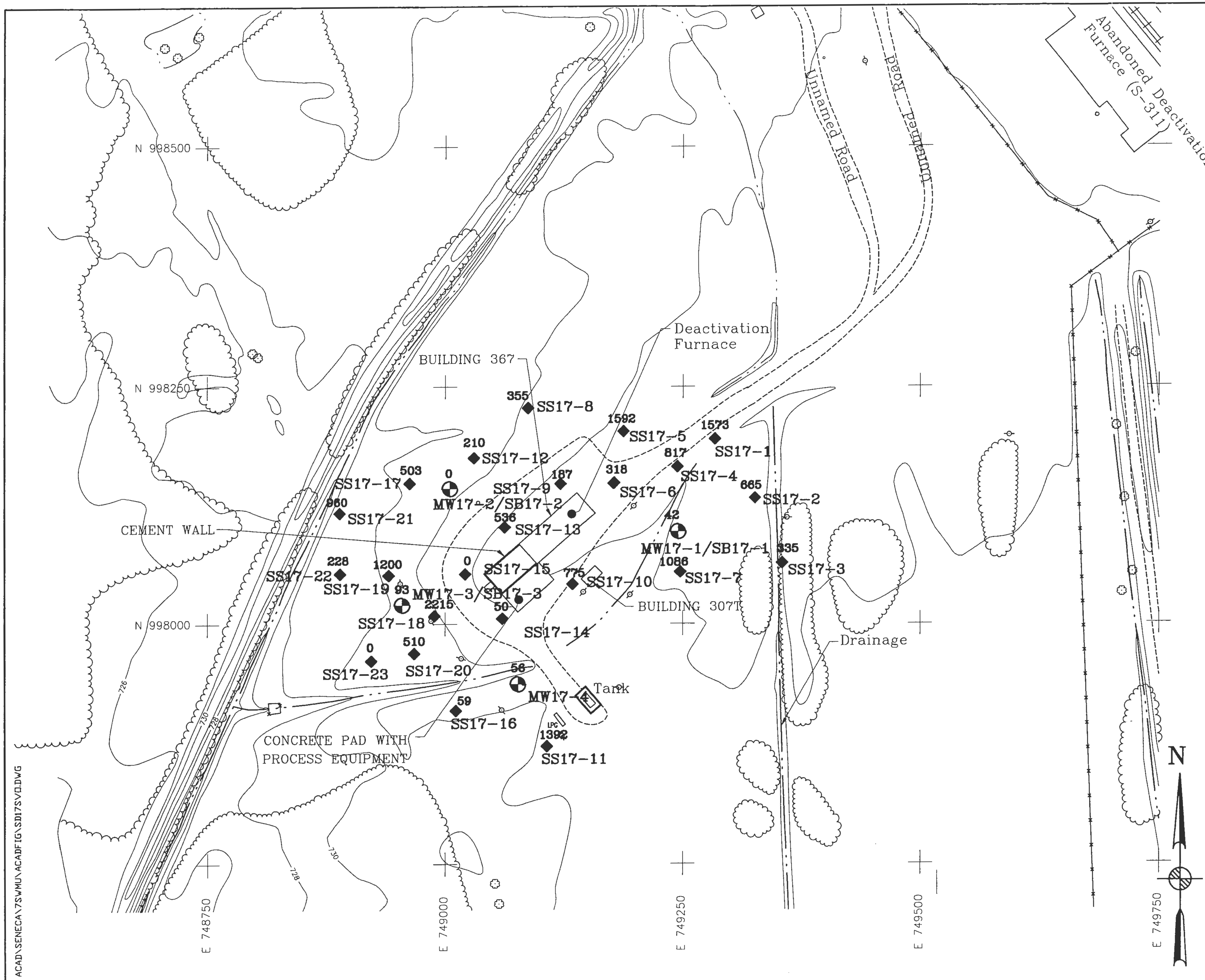
ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-2 10/27/93 SB17-2.1 202502	SOIL SEAD-17 2-4 10/27/93 SB17-2.2 202503	SOIL SEAD-17 2-4 10/27/93 SB17-2.10 202505 SS17-2.2DUP	SOIL SEAD-17 0-2 11/30/93 SB17-3.1 205877	SOIL SEAD-17 2-4 11/30/93 SB17-3.2 205878	SOIL SEAD-17 0-2 11/30/93 SB17-4.1 205879	SOIL SEAD-17 2-4 11/30/93 SB17-4.2 205880
S												
	ug/kg	8	3.1%	100	0	12 UJ	12 U	13 U	12 U	13 U	12 U	12 U
	ug/kg	15	3.1%	200	0	12 UJ	12 U	13 U	12 U	13 U	12 U	12 U
	ug/kg	4	6.3%	1500	0	12 UJ	12 U	13 U	12 U	13 U	12 U	12 U
	ug/kg	34000	12.5%	NA	NA	6000 U	5800 U	5800 U	6100 U	5900 U	5900 U	5400 U
	ug/kg	330	9.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
ANICS												
	ug/kg	70	3.1%	1000	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	1400	9.4%	NA	NA	390 U	380 U	380 U	400 U	390 U	390 U	360 U
e	ug/kg	27	3.1%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	120	28.1%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	23	3.1%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	1200	59.4%	8100	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	190	43.8%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	170	40.6%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	46	6.3%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	72	28.1%	220	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	78	28.1%	400	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
ate	ug/kg	1300	56.3%	50000 *	0	390 U	490	480	93 J	72 J	59 J	27 J
	ug/kg	70	28.1%	1100	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	49	21.9%	1100	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	58	18.8%	61	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	62	12.5%	3200	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	40	3.1%	14	1	390 U	380 U	380 U	400 U	390 U	390 U	360 U
	ug/kg	63	18.8%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U

TABLE 4.3-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

ID	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-17 0-2 10/27/93 SB17-2.1 202502	SOIL SEAD-17 2-4 10/27/93 SB17-2.2 202503	SOIL SEAD-17 2-4 10/27/93 SB17-2.10 202505 SS17-2.2DUP	SOIL SEAD-17 0-2 11/30/93 SB17-3.1 205877	SOIL SEAD-17 2-4 11/30/93 SB17-3.2 205878	SOIL SEAD-17 0-2 11/30/93 SB17-4.1 205879	SOIL SEAD-17 2-4 11/30/93 SB17-4.2 205880
	ug/kg	1.1	3.1%	20	0	2 U	2 U	1.9 U	2.1 U	2 U	2 U	1.8 U
	ug/kg	0.76	3.1%	900	0	2 U	2 U	1.9 U	2.1 U	2 U	2 U	1.8 U
	ug/kg	62	3.1%	44	1	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
	ug/kg	37	37.5%	2100	0	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
	ug/kg	15	6.3%	2900	0	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
	ug/kg	10	15.6%	2100	0	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
	ug/kg	61	3.1%	1000(a)	0	39 U	38 U	38 U	40 U	39 U	39 U	36 U
	ug/kg	28	6.2%	1000(a)	0	39 U	38 U	38 U	40 U	39 U	39 U	36 U
	mg/kg	19300	100.0%	15523	11	15900	15600	14100	19300	13200	15100	11600
	mg/kg	52	22.2%	5	3	12.1 UJ	11.8 UJ	9.6 UJ	6.9 UJ	11.9 UJ	6.9 UJ	6.1 UJ
	mg/kg	16.1	100.0%	7.5	7	5.2	6.9	6.3	4.1	5.4	4.9	5.7
	mg/kg	447	53.1%	300	3	158	68.5	71.4	104	73.7	89.2	51.6
	mg/kg	0.99	100.0%	1	0	0.62 J	0.56 J	0.58 J	0.99	0.63 J	0.72	0.56 J
	mg/kg	14.3	59.4%	1	19	2.8	0.74 U	0.6 U	0.43 U	0.74 U	0.43 U	0.38 U
	mg/kg	209000	100.0%	120725	2	48200	44200	115000	2620	4920	3640	18100
	mg/kg	27.9	100.0%	24	4	27.1	23.3	20.3	27.9	20.1	21.6	18.4
	mg/kg	21.9	100.0%	30	0	10.8 J	9.4 J	9.6	21.7	9 J	9.5	11
	mg/kg	654	100.0%	25	28	85.1	18.5	21.5	25.9	26.9	24	22.7
	mg/kg	38700	100.0%	28986	3	38700	26700	24900	36100	25800	27700	25600
	mg/kg	3150	96.9%	30	25	686	13	11.2	24.6 J	21.2 J	12 J	11.7 J
	mg/kg	18100	100.0%	12308	2	6630	8380	8370	5820	4600	5170	7890
	mg/kg	1160	100.0%	759	4	673	409	1160	1080	338	274	403
	mg/kg	1	90.6%	0.1	3	0.04 U	0.04 J	0.04 J	0.06 J	0.04 J	0.04 U	0.03 J
	mg/kg	43.7	100.0%	37	7	34.7	30.8	27.4	37.2	31.5	28.6	30.8
	mg/kg	2260	100.0%	1548	10	1630	1720	1750	1540	1350	1220	960
	mg/kg	1.6	43.8%	2	0	0.25 UJ	0.21 UJ	0.25 UJ	0.26 UJ	0.17 UJ	0.18 UJ	0.23 UJ
	mg/kg	5.5	28.1%	0.5	8	1.5 UJ	1.5 UJ	1.2 UJ	0.88 U	1.5 U	0.87 U	0.77 U
	mg/kg	249	100.0%	114	15	145 J	177 J	239 J	70.8 J	80.2 J	65.6 J	75.9 J
	mg/kg	0.25	9.4%	0.3	0	0.27 U	0.23 U	0.27 U	0.28 UJ	0.18 UJ	0.2 UJ	0.25 UJ
	mg/kg	30.7	100.0%	150	0	27.3	23.9	21.8	30.7	21.1	26.1	18.6
	mg/kg	1530	100.0%	90	23	172	63	76.7	69.7	69	64.2	85.1
	mg/kg	3.8	100.0%	NA	NA	0.51	0.05	0.01 U	0.22	0.19	0.41	0.22
	%W/W	96.5				83.8	85.8	87.2	82	85.2	83.6	91.9

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) U = Compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR (760)
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT

MW17-3/SS17-3 25 — MONITORING WELL/SURFACE SOIL SAMPLE TOTAL SVOs IN SOILS (ug/kg)

SS17-11 25 — SURFACE SOIL SAMPLE AND TOTAL SVOs IN SURFACE SOILS (mg/kg)

50 0 50 100 (feet)

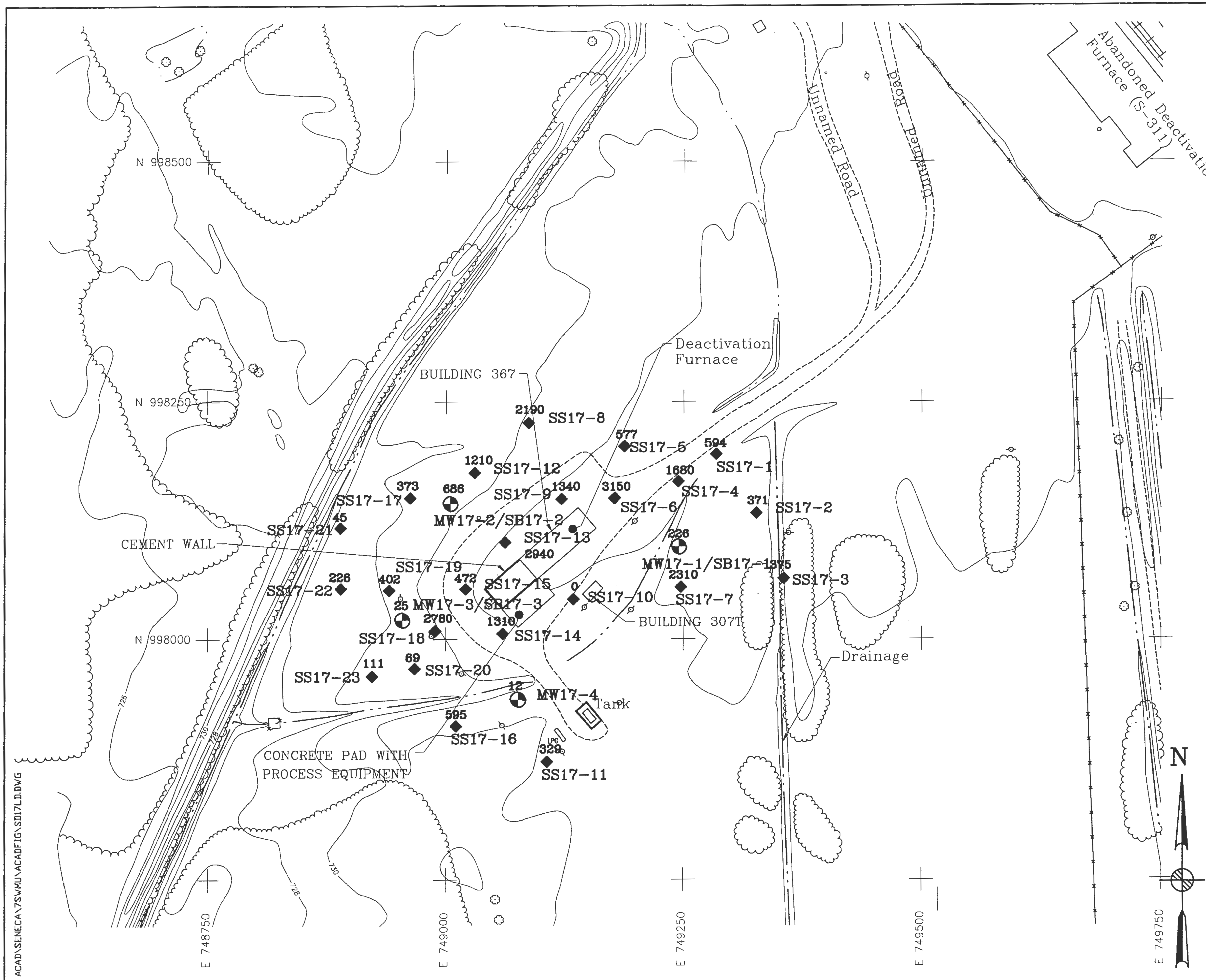
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg No. 720477-02000

FIGURE 4.3-1
SEAD-17 ACTIVE DEACTIVATION FURNACE TOTAL SVOs IN SURFACE SOILS (ug/kg)

SCALE 1" = 100' | DATE MAY 1995 | REV C



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- ROAD SIGN
- DECIDOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- CORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT
- MW17-3/SS17-3 25 — MONITORING WELL/SURFACE SOIL SAMPLE LEAD IN SOILS (mg/kg)
- SS17-11 25 — SURFACE SOIL SAMPLE AND LEAD IN SURFACE SOILS (mg/kg)

50 0 50 100 (feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720477-02000

FIGURE 4.3-2
SEAD-17 ACTIVE DEACTIVATION FURNACE
LEAD IN SURFACE SOILS (mg/kg)

SCALE 1" = 100' | DATE MAY 1995 | REV C

Subsurface Soils

No nitroaromatic compounds were identified in any of the subsurface soil samples collected at SEAD-17.

4.3.2.7 Indicator Compounds

Surface Soils

The surface soil samples at SEAD-17 were analyzed for nitrate/nitrite nitrogen. The concentrations detected ranged from 0.06 mg/kg to a maximum of 3.8 mg/kg in sample SS17-6.

Subsurface Soils

Nitrate/Nitrite nitrogen was detected at concentrations ranging from 0.05 to 0.33 μg/kg in all 5 of the subsurface soil samples analyzed.

4.3.3 Groundwater

Four monitoring wells were installed as part of the SEAD-17 investigation. The summary chemical analyses are presented in Table 4.3-2. The monitoring well locations were shown in Figure 2.5-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-17.

4.3.3.1 Volatile Organic Compounds

No volatile organic compounds were identified within the four groundwater samples collected at SEAD-17.

4.3.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were identified within the four groundwater samples collected at SEAD-17.

TABLE 4.3-2

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-17 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-17 01/25/94 MW17-1 209339	WATER SEAD-17 11/18/93 MW17-2 205059	WATER SEAD-17 01/26/94 MW17-3 209944	WATER SEAD-17 01/25/94 MW17-4 209340
NITROAROMATICS									
Tetryl	ug/L	0.08	NA	NA	NA	0.13 U	0.08 J	0.13 U	0.13 U
METALS									
Aluminum	ug/L	10800	NA	NA	NA	10800	7220	1070	774
Arsenic	ug/L	5.8	25	50	0	5.8 J	3.2 J	1.4 U	0.87 J
Barium	ug/L	147	1000	2000	0	147 J	77.9 J	24.4 J	33.4 J
Beryllium	ug/L	0.52	3	4	0	0.52 J	0.4 J	0.4 U	0.4 U
Calcium	ug/L	170000	NA	NA	NA	170000	149000	110000	113000
Chromium	ug/L	17.3	50	100	0	17.3	12.9	2.6 U	2.6 U
Cobalt	ug/L	11.4	NA	NA	NA	11.4 J	7 J	4.4 U	4.4 U
Copper	ug/L	11.7	200	1300(g)	0	18 J	11.7 J	3.1 U	3.1 U
Iron	ug/L	18300	300	NA	4	18300	12200	1870	1100
Lead	ug/L	32.3	25	15(h)	1	8.7	32.3	0.52 J	1.9 J
Magnesium	ug/L	40200	35000	NA	1	40200	24400	17800	17800
Manganese	ug/L	550	300	NA	3	473	459	164	550
Mercury	ug/L	0.07	2	2	0	0.05 J	0.07 UJ	0.04 U	0.07 J
Nickel	ug/L	24.4	NA	100	0	24.4 J	15.4 J	4 U	4 U
Potassium	ug/L	5820	NA	NA	NA	4740 J	4280 J	3590 J	5820
Selenium	ug/L	2	10	50	0	2 J	0.79 U	0.69 U	0.7 U
Sodium	ug/L	46100	20000	NA	2	8270	44300	46100	17200
Vanadium	ug/L	19.9	NA	NA	NA	19.9 J	12.8 J	3.7 U	3.7 U
Zinc	ug/L	100	300	NA	0	100	33	16.4 J	13 J
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	0.26	10	10	0	0.26	0.13	0.09	0.05
pH	standard units	7.59				7.43	7.46	7.59	7.53
Specific Conductivity	umhos/cm	675				390	675	420	370
Turbidity	NTU	427				427	176	47	5.4

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) The value listed is an Action Level for copper, and not an MCL Standard
h) The value listed is an Action Level for lead at the tap, and not an MCL Standard

4.3.3.3 Pesticides and PCBs

No pesticides or PCB compounds were identified within the four groundwater samples collected at SEAD-17.

4.3.3.4 Herbicides

No herbicide compounds were detected in the four groundwater samples collected at SEAD-17.

4.3.3.5 Metals

Groundwater concentrations for five metals were found above the criteria value in one or more of the 4 monitoring wells sampled. The highest concentrations of many of these metals were found in the groundwater sample collected from monitoring well MW17-1. This sample also had the highest turbidity measured of 427 NTUs. While it is difficult to ascertain the extent to which particulate matter has impacted these results, it appears that the high metal concentrations are most likely due to the high sample turbidity.

4.3.3.6 Nitroaromatics

The nitroaromatic compound Tetryl was detected in the groundwater sample collected from MW17-2 at an estimated concentration of 0.08J μg/L. This concentration is below the method detection limit of 0.13 μg/L. No other nitroaromatic compounds were detected.

4.3.3.7 Indicator Compounds

No exceedances were detected for nitrates and the pH and specific conductivity results indicate no adverse impacts to groundwater based upon these data.

4.3.4 Tentatively Identified Compounds

Total TIC concentrations exceeding 50 mg/kg were found in only one sample, surface soil sample SS17-19. A total TIC concentration of 93.6 mg/kg was reported in this sample. The primary TIC identified was limonene.

4.4 SEAD-24

4.4.1 Introduction

A total of 17 surface soil samples and 10 subsurface soil samples were collected at SEAD-24. Three monitoring wells were also installed and sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-24.

4.4.2 Soil

The analytical results for the 17 surface, and 10 subsurface soil samples collected as part of the SEAD-24 investigation are presented in Table 4.4-1. The sample locations were shown in Figure 2.6-2. The following sections describe the nature and extent of contamination in SEAD-24 soils.

4.4.2.1 Volatile Organic Compounds

Surface Soils

Three volatile organic compounds were detected in the 17 soil samples collected at SEAD-24. All were found at low concentrations, well below their respective TAGM values. The maximum detected concentration was 27 μg/kg of acetone in the surface soil sample SS24-6. Two of the volatile organic compounds detected (acetone, and chloroform) are common laboratory contaminants. The remaining compound, chlorobenzene, was found in only one sample at a concentration of 7J μg/kg.

Subsurface Soils

Seven VOCs were detected at concentrations below TAGM values in four of the 10 subsurface soil samples analyzed. Several of the VOCs found (methylene chloride, acetone, and chloroform) are common laboratory contaminants. The remaining compounds detected, trichloroethane, benzene, toluene, and chlorobenzene were detected only in sample SB24-5.5, which was collected from soil boring SB24-5 from the 8 to 10 foot depth interval. SB24-5 was considered as the upgradient sampling location and is located in the southeast corner of the site.

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INVESTIGATION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 0-0.2 10/22/93 SS24-1 202078	SOIL SEAD-24 0-0.2 10/22/93 SS24-2 202079	SOIL SEAD-24 0-0.2 10/22/93 SS24-3 202080	SOIL SEAD-24 0-0.2 10/22/93 SS24-4 202081	SOIL SEAD-24 0-0.2 10/22/93 SS24-5 202082	SOIL SEAD-24 0-0.2 10/22/93 SS24-6 202083	SOIL SEAD-24 0-0.2 10/22/93 SS24-7 202084	SOIL SEAD-24 0-0.2 10/22/93 SS24-8 202085
S													
	ug/kg	12	10.3%	100	0	14 UJ	13 U	11 U	12 U	12 U	13 U	12 U	14 U
	ug/kg	27	10.3%	200	0	14 UJ	13 U	11 U	12 U	12 U	27	7 J	14 U
	ug/kg	13	34.5%	300	0	5 J	13 U	11 U	12 U	13	5 J	1 J	3 J
	ug/kg	1	3.4%	700	0	14 UJ	13 U	11 U	12 U	12 U	13 U	12 U	14 U
	ug/kg	1	3.4%	60	0	14 UJ	13 U	11 U	12 U	12 U	13 U	12 U	14 U
	ug/kg	2	3.4%	1500	0	14 UJ	13 U	11 U	12 U	12 U	13 U	12 U	14 U
	ug/kg	7	6.9%	1700	0	14 UJ	13 U	11 U	12 U	12 U	13 U	12 U	14 U
	ug/kg	8	3.4%	1900	0	6.1 U	6.7 U	5.5 U	6.2 U	6.1 U	6.4 U	6.1 U	6.9 U
	ug/kg	9.7	3.4%	NA	NA	6.1 U	6.7 U	5.5 U	6.2 U	6.1 U	6.4 U	6.1 U	6.9 U
	ug/kg	6600	3.4%	NA	NA	6600	6700 U	5500 U	6200 U	6100 U	6400 U	6100 U	6900 U
	ug/kg	76	3.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	110	3.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	120 J
	ug/kg	4400	17.2%	NA	NA	130 U	310	640	130 U	4400	240	130 U	130 U
ANICS													
	ug/kg	54	3.4%	41000	0	54 J	440 U	360 U	400 U	1600 U	420 U	400 U	450 U
	ug/kg	12000	24.1%	NA	NA	74 J	440 U	250 J	420	12000	93 J	400 U	450 U
ne	ug/kg	810	17.2%	50000 *	0	30 J	440 U	74 J	70 J	650 J	420 U	400 U	450 U
	ug/kg	44	13.8%	50000 *	0	37 J	440 U	360 U	400 U	1600 U	37 J	400 U	450 U
	ug/kg	19	3.4%	50000 *	0	19 J	440 U	360 U	400 U	1600 U	420 U	400 U	450 U
	ug/kg	1100	20.7%	8100	0	400 U	440 U	31 J	400 U	370 J	25 J	400 U	450 U
	ug/kg	210	20.7%	50000 *	0	210 J	440 U	20 J	400 U	1600 U	82 J	400 U	450 U
	ug/kg	260	20.7%	50000 *	0	260 J	440 U	18 J	400 U	1600 U	72 J	400 U	450 U
	ug/kg	280	10.3%	220	1	280 J	440 U	360 U	400 U	1600 U	38 J	400 U	450 U
	ug/kg	320	20.7%	400	0	320 J	440 U	18 J	400 U	1600 U	51 J	400 U	450 U
late	ug/kg	1300	41.4%	50000 *	0	400 U	440 U	360 U	400 U	1600 U	420 U	400 U	450 U
	ug/kg	350	13.8%	1100	0	350 J	440 U	360 U	400 U	1600 U	42 J	400 U	450 U
	ug/kg	340	13.8%	1100	0	340 J	440 U	360 U	400 U	1600 U	40 J	400 U	450 U
	ug/kg	420	13.8%	61	1	420	440 U	360 U	400 U	1600 U	34 J	400 U	450 U
e	ug/kg	220	6.9%	3200	0	220 J	440 U	360 U	400 U	1600 U	22 J	400 U	450 U
e	ug/kg	28	3.4%	14	1	28 J	440 U	360 U	400 U	1600 U	420 U	400 U	450 U
	ug/kg	170	6.9%	50000 *	0	170 J	440 U	360 U	400 U	1600 U	24 J	400 U	450 U

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INVESTIGATION

UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 0-0.2 10/22/93 SS24-1 202078	SOIL SEAD-24 0-0.2 10/22/93 SS24-2 202079	SOIL SEAD-24 0-0.2 10/22/93 SS24-3 202080	SOIL SEAD-24 0-0.2 10/22/93 SS24-4 202081	SOIL SEAD-24 0-0.2 10/22/93 SS24-5 202082	SOIL SEAD-24 0-0.2 10/22/93 SS24-6 202083	SOIL SEAD-24 0-0.2 10/22/93 SS24-7 202084	SOIL SEAD-24 0-0.2 10/22/93 SS24-8 202085
	ug/kg	2.3	6.9%	900	0	2 U	2.3 U	1.9 U	2.1 U	2 UJ	1.1 J	2.1 U	2.3 U
	ug/kg	12	10.3%	2100	0	4 U	4.4 U	3.6 U	4.1 U	3.6 J	2 J	12	4.5 U
	ug/kg	35	3.4%	2100	0	4 U	4.4 U	3.6 U	4.1 U	4 UJ	4.1 U	35	4.5 U
	ug/kg	4.2	3.4%	NA	NA	4 U	4.4 U	3.6 U	4.1 U	4 UJ	4.2 J	4 U	4.5 U
	ug/kg	4.7	3.4%	540	0	2 U	2.3 U	1.9 U	2.1 U	2 UJ	2.1 U	4.7 J	2.3 U
	ug/kg	6	3.4%	540	0	2 U	2.3 U	1.9 U	2.1 U	2 UJ	2.1 U	6	2.3 U
	mg/kg	25500	93.1%	15523	12	9540	16800	12000	18900	13200	13600	18700	14700
	mg/kg	56.8	93.1%	7.5	11	51.1	11.4	53.5	20.7	22.1	56.8	9.9	12.1
	mg/kg	149	93.1%	300	0	71.6	149	57.8	105	121	81.9	118	105
	mg/kg	1.2	93.1%	1	2	0.43 J	0.89 J	0.51 J	0.91 J	0.59 J	0.66 J	0.86	0.81 J
	mg/kg	8.2	3.4%	1	1	0.64 U	0.72 U	0.71 U	0.69 U	0.75 U	0.65 U	0.55 U	0.77 U
	mg/kg	106000	93.1%	120725	0	79300	3290	23600	2140	23000	19900	2100	3940
	mg/kg	35.1	93.1%	24	9	12.2	24.5	22.2	23.9	21.9	20.4	25.2	23.3
	mg/kg	20.5	93.1%	30	0	4.7 J	13.9	10.9	11.5	10.4 J	10.6	13	12.6
	mg/kg	324	93.1%	25	12	13.5 J	20 J	28.2 J	26.1 J	35.2 J	22.2 J	23.9 J	22.5 J
	mg/kg	37700	93.1%	28986	10	14000	30900	25500	29200	25000	24300	29100	29700
	mg/kg	422	93.1%	30	14	15.1	46.6	59.4	51.3	422	40.7	15.4	24.4
	mg/kg	43700	93.1%	12308	4	43700	4320	5960	4600	5470	4400	5190	4730
	mg/kg	1770	93.1%	759	4	393	1770	353	244	550	724	677	448
	mg/kg	0.15	68.0%	0.1	1	0.04 J	0.05 J	0.04 J	0.15	0.04 U	0.03 U	0.05 J	0.04 J
	mg/kg	535	93.1%	37	8	13.8	30	39.5	26.4	31.6	26.8	30.1	34.8
	mg/kg	2510	93.1%	1548	11	1140	1340	1190	1710	1560	1360	2090	1590
	mg/kg	0.3	10.3%	2	0	0.2 UJ	0.23 UJ	0.2 UJ	0.26 UJ	0.23 UJ	0.21 UJ	0.22 UJ	0.23 UJ
	mg/kg	161	93.1%	114	10	146 J	51.9 J	95.5 J	56 J	88.4 J	69.8 J	52.3 J	59.8 J
	mg/kg	0.28	6.9%	0.3	0	2.2 U	0.25 U	0.22 U	0.29 U	0.25 U	0.23 U	0.24 U	0.25 U
	mg/kg	39.3	93.1%	150	0	17.7	30.1	17.1	32.8	22.3	24.4	32.8	27.2
	mg/kg	1180	93.1%	90	14	58.7	129	100	85.1	566	97.2	63.8	88.5
	mg/kg	2.1	93.1%	NA	NA	2.1	0.56	0.22	0.18	0.6	0.11	0.26	0.16
	%W/W	807				81.6	75.4	91.4	80.7	81.9	78.6	82.2	73.2
carbons	mg/kg	158	100.0%	NA	NA	99	81	73	72	78	93	59	46

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INVESTIGATION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 0-0.2 10/22/93 SS24-13 202092 SS24-9DUP	SOIL SEAD-24 0-0.2 10/22/93 SS24-10 202089	SOIL SEAD-24 0-0.2 10/22/93 SS24-11 202090	SOIL SEAD-24 0-0.2 10/22/93 SS24-12 202091	SOIL SEAD-24 0-2 11/30/93 SB24-1.1 205918	SOIL SEAD-24 4-6 11/30/93 SB24-1.3 205919	SOIL SEAD-24 10-12 11/30/93 SB24-1.5 205920
S												
	ug/kg	12	10.3%	100	0	13 UJ	13 U	11 U	13 U	12 U	11 U	11 U
	ug/kg	27	10.3%	200	0	13 UJ	13 U	11 U	13 U	20 U	26 U	11 U
	ug/kg	13	34.5%	300	0	4 J	13 U	11 U	3 J	12 U	11 U	11 U
	ug/kg	1	3.4%	700	0	13 UJ	13 U	11 U	13 U	12 U	11 U	11 U
	ug/kg	1	3.4%	60	0	13 UJ	13 U	11 U	13 U	12 U	11 U	11 U
	ug/kg	2	3.4%	1500	0	13 UJ	13 U	11 U	13 U	12 U	11 U	11 U
	ug/kg	7	6.9%	1700	0	13 UJ	13 U	11 U	7 J	12 U	11 U	11 U
	ug/kg	8	3.4%	1900	0	6.1 U	6.3 U	5.6 U	6.5 U	6.2 U	5.6 UJ	5.4 U
	ug/kg	9.7	3.4%	NA	NA	9.7	6.3 U	5.6 U	6.5 U	6.2 U	5.6 UJ	5.4 U
	ug/kg	6600	3.4%	NA	NA	6100 U	6300 U	5600 U	6500 U	6200 U	5600 UJ	5400 U
	ug/kg	76	3.4%	NA	NA	130 U	130 U	130 U	130 U	130 UJ	130 U	130 U
	ug/kg	110	3.4%	NA	NA	130 U	130 U	130 U	130 U	130 UJ	130 U	130 U
	ug/kg	4400	17.2%	NA	NA	560	130 U	130 U	130 U	130 UJ	130 U	130 U
ANICS												
	ug/kg	54	3.4%	41000	0	1600 U	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	12000	24.1%	NA	NA	7600	420 U	370 U	430 U	400 U	370 U	350 U
e	ug/kg	810	17.2%	50000 *	0	810 J	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	44	13.8%	50000 *	0	1600 U	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	19	3.4%	50000 *	0	1600 U	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	1100	20.7%	8100	0	1100 J	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	210	20.7%	50000 *	0	160 J	420 U	370 U	29 J	400 U	370 U	350 U
	ug/kg	260	20.7%	50000 *	0	150 J	420 U	370 U	29 J	400 U	370 U	350 U
	ug/kg	280	10.3%	220	1	78 J	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	320	20.7%	400	0	100 J	420 U	370 U	20 J	400 U	370 U	350 U
late	ug/kg	1300	41.4%	50000 *	0	620	420 U	370 U	430 U	1200	860	38 J
	ug/kg	350	13.8%	1100	0	83 J	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	340	13.8%	1100	0	74 J	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	420	13.8%	61	1	1600 U	420 U	370 U	430 U	400 U	370 U	350 U
e	ug/kg	220	6.9%	3200	0	1600 U	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	28	3.4%	14	1	1600 U	420 U	370 U	430 U	400 U	370 U	350 U
	ug/kg	170	6.9%	50000 *	0	1600 U	420 U	370 U	430 U	400 U	370 U	350 U

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INVESTIGATION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 0-0.2 10/22/93 SS24-13 202092 SS24-9DUP	SOIL SEAD-24 0-0.2 10/22/93 SS24-10 202089	SOIL SEAD-24 0-0.2 10/22/93 SS24-11 202090	SOIL SEAD-24 0-0.2 10/22/93 SS24-12 202091	SOIL SEAD-24 0-2 11/30/93 SB24-1.1 205918	SOIL SEAD-24 4-6 11/30/93 SB24-1.3 205919	SOIL SEAD-24 10-12 11/30/93 SB24-1.5 205920
	ug/kg	2.3	6.9%	900	0	2.3 J	2.1 U	1.9 U	2.2 U	2.1 U	1.9 U	1.8 U
	ug/kg	12	10.3%	2100	0	8.6 J	4.1 U	3.6 U	4.3 U	4 U	3.7 U	3.5 U
	ug/kg	35	3.4%	2100	0	2.7 J	4.1 U	3.6 U	4.3 U	4 U	3.7 U	3.5 U
	ug/kg	4.2	3.4%	NA	NA	4 UJ	4.1 U	3.6 U	4.3 U	4 U	3.7 U	3.5 U
	ug/kg	4.7	3.4%	540	0	2.1 UJ	2.1 U	1.9 U	2.2 U	2.1 U	1.9 U	1.8 U
	ug/kg	6	3.4%	540	0	2.1 UJ	2.1 U	1.9 U	2.2 U	2.1 U	1.9 U	1.8 U
	mg/kg	25500	93.1%	15523	12	14300	25500	12900	15900	24000	11400	9280
	mg/kg	56.8	93.1%	7.5	11	38.6	8.7	6.4	8.1	5.2	3.9	3.8
	mg/kg	149	93.1%	300	0	96.6	119	28.2 J	88.8	97.3	58.9	57.2
	mg/kg	1.2	93.1%	1	2	0.67 J	1.2	0.57 J	0.81 J	0.9 J	0.5 J	0.44 J
	mg/kg	8.2	3.4%	1	1	0.71 U	0.7 U	0.75 J	8.2	0.59 U	0.51 U	0.38 U
	mg/kg	106000	93.1%	120725	0	8670	2770	13400	4660	4950	58500	58400
	mg/kg	35.1	93.1%	24	9	23.8	35.1	25.1	23.8	32.2	17.6	15.5
	mg/kg	20.5	93.1%	30	0	11	17.8	14.8	11.5 J	12.2	9.5	9.7
	mg/kg	324	93.1%	25	12	34.5 J	32.6 J	34.6 J	24.4 J	28.9	26.4	14.9
	mg/kg	37700	93.1%	28986	10	26300	37500	30600	27500	33200	22700	18800
	mg/kg	422	93.1%	30	14	112	24.6	30.9	121	13.5 J	13.1 J	5.9 J
	mg/kg	43700	93.1%	12308	4	5390	6660	6750	5000	6990	11300	12700
	mg/kg	1770	93.1%	759	4	519	612	293	512	438	397	384
	mg/kg	0.15	68.0%	0.1	1	0.04 J	0.05 J	0.04 U	0.06 J	0.04 J	0.02 UJ	0.03 UJ
	mg/kg	535	93.1%	37	8	35.4	46.6	52.4	535	43.4	30.8	23.7
	mg/kg	2510	93.1%	1548	11	1410	2510	1200	1650	2120	1610	1130
	mg/kg	0.3	10.3%	2	0	0.25 UJ	0.21 UJ	0.27 J	0.26 UJ	0.19 UJ	0.21 UJ	0.19 UJ
	mg/kg	161	93.1%	114	10	74.3 J	63 J	91.5 J	53.5 J	86.5 J	116 J	127 J
	mg/kg	0.28	6.9%	0.3	0	0.28 U	0.23 U	0.23 U	0.28 U	0.21 UJ	0.23 UJ	0.21 UJ
	mg/kg	39.3	93.1%	150	0	24	39.3	18.2	26.1	33	17	13.5
	mg/kg	1180	93.1%	90	14	182	108	236	1180	99.9	114	44.3
	mg/kg	2.1	93.1%	NA	NA	0.37	0.3	0.05	0.14	0.01	0.02	0.17
	%W/W	807				81.5	78.1	90.5	76.7	81	89.5	92.7
carbons	mg/kg	158	100.0%	NA	NA	158	47	38	87	32	68	43

/MU\SD24SLF.WK3

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INVESTIGATION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 0-2 11/30/93 SB24-1.7 205921 SB24-1.1DUP	SOIL SEAD-24 0-2 12/01/93 SB24-2.1 205922	SOIL SEAD-24 6-8 12/01/93 SB24-2.3 205923	SOIL SEAD-24 12-14 12/01/93 SB24-2.4 205952	SOIL SEAD-24 0-2 12/02/93 SB24-3.1 206044	SOIL SEAD-24 4-6 12/02/93 SB24-3.3 206045
S											
	ug/kg	12	10.3%	100	0	11 U	12 U	11 U	12	12 U	11 U
	ug/kg	27	10.3%	200	0	11 U	12 U	14 U	11 U	12 U	11 U
	ug/kg	13	34.5%	300	0	11 U	12 U	11 U	6 J	12 U	11 U
	ug/kg	1	3.4%	700	0	11 U	12 U	11 U	11 U	12 U	11 U
	ug/kg	1	3.4%	60	0	11 U	12 U	11 U	11 U	12 U	11 U
	ug/kg	2	3.4%	1500	0	11 U	12 U	11 U	11 U	12 U	11 U
	ug/kg	7	6.9%	1700	0	11 U	12 U	11 U	11 U	12 U	11 U
	ug/kg	8	3.4%	1900	0	5.9 U	6.1 U	5.6 U	5.4 U	6.3 U	5.9 U
	ug/kg	9.7	3.4%	NA	NA	5.9 U	6.1 U	5.6 U	5.4 U	6.3 U	5.9 U
	ug/kg	6600	3.4%	NA	NA	5900 U	6100 U	5600 U	5400 U	6300 U	5900 U
	ug/kg	76	3.4%	NA	NA	130 U	130 U	130 U	76 J	130 U	130 U
	ug/kg	110	3.4%	NA	NA	130 U	130 U	130 U	130 U	1100 U	1700 U
	ug/kg	4400	17.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
ANICS											
	ug/kg	54	3.4%	41000	0	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U
	ug/kg	12000	24.1%	NA	NA	390 UJ	980 J	370 UJ	350 U	420 U	380 U
ne	ug/kg	810	17.2%	50000 *	0	390 UJ	280 J	370 UJ	350 U	420 U	380 U
	ug/kg	44	13.8%	50000 *	0	390 UJ	410 UJ	370 UJ	350 U	33 J	380 U
	ug/kg	19	3.4%	50000 *	0	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U
	ug/kg	1100	20.7%	8100	0	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U
	ug/kg	210	20.7%	50000 *	0	390 UJ	410 UJ	370 UJ	350 U	62 J	380 U
	ug/kg	260	20.7%	50000 *	0	390 UJ	410 UJ	370 UJ	350 U	56 J	380 U
	ug/kg	280	10.3%	220	1	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U
	ug/kg	320	20.7%	400	0	390 UJ	410 UJ	370 UJ	350 U	37 J	380 U
late	ug/kg	1300	41.4%	50000 *	0	1300 J	30 J	27 J	41 J	420 U	89 J
	ug/kg	350	13.8%	1100	0	390 UJ	410 UJ	370 UJ	350 U	27 J	380 U
	ug/kg	340	13.8%	1100	0	390 UJ	410 UJ	370 UJ	350 U	27 J	380 U
	ug/kg	420	13.8%	61	1	390 UJ	410 UJ	370 UJ	350 U	24 J	380 U
e	ug/kg	220	6.9%	3200	0	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U
e	ug/kg	28	3.4%	14	1	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U
	ug/kg	170	6.9%	50000 *	0	390 UJ	410 UJ	370 UJ	350 U	420 U	380 U

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INVESTIGATION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 0-2 11/30/93 SB24-1.7 205921 SB24-1.1DUP	SOIL SEAD-24 0-2 12/01/93 SB24-2.1 205922	SOIL SEAD-24 6-8 12/01/93 SB24-2.3 205923	SOIL SEAD-24 12-14 12/01/93 SB24-2.4 205952	SOIL SEAD-24 0-2 12/02/93 SB24-3.1 206044	SOIL SEAD-24 4-6 12/02/93 SB24-3.3 206045
	ug/kg	2.3	6.9%	900	0	2 U	2.1 U	1.9 U	1.8 U	2.2 U	2 U
	ug/kg	12	10.3%	2100	0	3.8 U	4 U	3.7 U	3.5 U	4.2 U	3.8 U
	ug/kg	35	3.4%	2100	0	3.8 U	4 U	3.7 U	3.5 U	4.2 U	3.8 U
	ug/kg	4.2	3.4%	NA	NA	3.8 U	4 U	3.7 U	3.5 U	4.2 U	3.8 U
	ug/kg	4.7	3.4%	540	0	2 U	2.1 U	1.9 U	1.8 U	2.2 U	2 U
	ug/kg	6	3.4%	540	0	2 U	2.1 U	1.9 U	1.8 U	2.2 U	2 U
	mg/kg	25500	93.1%	15523	12	17600	16500	9620	14200	19300	15800
	mg/kg	56.8	93.1%	7.5	11	5	3.8	4.4	4.9	4.5	3.7
	mg/kg	149	93.1%	300	0	67.3	111	79.3	54.3	132	76.2
	mg/kg	1.2	93.1%	1	2	0.78	0.97	0.45 J	0.61	0.97 J	0.72 J
	mg/kg	8.2	3.4%	1	1	0.47 U	0.53 U	0.43 U	0.38 U	0.72 U	0.56 U
	mg/kg	106000	93.1%	120725	0	13300	3070	63300	56900	3430	42100
	mg/kg	35.1	93.1%	24	9	27.5	22.5	15.5	23	24.9	23.3
	mg/kg	20.5	93.1%	30	0	13.3	10.3	9.6	10.7	11.6	11.2
	mg/kg	324	93.1%	25	12	26.1	24.5	24.7	17.1	19	21.2
	mg/kg	37700	93.1%	28986	10	32100	27400	19800	26600	25700	25300
	mg/kg	422	93.1%	30	14	14.9 J	80.3	11.9 J	4.7 J	81.7 J	13.3 J
	mg/kg	43700	93.1%	12308	4	8050	4830	16400	11500	4280	11100
	mg/kg	1770	93.1%	759	4	509	413	388	434	837	581
	mg/kg	0.15	68.0%	0.1	1	0.03 J	0.03 J	0.03 UJ	0.03 J	0.09 J R	0.05 J R
	mg/kg	535	93.1%	37	8	42.2	28.9	26.4	34	29.6	31
	mg/kg	2510	93.1%	1548	11	1230	1170	1350	1760	1750	1830
	mg/kg	0.3	10.3%	2	0	0.23 UJ	0.22 UJ	2 UJ	0.28 J	0.3 J	0.24 UJ
	mg/kg	161	93.1%	114	10	74.9 J	51.3 J	135 J	161 J	64.6 J	113 J
	mg/kg	0.28	6.9%	0.3	0	0.25 UJ	0.24 UJ	0.22 UJ	0.25 U	0.22 U	0.26 U
	mg/kg	39.3	93.1%	150	0	26	28	15.2	20.1	31.1	23.6
	mg/kg	1180	93.1%	90	14	86	223	62.6	48.9	112	76.1
	mg/kg	2.1	93.1%	NA	NA	0.01	0.01	0.12	0.14	0.47	0.02
	%W/W	807				85.2	81.5	90.1	92.9	79.2	86.5
carbons	mg/kg	158	100.0%	NA	NA	74	33	45	106	119	58

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SEAD-24 EXPANDED SITE INVESTIGATION
SENECA ARMY DEPOT

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 8-10 12/02/93 SB24-3.5 206046	SOIL SEAD-24 0-2 12/01/93 SB24-4.1 205953	SOIL SEAD-24 6-8 12/01/93 SB24-4.4 205954	SOIL SEAD-24 12-14 12/02/93 SB24-4.7 205955	SOIL SEAD-24 0-2 12/02/93 SB24-5.1 206047	SOIL SEAD-24 4-6 12/02/93 SB24-5.3 206048	SOIL SEAD-24 8-10 12/02/93 SB24-5.5 206049
S												
	ug/kg	12	10.3%	100	0	11 U	12 U	12 U	9 J	12 U	11 U	2 J
	ug/kg	27	10.3%	200	0	11 U	12 U	12 U	6 J	12 U	11 U	11 U
	ug/kg	13	34.5%	300	0	11 U	5 J	12 U	3 J	12 U	2 J	11 U
	ug/kg	1	3.4%	700	0	11 U	12 U	12 U	11 UJ	12 U	11 U	1 J
	ug/kg	1	3.4%	60	0	11 U	12 U	12 U	11 UJ	12 U	11 U	1 J
	ug/kg	2	3.4%	1500	0	11 U	12 U	12 U	11 UJ	12 U	11 U	2 J
	ug/kg	7	6.9%	1700	0	11 U	12 U	12 U	11 UJ	12 U	11 U	1 J
	ug/kg	8	3.4%	1900	0	5.4 U	5.9 U	5.6 U	5.4 U	6.3 U	5.4 U	5.7 U
	ug/kg	9.7	3.4%	NA	NA	5.4 U	5.9 U	5.6 U	5.4 U	6.3 U	5.4 U	5.7 U
	ug/kg	6600	3.4%	NA	NA	5400 U	5900 U	5600 U	5400 U	6300 U	5400 U	5400 U
	ug/kg	76	3.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
	ug/kg	110	3.4%	NA	NA	1600 U	110 J	130 U	130 U	730 U	960 U	1700 U
	ug/kg	4400	17.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
ANICS												
	ug/kg	54	3.4%	41000	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	12000	24.1%	NA	NA	350 U	400 U	380 U	360 U	410 U	350 U	380 U
e	ug/kg	810	17.2%	50000 *	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	44	13.8%	50000 *	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	19	3.4%	50000 *	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	1100	20.7%	8100	0	22 J	400 U	380 U	360 U	67 J	350 U	380 U
	ug/kg	210	20.7%	50000 *	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	260	20.7%	50000 *	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	280	10.3%	220	1	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	320	20.7%	400	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
ate	ug/kg	1300	41.4%	50000 *	0	56 J	400 U	86 J	69 J	53 J	350 U	120 J
	ug/kg	350	13.8%	1100	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	340	13.8%	1100	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	420	13.8%	61	1	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	220	6.9%	3200	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	28	3.4%	14	1	350 U	400 U	380 U	360 U	410 U	350 U	380 U
	ug/kg	170	6.9%	50000 *	0	350 U	400 U	380 U	360 U	410 U	350 U	380 U

TABLE 4.4-1

SOIL ANALYSIS RESULTS
SEAD-24 EXPANDED SITE INVESTIGATION
SENECA ARMY DEPOT

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-24 8-10 12/02/93 SB24-3.5 206046	SOIL SEAD-24 0-2 12/01/93 SB24-4.1 205953	SOIL SEAD-24 6-8 12/01/93 SB24-4.4 205954	SOIL SEAD-24 12-14 12/02/93 SB24-4.7 205955	SOIL SEAD-24 0-2 12/02/93 SB24-5.1 206047	SOIL SEAD-24 4-6 12/02/93 SB24-5.3 206048	SOIL SEAD-24 8-10 12/02/93 SB24-5.5 206049
	ug/kg	2.3	6.9%	900	0	1.8 U	2 U	1.9 U	1.8 U	2.1 U	1.8 U	1.9 U
	ug/kg	12	10.3%	2100	0	3.5 U	4 U	3.7 U	3.6 U	4.1 U	3.5 U	3.7 U
	ug/kg	35	3.4%	2100	0	3.5 U	4 U	3.7 U	3.6 U	4.1 U	3.5 U	3.7 U
	ug/kg	4.2	3.4%	NA	NA	3.5 U	4 U	3.7 U	3.6 U	4.1 U	3.5 U	3.7 U
	ug/kg	4.7	3.4%	540	0	1.8 U	2 U	1.9 U	1.8 U	2.1 U	1.8 U	1.9 U
	ug/kg	6	3.4%	540	0	1.8 U	2 U	1.9 U	1.8 U	2.1 U	1.8 U	1.9 U
	mg/kg	25500	93.1%	15523	12	5820	20700	7470	11300	16200	10100	13700
	mg/kg	56.8	93.1%	7.5	11	2.5	4.2	2.5	2.7	4.2	3.3	5
	mg/kg	149	93.1%	300	0	40.5	115	73.8	47	117	58.3	67.2
	mg/kg	1.2	93.1%	1	2	0.34 J	1.1	0.37 J	0.53 J	0.98 J	0.48 J	0.62 J
	mg/kg	8.2	3.4%	1	1	0.63 U	0.45 U	0.52 U	0.41 U	0.78 U	0.36 U	0.7 U
	mg/kg	106000	93.1%	120725	0	106000	3660	81400	30500	4540	74200	49000
	mg/kg	35.1	93.1%	24	9	10.8	31	15.6	18.8	24.5	16.9	23.1
	mg/kg	20.5	93.1%	30	0	6.7 J	20.5	5.7 J	10.3	16	8.2	12
	mg/kg	324	93.1%	25	12	14.6	25.3	18.1	12.5	28.4	20.9	22.2
	mg/kg	37700	93.1%	28986	10	14100	37700	14800	22600	33600	21300	26700
	mg/kg	422	93.1%	30	14	33.8 J	31.4 J	7.6 J	3.6 J	45.5 J	8.7 J	7.9 J
	mg/kg	43700	93.1%	12308	4	36700	6270	16800	7670	5150	12100	11400
	mg/kg	1770	93.1%	759	4	349	802	409	400	1080	400	450
	mg/kg	0.15	68.0%	0.1	1	0.03 J	0.07 J R	0.06 J R	0.05 J R	0.07 J R	0.06 J R	0.04 J R
	mg/kg	535	93.1%	37	8	23.9	43.6	19.3	28.6	37.3	26.4	35.2
	mg/kg	2510	93.1%	1546	11	1040	1520	1390	1140	1170 J	993	1660
	mg/kg	0.3	10.3%	2	0	0.15 UJ	0.24 UJ	0.15 UJ	0.12 UJ	0.15 UJ	0.23 UJ	0.22 UJ
	mg/kg	161	93.1%	114	10	133 J	58.3 J	138 J	131 J	50.9 J	153 J	139 J
	mg/kg	0.28	6.9%	0.3	0	0.16 U	0.27 U	0.85 U	0.14 J	0.16 U	0.25 U	0.24 U
	mg/kg	39.3	93.1%	150	0	10.7	32.6	13.4	14.6	29.9	14.4	19.5
	mg/kg	1180	93.1%	90	14	39.6	209	58.7	30	85.7	62.8	63.2
	mg/kg	2.1	93.1%	NA	NA	0.2	0.29	0.07	0.13	0.27	0.15	0.33
	%W/W	807				93.2	83.5	88.2	92.1	80.5	92.7	87.7
carbons	mg/kg	158	100.0%	NA	NA	81	89	116	99	89	52	94

Notes:
a) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; Individual semi-VOCs < 50 ppm.
b) NA = Not Available
c) U = Compound was not detected.
d) J = the reported value is an estimated concentration.
e) R = the data was rejected in the data validating process.
f) UJ = the compound was not detected; the associated reporting limit is approximate.

/MU\SD24SLF.WK3

4.4.2.2 Semivolatile Organic Compounds

Surface Soils

A total of 17 semivolatile organic compounds were found at varying concentrations in the surface soil samples collected at SEAD-24. In general, the concentrations of semivolatile compounds were low, with only 3 results exceeding TAGM values. All of these were from the surface soil sample SS24-1, which was collected at the east end of the site. With the exception of the phthalates (bis(2-ethylhexyl)phthalate and di-n-butylphthalate) which are common laboratory and sampling contaminants, and 2,4-dinitrotoluene, which is a nitroaromatic, all the semivolatile organic compounds detected were PAHs, which were likely derived from petroleum products. The PAHs were more widespread than the volatiles and were primarily detected only in surface soil samples. The samples containing the greatest number of PAHs were SS24-1, SS24-6, SS24-9 and SB24-3.1. Other than the surface soil sample SS24-1, these samples were located in the northwest portion of the site, near the boundary of the burning pit.

Subsurface Soils

Two phthalate compounds, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were the only SVO compounds detected in the subsurface soil samples collected at SEAD-24. Phthalate compounds are common laboratory and sampling contaminants. The highest reported phthalate concentration was 860 μg/kg, well below the TAGM value of 50,000 μg/kg for any individual phthalate compound.

4.4.2.3 Pesticides and PCBs

Surface Soils

Six pesticides were found in the surface soil samples collected at SEAD-24. Four of these pesticides were found in only one sample, while one was found in two samples, and one in three samples. The most pesticides were detected in the surface soil sample SS24-7, collected at the southern end of the site. Lesser amounts of pesticides were detected in the surface soil samples SS24-6 and SS24-5. All of the reported pesticide concentrations were well below their respective TAGM values.

Subsurface Soils

Pesticides and PCBs were undetected in the subsurface soil samples analyzed.

4.4.2.4 Herbicides

Surface Soils

Three herbicide compounds were detected in the surface soil samples collected from the site. These compounds were found in only one sample each, and each one was found in a different sample. 2,4,5-T was detected at 8 μg/kg in the surface soil sample SS24-9, but was not detected in the duplicate sample SS24-13. Dicamba was detected at 9.7 μg/kg in the duplicate sample SS24-13, but was not detected in sample SS24-9. MCPP was detected at 6600 μg/kg in sample SS24-1. The TAGM for 2,4,5-T is 1900 μg/kg in soil. The other two compounds have no TAGMs in soil.

Subsurface Soils

Herbicides were undetected in the subsurface soil samples analyzed.

4.4.2.5 Metals

Surface Soils

A variety of surface soil samples were found to contain various metals at concentrations that exceed the associated TAGM values. Of the 24 metals reported, 15 of these were found in one or more surface soil samples at concentrations above the TAGM values. Of these metals, arsenic, cadmium, copper, lead, nickel, and zinc were found at the highest concentrations and/or in the largest number of surface soil samples above the TAGM values.

Arsenic was detected at concentrations above the TAGM (7.5 mg/kg) in 11 of the surface soil samples collected. These samples included surface soil samples SS24-1 through SS24-10, and SS24-12. The highest concentration, 56.8 mg/kg, was detected in the surface soil sample SS24-6. Other high concentrations were detected in samples SS24-1 (51.1 mg/kg), SS24-3 (53.5 mg/kg), and SS24-9 (38.5 mg/kg). Figure 4.4-1 shows the arsenic concentrations in the surface soil samples. In general, the high concentrations were present in the north and east

Subsurface Soils

The phthalate compound bis(2-ethylhexyl) phthalate was the only SVO detected in the subsurface soil samples analyzed. Phthalates are common laboratory contaminants. The maximum reported concentration of 490 μg/kg is well below the 50,000 μg/kg TAGM.

4.3.2.3 Pesticides and PCBs

Surface Soils

A wide distribution of pesticide compounds were identified at low concentrations in the surface soil samples collected at SEAD-17. Only the compound Dieldrin was detected in a single sample, SS17-11, at a concentration of 62 μg/kg that exceeded the TAGM value of 44 μg/kg. The PCB aroclor-1260 was the only PCB compound detected in the surface soil samples analyzed. The maximum reported concentration of 28J μg/kg is well below the 1000 μg/kg TAGM level.

Subsurface Soils

No pesticide compounds were detected in the subsurface soil samples analyzed. Aroclor-1254 was the only PCB compound which was detected in one subsurface soil sample at a concentration of 61 μg/kg. The TAGM for Aroclor-1254 in subsurface soils is 10,000 μg/kg.

4.3.2.4 Herbicides

Surface Soils

The herbicide MCPA was identified in four of the 27 surface soil samples collected at SEAD-17. The maximum concentration of MCPA, 34000 μg/kg, was found in the surface soil sample SS17-5, collected from the area northeast of the building. Other samples with elevated concentrations of MCPA included SS17-1 (16000 μg/kg), SS17-7 (12000 μg/kg), and SS17-17 (32000 μg/kg). There is no TAGM for MCPA in soil. There appears to be no spatial correlation to where this compound was detected at the site.

Subsurface Soils

Herbicides were undetected in the subsurface soil samples analyzed from SEAD-17.

4.3.2.5 Metals

Surface Soils

Eighteen of the 24 analyzed metals were found in one or more of the SEAD-17 soil samples at concentrations exceeding the associated TAGM values. Elevated levels of cadmium, copper, lead, and zinc were identified in more than half of the 27 soil samples analyzed. Figure 4.3-2 shows the concentrations of lead in the surface soil samples. The highest concentrations of cadmium (14.3 mg/kg) and zinc (1530 mg/kg) were identified in the surface soil sample SS17-18. The highest lead concentration was reported for the surface soil sample SS17-6 (3150 mg/kg), while the highest concentration of copper was reported for the surface soil sample SS17-8 (654 mg/kg). Other samples with elevated lead levels include SS17-7 (2310 mg/kg), SS17-8 (2190 mg/kg), SS17-13 (2940 mg/kg), and SS17-18 (2780 mg/kg). In general, these same samples also show elevated levels of copper and zinc.

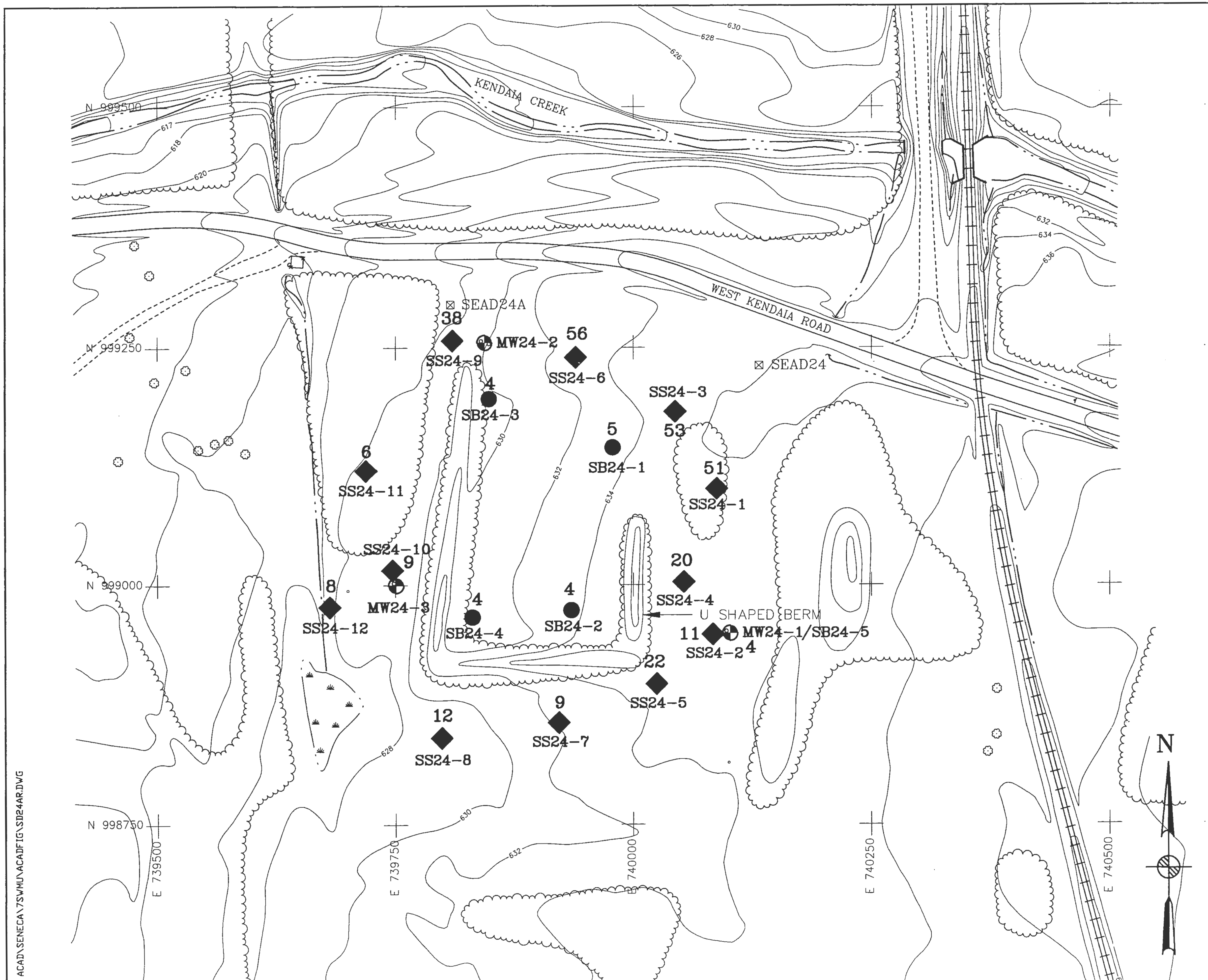
Subsurface Samples

Eight metals were detected at elevated concentrations in various subsurface samples. The extent of elevated metals appears to be limited to the surface soils at the site and does not appear to have migrated deeper into the subsurface soils as evidenced by the following concentration ranges detected in the subsurface soil samples: 18 to 30 mg/kg copper, 7.5J to 25 mg/kg lead, 50 to 90 mg/kg zinc, and no cadmium detected in any subsurface samples.

4.3.2.6 Nitroaromatics

Surface Soils

The nitroaromatic compound 2,4-dinitrotoluene was detected in three of the 27 surface soil samples collected at SEAD-17. The maximum concentration of 2,4-dinitrotoluene, 330J μg/kg, was found in the surface soil sample SS17-10, collected near the southwest side of the building. Other surface soil samples with very low 2,4-dinitrotoluene concentrations were SS17-6 (170 μg/kg), and SS17-13 (130 μg/kg). There is no TAGM for this compound.



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ROAD SIGN
- DECIDOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- CORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT
- MONITORING WELL
- 4 SOIL BORING AND ARSENIC IN SURFACE SOILS (mg/kg)
- 22 SURFACE SOIL AND ARSENIC IN SURFACE SOILS (mg/kg)
- SURFACE WATER/SEDIMENT SAMPLE

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	Dwg No. 720477-02000

FIGURE 4.4-1
SEAD-24 POWDER BURNING PAD
ARSENIC IN SURFACE SOILS (mg/kg)

SCALE 1" = 100'	DATE MAY 1995	REV C

areas of the site. Concentrations were highest on the north side of the site and decreased towards the southeast.

Cadmium was detected in concentrations exceeding the TAGM value in only one surface soil sample, SS24-12. The concentration of 8.2 mg/kg was well in excess of the TAGM value of 1 mg/kg.

Copper was detected in concentrations exceeding the TAGM value (25 mg/kg) in 11 of the surface soil samples analyzed. Most of these were only slightly above the TAGM value (i.e., in the 25 to 30 mg/kg range). The exception was sample SS24-9, which had a copper concentration of 324J mg/kg. The copper concentration in the duplicate sample, SS24-13, was 34.5J mg/kg.

Lead concentrations exceeded the TAGM value (30 mg/kg) in 13 of the surface soil samples analyzed. The maximum concentration of lead, 422 mg/kg, was found in the surface soil sample SS24-5. All other detected lead concentrations were below 100 mg/kg.

Nickel concentrations exceeded the TAGM value (37 mg/kg) in eight of the surface soil samples collected. Again, most exceeded the TAGM by only a slight amount. The only anomalously high concentration of nickel was 535 mg/kg, found in the surface soil sample SS24-12.

Zinc concentrations exceeded the TAGM value (90 mg/kg) in 13 samples. The highest concentrations were 566 mg/kg in SS24-5 and 1180 mg/kg in sample SS24-12.

Subsurface Soils

Seven metals were detected at elevated concentrations in various subsurface soil samples. The extent of significantly elevated metals concentrations appears to be limited to the surface soils at the site and does not appear to have migrated deeper into the subsurface soils as evidenced by the following maximum concentrations detected in the subsurface soil samples: 26.4 mg/kg copper, 33.8 mg/kg lead, 114 mg/kg lead, and no arsenic, cadmium or nickel detected in any subsurface soil samples.

4.4.2.6 Nitroaromatics

Surface Soils

Two nitroaromatic compounds were detected in the soil samples at SEAD-24, tetryl and 2,4-dinitrotoluene. Tetryl was found in only 1 sample, and at low a concentration. 2,4-dinitrotoluene was slightly more prevalent, being detected in 35.3% of the surface soil samples. The concentrations of 2,4-dinitrotoluene ranged from 240 μg/kg in sample SS24-6 to 4400 μg/kg in sample SS24-5.

Subsurface Soils

1,3-dinitrobenzene was the only nitroaromatic compound detected in the subsurface soil samples analyzed. It was detected at a concentration of 76J μg/kg in one subsurface soil sample only, SB24-2.4, which was collected from the 12-14 foot depth interval.

4.4.2.7 Indicator Compounds

Surface Soil

The surface soil samples at the site were analyzed for nitrate/nitrite nitrogen and TPH. Nitrate/nitrite nitrogen concentrations ranged from 0.01 mg/kg to 2.1 mg/kg. TPH was also detected in all of the soil samples. The concentrations of TPH ranged from 32 mg/kg to a high of 158 mg/kg in the surface soil sample SS24-9.

Subsurface Soils

The subsurface soils collected at SEAD-24 were analyzed for nitrate/nitrite nitrogen and total petroleum hydrocarbons (TPH). Nitrate/nitrite nitrogen was detected in all of the subsurface soil samples at concentrations ranging from 0.02 mg/kg to 0.33 mg/kg. TPH was also detected in all of the subsurface soil samples at concentrations ranging from 43 to 116 mg/kg.

4.4.3 Groundwater

Three monitoring wells were installed and sampled as part of the SEAD-24 investigation. The summary chemical analyses are presented in Table 4.4-2. The locations of the wells were shown in Figure 2.6-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-24.

TABLE 4.4-2

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-24 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-24 01/23/94 MW24-1 209254	WATER SEAD-24 11/16/93 MW24-2 204657	WATER SEAD-24 11/15/93 MW24-3 204632
	ug/L	19100	100.0%	NA	NA	NA	19100	9650	18700
	ug/L	10	100.0%	25	50	0	10	5.5 J	6.7 J
	ug/L	177	100.0%	1000	2000	0	156 J	82.1 J	177 J
	ug/L	0.89	100.0%	3	4	0	0.89 J	0.62 J	0.86 J
	ug/L	180000	100.0%	NA	NA	NA	180000	176000	133000
	ug/L	32.6	100.0%	50	100	0	29.8	18.1	32.6
	ug/L	18.7	100.0%	NA	NA	NA	18.7 J	14.5 J	11.8 J
	ug/L	32.5	100.0%	200	1300(g)	0	32.5	8.2 J	16.4 J
	ug/L	32000	100.0%	300	NA	3	32000	19800	29800
	ug/L	7	100.0%	25	15(h)	0	7	3.1	3.9
n	ug/L	47700	100.0%	35000	NA	3	39800	47700	43300
e	ug/L	767	100.0%	300	NA	3	712	767	528
	ug/L	0.06	33.3%	2	2	0	0.06 J	0.07 UJ	0.07 UJ
	ug/L	41.4	100.0%	NA	100	0	41.4	27.8 J	37.4 J
	ug/L	7550	100.0%	NA	NA	NA	7220	6610	7550
	ug/L	2.5	66.7%	10	50	0	2.5 J	1 J	0.8 U
	ug/L	9510	100.0%	20000	NA	0	5950	6950	9510
	ug/L	30.9	100.0%	NA	NA	NA	30.9 J	16.3 J	30.6 J
	ug/L	NA	100.0%	300	NA	0	107	31.8	53
NALYSES									
ite-Nitrogen	mg/L	0.11	100.0%	10	10	0	0.11	0.07	0.01
	standard units	7.45	NA				7.26	7.45	6.95
onductivity	umhos/cm	700	NA				435	700	560
	NTU	150	NA				150	NA(Cloudy)	NA(Cloudy)

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) The value listed is an Action Level for copper, and not an MCL Standard
h) The value listed is an Action Level for lead at the tap, and not an MCL Standard

ECA\7SWMU\TABLES\SD24GWTF.WK3

4.4.3.1 Volatile Organic Compounds

No volatile organic compounds were detected in the three groundwater samples collected at SEAD-24.

4.4.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the three groundwater samples collected at SEAD-24.

4.4.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the three groundwater samples collected at SEAD-24.

4.4.3.4 Herbicides

No herbicides were found in the three groundwater samples collected at SEAD-24.

4.4.3.5 Metals

The three metals iron, magnesium, and manganese were found in three of the groundwater samples at concentrations above the criteria value. None of these metals are derived from petroleum products, and their presence is likely attributable to natural conditions. The turbidities of these samples were all very high.

4.4.3.6 Nitroaromatics

No nitroaromatic compounds were found in the three groundwater samples collected at SEAD-24.

4.4.3.7 Indicator Compounds

None of the three groundwater samples analyzed had nitrate/nitrite nitrogen concentrations above the criteria value of 10 mg/L. The maximum nitrate value detected was 0.11 mg/L in sample MW24-1.

4.4.4 Tentatively Identified Compounds

All Total TIC concentrations reported in the samples analyzed form SEAD-24 were less than 50 mg/kg.

4.5 SEAD-25

4.5.1 Introduction

A total of 17 soil samples were collected from six soil borings at SEAD-25. Three monitoring wells were also installed and sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-25.

4.5.2 Soil

The analytical results for the 6 surface and 11 subsurface soil samples collected as part of the SEAD-25 investigation are presented in Table 4.5-1. The sample locations were shown in Figure 2.7-2. The following sections describe the nature and extent of contamination in SEAD-25 soils.

4.5.2.1 Volatile Organic Compounds

Surface Soils

A variety of volatile organic compounds were identified in the soil samples collected at SEAD-25. Ten different volatile organic compounds were detected, 5 of which were present in concentrations exceeding TAGM values. The petroleum derived BTEX (benzene, toluene, ethylbenzene and xylenes) compounds were the most prevalent VOCs, with xylene being detected in 50% of the surface soil samples. Figure 4.5-1 shows the total BTEX concentrations in the surface soil samples. Several chlorinated compounds were present as

TABLE 4.5-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-1.1 206050	SOIL SEAD-25 4-6 12/03/93 SB25-1.3 206051	SOIL SEAD-25 6-8 12/03/93 SB25-1.4 206052	SOIL SEAD-25 0-2 12/03/93 SB25-2.1 206053	SOIL SEAD-25 0-2 12/03/93 SB25-2.4 206057 SB25-2.1DUP	SOIL SEAD-25 2-4 12/03/93 SB25-2.2 206055	SOIL SEAD-25 4-6 12/03/93 SB25-2.3 206056	SOIL SEAD-25 0-2 12/03/93 SB25-3.1 206058	SOIL SEAD-25 2-4 12/03/93 SB25-3.2 206059
S														
	ug/kg	390	11.8%	100	2	11 U	11 U	11 U	11 U	11 U	19 U	11 U	52 U	12 U
	ug/kg	2800	52.9%	200	3	11 U	11 U	11 U	11 U	11 U	39	24	52 U	40
total)	ug/kg	310	5.9%	300(d)	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	52 U	12 U
	ug/kg	9	11.8%	300	0	11 U	11 U	11 U	2 J	11 U	19 U	11 U	52 U	12 U
	ug/kg	10	17.6%	300	0	11 U	11 U	11 U	11 U	11 U	10 J	11 U	52 U	8 J
o	ug/kg	170	5.9%	800	0	11 U	11 U	11 U	11 U	11 U	19 U	11 U	170	12 U
	ug/kg	280	11.8%	700	0	11 U	11 U	11 U	11 U	11 U	19 U	11 U	38 J	12 U
	ug/kg	100	11.8%	60	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	100	12 U
	ug/kg	4500	29.4%	1500	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	840	4 J
	ug/kg	17000	35.3%	5500	1	11 U	11 U	11 U	11 U	11 U	19 U	6 J	370	12 U
	ug/kg	30000	58.8%	1200	5	11 U	11 U	11 U	11 U	11 U	19 U	37	4100 J	49
	ug/kg	6.4	5.9%	NA	NA	5.4 U	5.5 U	5.5 U	5.4 U	5.5 U	5.4 U	5.5 U	5.3 U	6 U
	ug/kg	5400	5.9%	NA	NA	5700 U	5400 U	5500 U	5400	5500 U	5400 U	5500 U	5300 U	6000 U
ANICS														
	ug/kg	4300	47.1%	13000	0	720 U	360 U	500 U	350 U	500 U	390 J	250 J	1100 J	400 U
o	ug/kg	8900	64.7%	36400	0	55 J	360 U	500 U	40 J	51 J	5100	2800 J	4700 J	400 U
	ug/kg	32	5.9%	41000	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	300	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	300 J	220 J	6900 U	400 U
	ug/kg	1900	47.1%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	620 J	910 J	400 U
nine	ug/kg	1500	17.6%	50000 *	0	720 U	360 U	500 U	350 U	500 U	960 J	870 J	1500 J	400 U
	ug/kg	4600	70.6%	50000 *	0	720 U	360 U	500 U	350 U	65 J	1400 J	1200 J	2500 J	400 U
	ug/kg	42	5.9%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	26	5.9%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	570	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	950	23.5%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	380 J	400 U
	ug/kg	230	11.8%	220	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	350	11.8%	400	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
nalate	ug/kg	480	35.3%	50000 *	0	160 J	63 J	90 J	25 J	49 J	3600 U	3600 U	480 J	30 J
	ug/kg	240	5.9%	1100	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	260	5.9%	1100	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	250	5.9%	61	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
one	ug/kg	170	5.9%	3200	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
e	ug/kg	72	5.9%	14	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U
	ug/kg	200	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U

TABLE 4.5-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-1.1 206050	SOIL SEAD-25 4-6 12/03/93 SB25-1.3 206051	SOIL SEAD-25 6-8 12/03/93 SB25-1.4 206052	SOIL SEAD-25 0-2 12/03/93 SB25-2.1 206053	SOIL SEAD-25 0-2 12/03/93 SB25-2.4 206057 SB25-2.1DUP	SOIL SEAD-25 2-4 12/03/93 SB25-2.2 206055	SOIL SEAD-25 4-6 12/03/93 SB25-2.3 206056	SOIL SEAD-25 0-2 12/03/93 SB25-3.1 206058	SOIL SEAD-25 2-4 12/03/93 SB25-3.2 206059
	ug/kg	2.9	11.8%	20	0	1.8 UJ	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2.8 J	2 U
	ug/kg	2.5	5.9%	900	0	1.8 UJ	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2.5 J	2 U
	ug/kg	4.8	11.8%	2100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	4.3	4 U
	ug/kg	3.4	11.8%	100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.4 J	4 U
	ug/kg	4.3	11.8%	2100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.4 J	4 U
	ug/kg	3.7	5.9%	NA	NA	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.7 J	4 U
	ug/kg	2.5	11.8%	540	0	1.8 UJ	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	2 U
	ug/kg	130	17.6%	1000(a)	0	36 UJ	36 U	36 U	35 U	36 U	36 U	36 U	35 U	40 U
	mg/kg	23600	100.0%	15523	4	9720	10800	8730	9370	7330	9140	8640	6160	18600
	mg/kg	2.5	5.9%	5	0	9.9 UJ	9.1 UJ	7.1 UJ	7.6 UJ	8.7 UJ	7.6 UJ	6.6 UJ	9.2 UJ	12 UJ
	mg/kg	12.2	100.0%	7.5	6	4.7	3.8	4.7	4.1	5.4	3.5	3.4	2.4	5
	mg/kg	160	100.0%	300	0	25 J	62.4	55.5	36.7	32.7 J	57.1	60.3	82.3	111
	mg/kg	1.1	100.0%	1	1	0.45 J	0.52 J	0.38 J	0.49 J	0.48 J	0.43 J	0.36 J	0.42 J	0.65 J
	mg/kg	0.73	22.2%	1	0	0.62 U	0.57 U	0.44 U	0.48 U	0.64 J	0.47 U	0.73	0.58 U	0.75 U
	mg/kg	195000	100.0%	120725	5	53800	67300	59100	112000	192000	70800	81600	195000	2760
	mg/kg	30.4	100.0%	24	4	16	17.6	14.6	15.4	11.5	14.5	15.8	11.9	25.2
	mg/kg	16.8	100.0%	30	0	9.7	9.8	8.7	10.5	9.8	8.2	7.2	6.3 J	15.8
	mg/kg	35.7	100.0%	25	3	17	15.6	15.6	14.7	14.4	21.6	23.3	16.3	7.6
	mg/kg	54600	100.0%	28986	4	20400	22100	21100	19100	14400	18700	16800	11900	54600
	mg/kg	291	100.0%	30	6	21.7 J	7.1 J	11.6 J	26.8 J	42.6 J	13.7 J	14.2 J	291 J	15.8 J
	mg/kg	22800	100.0%	12308	7	6350	19600	12300	8590	12300	12600	21000	11300	3980
	mg/kg	776	100.0%	759	1	394	469	435	450	444	464	407	384	622
	mg/kg	0.96	58.3%	0.1	1	0.06 J R	0.05 J R	0.07 J R	0.06 J R	0.03 J	0.03 J	0.05 J R	0.03 J	0.08 J R
	mg/kg	47.8	100.0%	37	3	27.1	27.1	23.6	46.4	23	35.3	23.7	17.5	21.7
	mg/kg	3250	100.0%	1548	5	844 J	1230	877	916	1370	979	1230	1420	1730
	mg/kg	2.3	52.9%	2	1	0.24 UJ	0.23 UJ	0.19 UJ	0.17 UJ	0.21 UJ	0.12 UJ	0.18 UJ	0.15 UJ	0.2 UJ
	mg/kg	269	100.0%	114	12	108 J	156 J	126 J	128 J	181 J	128 J	157 J	180 J	55 J
	mg/kg	0.79	41.2%	0.3	6	0.26 U	0.25 U	0.2 U	0.18 U	1.2 U	0.13 U	0.2 U	0.81 U	0.21 U
	mg/kg	40.8	100.0%	150	0	12.2	16	13.2	12.4	11.5	14.8	14	10.1	39.8
	mg/kg	210	100.0%	90	3	44.4	47.7	57.9	35.4	97.9	56.7	94.8	74.7	43.7
n	mg/kg	0.2	82.4%	NA	NA	0.2	0.01	0.05	0.02	0.09	0.01	0.02	0.04	0.01 U
	%W/W	94.7	100.0%			91.6	91.8	92.4	92.9	92.5	92.2	91	94.7	83.3
ocarbons	mg/kg	27000	100.0%	NA	NA	1240	68	98	1600	1270	3000	1920	14800	112

/MU\TABLES\SD25SOLF.WK3

TABLE 4.5-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

IND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-4.1 206062	SOIL SEAD-25 2-4 12/03/93 SB25-4.2 206063	SOIL SEAD-25 4-6 12/03/93 SB25-4.3 206064	SOIL SEAD-25 0-2 12/03/93 SB25-5.1 206055	SOIL SEAD-25 2-4 12/03/93 SB25-5.2 206066	SOIL SEAD-25 4-6 12/03/93 SB25-5.3 206067	SOIL SEAD-25 0-2 12/03/93 SB25-6.1 206068	SOIL SEAD-25 2-4 12/03/93 SB25-6.2 206069
S													
	ug/kg	390	11.8%	100	2	1400 U	11 U	11 U	390 J	6800 U	160 J	11 U	11 U
	ug/kg	2800	52.9%	200	3	1800	38	19	2800	6800 U	760 J	11 U	7 J
(total)	ug/kg	310	5.9%	300(d)	1	1400 U	11 U	11 U	310 J	6800 U	1200 U	11 U	11 U
	ug/kg	9	11.8%	300	0	1400 U	9 J	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	10	17.6%	300	0	1400 U	6 J	11 U	1300 U	6800 U	1200 U	11 U	11 U
e	ug/kg	170	5.9%	800	0	1400 U	11 U	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	280	11.8%	700	0	1400 U	11 U	11 U	280 J	6800 U	1200 U	11 U	11 U
	ug/kg	100	11.8%	60	1	1400 U	11 U	11 U	1300 U	6800 U	1200 U	11 U	11 U
	ug/kg	4500	29.4%	1500	1	1400 U	11 U	11 U	820 J	4500 J	1200 U	11 U	11 U
	ug/kg	17000	35.3%	5500	1	1400 U	11 U	11 U	990 J	17000	1200	11 U	11 U
	ug/kg	30000	58.8%	1200	5	2900	50	110	14000	130000	9000	11 U	11 U
	ug/kg	6.4	5.9%	NA	NA	5.9 U	5.6 U	5.4 U	6.4	5.7 U	5.5 U	5.6 U	5.4 U
	ug/kg	5400	5.9%	NA	NA	5900 U	5600 U	5400 U	5300 U	5700 U	5500 U	5600 U	5400 U
ANICS													
	ug/kg	4300	47.1%	13000	0	770 J	1500 U	810 U	1500 J	330 J	4300 J	360 U	360 U
e	ug/kg	8900	64.7%	36400	0	2600 J	1500 U	68 J	8900 J	550	7100 J	360 U	360 U
	ug/kg	32	5.9%	41000	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	32 J	360 U
	ug/kg	300	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
	ug/kg	1900	47.1%	50000 *	0	1500 J	170 J	95 J	1900 J	510 U	11000 U	28 J	360 U
mine	ug/kg	1500	17.6%	60000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
	ug/kg	4600	70.6%	50000 *	0	2700 J	350 J	180 J	4600 J	67 J	1000 J	370	360 U
	ug/kg	42	5.9%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	42 J	360 U
	ug/kg	26	5.9%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	26 J	360 U
	ug/kg	570	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	570	360 U
	ug/kg	950	23.5%	50000 *	0	12000 U	1500 U	810 U	950 J	510 U	11000 U	560	360 U
	ug/kg	230	11.8%	220	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	230 J	360 U
	ug/kg	350	11.8%	400	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	350 J	360 U
halate	ug/kg	480	35.3%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
e	ug/kg	240	5.9%	1100	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	240 J	360 U
e	ug/kg	260	5.9%	1100	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	260 J	360 U
	ug/kg	250	5.9%	61	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	250 J	360 U
ene	ug/kg	170	5.9%	3200	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	170 J	360 U
ne	ug/kg	72	5.9%	14	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	72 J	360 U
	ug/kg	200	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	200 J	360 U

TABLE 4.5-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-4.1 206062	SOIL SEAD-25 2-4 12/03/93 SB25-4.2 206063	SOIL SEAD-25 4-6 12/03/93 SB25-4.3 206064	SOIL SEAD-25 0-2 12/03/93 SB25-5.1 206065	SOIL SEAD-25 2-4 12/03/93 SB25-5.2 206066	SOIL SEAD-25 4-6 12/03/93 SB25-5.3 208067	SOIL SEAD-25 0-2 12/03/93 SB25-6.1 206068	SOIL SEAD-25 2-4 12/03/93 SB25-6.2 206069
	ug/kg	2.9	11.8%	20	0	2 UJ	1.9 U	2.2 U	2.9 J	1.9 UJ	1.9 U	1.9 U	1.8 U
	ug/kg	2.5	5.9%	900	0	2 UJ	1.9 U	2.2 U	1.8 UJ	1.9 UJ	1.9 U	1.9 U	1.8 U
	ug/kg	4.8	11.8%	2100	0	3.9 UJ	3.7 U	4.3 U	4.8 J	3.7 UJ	3.6 U	3.7 U	3.6 U
	ug/kg	3.4	11.8%	100	0	3.9 UJ	3.7 U	4.3 U	2.1 J	3.7 UJ	3.6 U	3.7 U	3.6 U
	ug/kg	4.3	11.8%	2100	0	3.9 UJ	3.7 U	4.3 U	3.5 UJ	3.7 UJ	3.6 U	4.3	3.6 U
	ug/kg	3.7	5.9%	NA	NA	3.9 UJ	3.7 U	4.3 U	3.5 UJ	3.7 UJ	3.6 U	3.7 U	3.6 U
	ug/kg	2.5	11.8%	540	0	2 UJ	1.9 U	2.2 U	2.5 J	1.9 UJ	1.9 U	1.9 U	1.8 U
	ug/kg	130	17.6%	1000(a)	0	33 NJ	37 U	43 U	130 J	37 UJ	36 U	37 U	36 U
	mg/kg	23600	100.0%	15523	4	19700	16600	7590	13200	23600	11600	10600	7070
	mg/kg	2.5	5.9%	5	0	4.2 U	4.5 U	4.6 U	2.5 J	3.8 U	4 U	4.2 U	3 U
	mg/kg	12.2	100.0%	7.5	6	12.2	7.4	9.1	5.1	8.3	8	8.3	4.8
	mg/kg	160	100.0%	300	0	57.4	86.1	46.1	61.8	160	81.1	59.1	35
	mg/kg	1.1	100.0%	1	1	0.86 J	0.82 J	0.76 J	0.57 J	1.1	0.64 J	0.48 J	0.35 J
	mg/kg	0.73	22.2%	1	0	0.41 U R	0.43 U R	0.44 U R	0.24 U R	0.37 U R	0.39 U R	0.41 U R	0.29 U R
	mg/kg	195000	100.0%	120725	5	5330	17800	128000	42600	5120	74200	82500	122000
	mg/kg	30.4	100.0%	24	4	28.4	26.8	15.8	21.1	30.4	17.5	16.9	11.3
	mg/kg	16.8	100.0%	30	0	11.5	16.8	5.6 J	10.8	14	9.5	11.2	6.6 J
	mg/kg	35.7	100.0%	25	3	35.7 J	28.3 J	11.4 J	17.6 J	34 J	22 J	20.2 J	12 J
	mg/kg	54600	100.0%	28986	4	38100	35200	14000	24400	31100	20700	21400	15800
	mg/kg	291	100.0%	30	6	66.4	16.4	156	77.2	18	15.6	9.5	13.8
	mg/kg	22800	100.0%	12308	7	5210	8550	21800	6590	6950	17800	19600	22800
	mg/kg	776	100.0%	759	1	281 J	776 J	344 J	433 J	697 J	423 J	722 J	610 J
	mg/kg	0.96	58.3%	0.1	1	0.04 J	0.04 J	0.04 U	0.03 U	0.96	0.04 U	0.03 J	0.04 U
	mg/kg	47.8	100.0%	37	3	34.4	47.8	14.2	30.8	45.2	29.1	26.8	18
	mg/kg	3250	100.0%	1548	5	1430	1410	1980	1790	3250	2090	1480	1060
	mg/kg	2.3	52.9%	2	1	0.92 J	0.85 J	1.5 J	1 J	0.67 J	0.66 J	0.97 J	0.63 J
	mg/kg	269	100.0%	114	12	55.2 J	81.3 J	176 J	97.4 J	98.1 J	162 J	269 J	186 J
	mg/kg	0.79	41.2%	0.3	6	0.51 J	0.48 J	0.79 J	0.55 J	0.62 J	0.23 J	0.24 UJ	0.21 UJ
	mg/kg	40.8	100.0%	150	0	34.1	27.5	14.8	17.5	40.8	20.5	18.5	12
	mg/kg	210	100.0%	90	3	72.9 J	210 J	67 J	51.9 J	60.6 J	76.6 J	71.6 J	40.6 J
n	mg/kg	0.2	82.4%	NA	NA	0.01 U	0.01 U	0.01	0.01 U	0.01	0.02	0.17	0.01 U
	%W/W	94.7	100.0%			65.2	89.7	93	94.3	87.6	91.5	90	91.6
carbons	mg/kg	27000	100.0%	NA	NA	5800	770	800	740	27000	2100	99	112

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) The TAGM for 1,2-Dichloroethene (trans) was used for 1,2-Dichloroehtene(total) since it was the only value available.
e) U = Compound was not detected.
f) J = the reported value is an estimated concentration.
g) R = the data was rejected in the data validating process.
h) UJ = the compound was not detected; the associated reporting limit is approximate.

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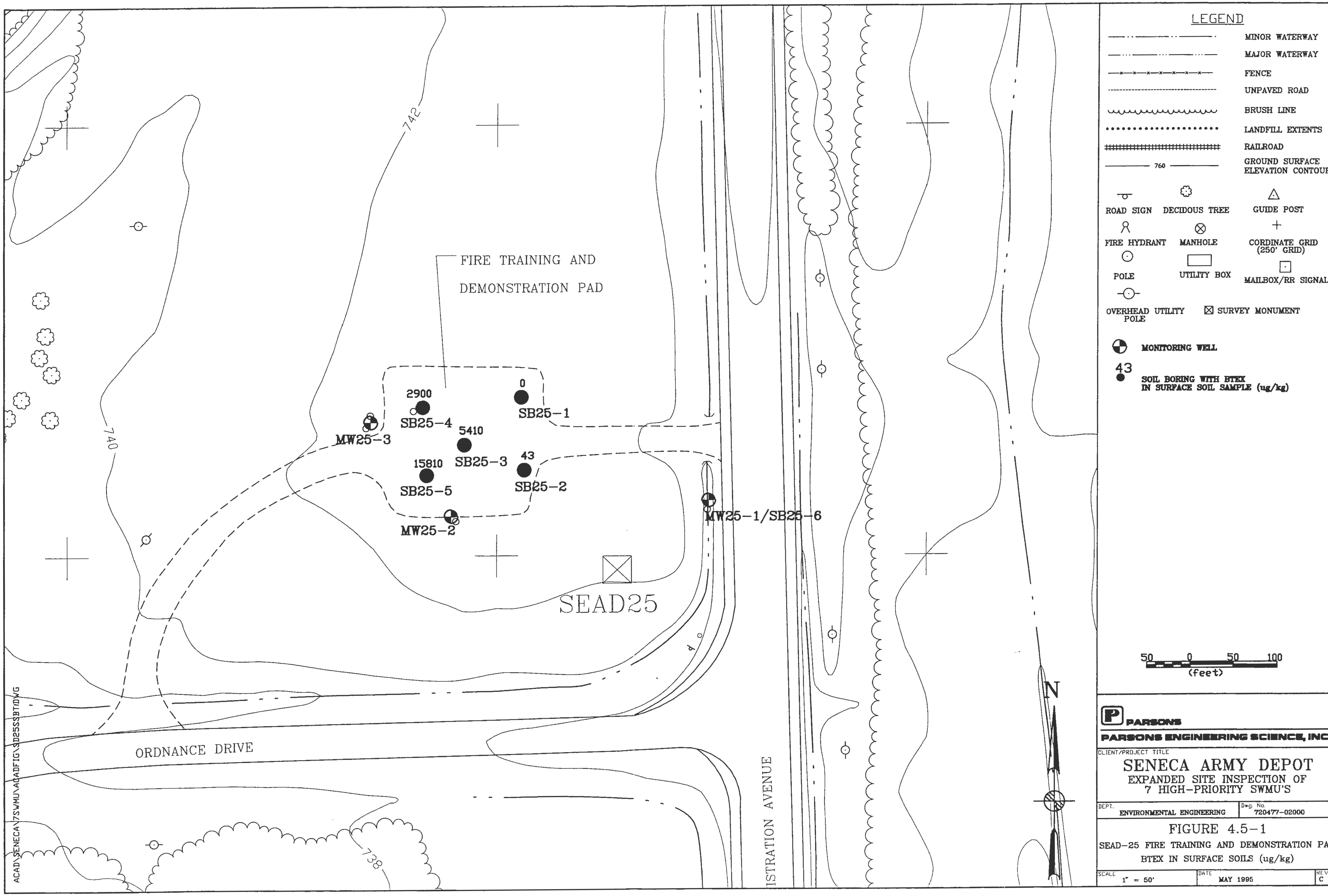
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
MONITORING WELL
43
SOIL BORING WITH BTEX IN SURFACE SOIL SAMPLE (ug/kg)
FIRE TRAINING AND DEMONSTRATION PAD
2900
SB25-4
0
SB25-1
5410
SB25-3
43
SB25-2
15810
SB25-5
MW25-3
MW25-2
MW25-1/SB25-6
SEAD25
742
740
738
ORDNANCE DRIVE
ISTRATION AVENUE
50 0 50 100
(feet)
N
ACAD\SENECA\7SWMU\ADFIG\SD25SBTD.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000
FIGURE 4.5-1
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD
BTEX IN SURFACE SOILS (ug/kg)
SCALE 1" = 50'
DATE MAY 1995
REV C

well, including trichloroethane, 1,1,1-trichloroethane, and 1,2-dichloroethene, though the maximum frequency of detection for these compounds was 33.3%. The chlorinated compounds were detected in borings SB25-3 and SB25-5, with the highest concentrations (280J μg/kg of trichloroethane and 310J μg/kg of 1,2-dichloroethene) being detected in the soil boring sample SB25-5.1. The only TAGM exceedance of the chlorinated compounds was for 1,2-dichloroethene. The 310 μg/kg concentration, identified in the sample SB25-5.1, exceeded the TAGM concentration of 300 μg/kg. The suspected laboratory contaminants acetone, methylene chloride and chloroform were also detected in the surface soil samples collected at the site.

Subsurface Soils

Eight VOCs were detected in the subsurface soil samples. Five VOCs were detected at concentrations which exceeded TAGM values. In particular, the BTEX compounds toluene, ethylbenzene, and xylene (total) were detected at concentrations significantly above TAGM values in subsurface soil sample SB25-5.2. Methylene chloride and acetone were also detected above TAGM values only in subsurface soil sample SB25-5.3.

The BTEX compounds are the primary constituents of concern at this site. The maximum concentrations of toluene (4500J μg/kg), ethylbenzene (17,000 μg/kg), and xylene (130,000 μg/kg) all occurred in the soil boring sample SB25-5.2, which was collected in the southwest corner of the site from a depth of 2 to 4 feet. High concentrations of these compounds were also detected in the 0- to 2-foot and 4- to 6-foot samples from the same boring, and in the samples collected from SB25-3, which is located in the center of the site. Little or no BTEX was detected in the soil samples collected from soil borings SB25-1, SB25-2, and SB25-6, which were located on the east side of the site, closer to Administrative Ave. Each of the BTEX compounds exceeded the TAGM values in at least one sample (either surface and subsurface samples), with xylene exceeding its TAGM value in 2 subsurface and 3 surface soil samples.

4.5.2.2 Semivolatile Organic Compounds

Surface Soils

A total of 19 semivolatile organic compounds were found at varying concentrations in the surface soil samples collected at SEAD-25. In general, the concentrations of semivolatile compounds were low, with only 3 results exceeding a TAGM value. All of these were from sample SB26-6.1, the 0- to 2-foot sample collected from boring SB26-6. This soil boring was located at the east end of the site, in the drainage ditch along Administrative Ave.

With the exception of bis(2-ethylhexyl)phthalate, all of the semivolatile organic compounds detected were PAHs, which were likely derived from petroleum products. The PAHs were more widespread than the volatiles, and the highest concentrations were found in the surface soil samples collected from the soil borings SB25-3 and SB25-5, which corresponds well with the volatiles data. The PAHs found in the surface soil samples collected from the soil boring SB25-6 were somewhat anomalous, since there were no BTEX compounds present in this sample. The PAHs in this sample may have resulted from runoff from the road, and not from the site.

Subsurface Soils

Twelve SVO compounds were detected in the subsurface soil samples. None were found at concentrations which exceeded TAGM values. The highest concentrations of SVOs in subsurface soils were found in the samples collected from soil borings SB25-2, SB25-3, and SB25-5.

The occurrence of SVOs in the subsurface soil samples collected from soil borings SB25-3 and SB25-5 correlate well with the reported concentrations of BTEX compounds in the same samples. The occurrence of SVO compounds in the subsurface soil samples from soil boring SB25-2 is somewhat anomalous since only low concentrations of VOCs were detected in the same sample and the surface soil sample collected from soil boring SB25-2 had only low concentrations of one VOC and two SVO compounds.

4.5.2.3 Pesticides and PCBs

Surface Soils

Seven pesticides and 1 PCB compound were found in the surface soil samples collected at SEAD-25. The frequency of detection of these compounds was generally low, and ranged from 5.9% for endrin aldehyde and endosulfan I, to 17.6% for Aroclor-1254, a PCB. Almost all of the pesticide and PCB compounds were detected in the surface soil samples SB25-3.1 and SB25-5.1, which were the samples which also had the highest levels of volatile and semivolatile organic compounds. None of the pesticide or PCB compounds were present in concentrations exceeding their respective TAGM values.

Subsurface Soils

No pesticides or PCBs were detected in the subsurface soil samples analyzed.

4.5.2.4 Herbicides

Surface Soils

Two herbicide compounds were detected in the surface soil samples collected from the site. Each compound, Dicamba and MCPP, was detected in only 1 sample. Dicamba was detected in the surface soil sample SB25-5.1 at a concentration of 6.4 μg/kg. MCPP was detected in the surface soil sample SB25-2.1 at a concentration of 5400 μg/kg. Neither of these compounds have TAGMs in soil.

Subsurface Soils

No herbicides were detected in the subsurface soil samples analyzed.

4.5.2.5 Metals

Surface Soils

A variety of samples were found to contain various metals at concentrations that exceed their associated TAGM values. Of the 24 metals reported, 13 of these were found in one or more samples at concentrations above the TAGM values. Few of the TAGM exceedances were significant. Most of the concentrations exceeded the TAGM only slightly, and in only a few samples. The primary exception was lead. Lead concentrations in samples SB25-3.1 (291J mg/kg), and SB25-5.1 (77.2 mg/kg) exceeded the TAGM value of 30 μg/kg. The lead in these samples corresponds with the presence of BTEX and PAHs in the same samples.

Subsurface Soils

Twenty-four metals were detected in the subsurface soil sample analyzed. Seventeen of the

24 metals had reported concentration which exceeded TAGM values in at least one subsurface soil sample. in general, the elevated concentrations of metals exceeded their respective TAGM values in only a few samples and most of the concentrations exceeded the TAGm only slightly. The primary exception was lead in subsurface soil sample SB25-4.3 which had a reported concentration of 156 μg/kg, well above the TAGM of 30 μg/kg.

4.5.2.6 Indicator Compounds

Surface Soils

The surface soil samples at the site were analyzed for nitrate/nitrite nitrogen and TPH. Nitrate/nitrite nitrogen concentrations ranged from 0.02 mg/kg to 0.2 mg/kg. TPH was detected in all of the surface soil samples. The concentrations of TPH ranged from 99 mg/kg in sample SB25-6.1 to 14,000 mg/kg in sample SB25-3.1. The TPH concentration in sample SB25-6.1 was relatively low (99 mg/kg) in comparison to the concentrations detected in the other surface soil samples, which further supports the contention that the PAHs in this sample may have derived from runoff from the road, and not from site activities.

Subsurface Soils

Nitrate/nitrite nitrogen and TPH were detected in the subsurface soil samples. Nitrate/nitrite nitrogen was found at concentrations ranging from 0.01 to 0.05 mg/kg in 8 of the 11 subsurface soil samples analyzed. TPH was detected in all 11 subsurface soil samples at concentrations ranging from 68 mg/kg (in sample SB25-1.3) to 27,000 mg/kg (in sample SB25-5.2). In general the elevated concentrations of TPH were found in the samples collected from soil borings SB25-2, SB25-3, SB25-4 and SB25-5, the same samples which had elevated concentrations of VOCs and/or SVOs.

4.5.3 Groundwater

Three monitoring wells were installed and sampled as part of the SEAD-25 investigation. The summary chemical analyses are presented in Table 4.5-2. The locations of the wells are shown in Figure 2.7-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-25.

TABLE 4.5-2

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-25 02/06/94 MW25-1 210541	WATER SEAD-25 02/06/94 MW25-4 210543 MW25-1DUP	WATER SEAD-25 02/05/94 MW25-2 210480	WATER SEAD-25 11/15/93 MW25-3 204633, 204658
VOLATILE ORGANICS										
1,1-Dichloroethene	ug/L	1	33.3%	NA	7	0	10 U	10 U	1 J	10 U
1,1-Dichloroethane	ug/L	8	66.7%	NA	NA	NA	10 U	10 U	8 J	3 J
1,2-Dichloroethene (total)	ug/L	25	66.7%	5	170(h)	1	10 U	10 U	25	2 J
Chloroform	ug/L	17	33.3%	7	100	1	10 U	10 U	17	10 U
1,1,1-Trichloroethane	ug/L	36	33.3%	5	200	1	10 U	10 U	36	10 U
Trichloroethene	ug/L	10	33.3%	5	5	1	10 U	10 U	10	10 U
Benzene	ug/L	780	66.7%	0.7	5	2	10 U	10 U	780	30
Tetrachloroethene	ug/L	1	33.3%	5	5	0	10 U	10 U	1 J	10 U
Toluene	ug/L	560	66.7%	5	1000	2	10 U	10 U	560	8 J
Ethylbenzene	ug/L	110	66.7%	5	700	2	10 U	10 U	110	18
Xylene (total)	ug/L	2500	66.7%	5	10000	2	10 U	10 U	2500	82
MTBE	ug/L		0.0%		NA	NA	ND	ND	Not Analyzed	ND
SEMIVOLATILE ORGANICS										
Phenol	ug/L	56	33.3%	NA	NA	NA	10 U	10 U	56	11 U
2-Methylphenol	ug/L	23	33.3%	NA	NA	NA	10 U	10 U	23 J	11 U
4-Methylphenol	ug/L	42	33.3%	NA	NA	NA	10 U	10 U	42	11 U
2,4-Dimethylphenol	ug/L	86	33.3%	NA	NA	NA	10 U	10 U	86	11 U
Naphthalene	ug/L	86	33.3%	10	NA	1	10 U	10 U	86	11 U
2-Methylnaphthalene	ug/L	37	33.3%	NA	NA	NA	10 U	10 U	37	11 U
Fluorene	ug/L	1	33.3%	50	NA	0	10 U	10 U	1 J	11 U
METALS										
Aluminum	ug/L	2260	100.0%	NA	NA	NA	894 J	1870 J	53.3 J	2260
Antimony	ug/L	36.3	66.6%	3	6	3	24.9 J	36.3 J	22.4 J	52.7 U
Arsenic	ug/L	3.8	33.3%	25	50	0	1.4 U	1.4 U	3.8 J	1 U
Barium	ug/L	121	100.0%	1000	2000	0	115 J	121 J	74.1 J	54 J
Beryllium	ug/L	0.31	33.3%	3	4	0	0.4 U	0.4 U	0.4 U	0.31 J
Calcium	ug/L	145000	100.0%	NA	NA	NA	142000	145000	143000	119000
Chromium	ug/L	5	66.7%	50	100	0	2.8 J	2.6 U	2.6 U	5 J
Cobalt	ug/L	7.9	33.3%	NA	NA	NA	4.4 U	4.4 U	4.4 U	7.9 J
Copper	ug/L	4.4	33.3%	200	1300(i)	0	3.1 U	3.1 U	3.1 U	4.4 J
Iron	ug/L	4150	100.0%	300	NA	4	1300 J	3200 J	3730	4150
Lead	ug/L	NA	100.0%	25	15(j)	0	3	2.7 J	2 J	3
Magnesium	ug/L	48000	100.0%	35000	NA	1	26100	26900	48000	22000
Manganese	ug/L	2440	100.0%	300	NA	2	213	241	1330	2440
Mercury	ug/L	0.05	33.3%	2	2	0	0.05 J	0.05 J	0.04 U	0.07 UJ
Nickel	ug/L	11.5	100.0%	NA	100	0	4.4 J	6.8 J	4.7 J	11.5 J
Potassium	ug/L	9950	100.0%	NA	NA	NA	906 U	1010 J	9950	4170 J
Selenium	ug/L	0.73	33.3%	10	50	0	0.73 J	0.7 U	0.7 U	0.8 U
Sodium	ug/L	NA	100.0%	20000	NA	2	52900	54100	13100	11500
Vanadium	ug/L	5.4	33.3%	NA	NA	NA	3.7 U	3.7 U	3.7 U	5.4 J
Zinc	ug/L	31.3	100.0%	300	NA	0	12.4 J	20.2	31.3	20
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/L	0.17	66.7%	10	10	0	0.16	0.17	0.01 U	0.07
Total Petroleum Hydrocarbons	mg/L	2	66.7%	NA	NA	NA	0.4 U	0.4 U	2	1.6
pH	standard units	7.52	NA				7.01		7.08	7.52
Specific Conductivity	umhos/cm	600	NA				600		600	510
Turbidity	NTU	56.4	NA				56.4		3.6	2.2

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) ND = not detected

h) The MCL standard listed is the sum of cis-1,2- and trans-2,2-dichloroethylen MCL standards which are 70 and 100 ug/L, respectively.
i) The value listed is an Action Level for copper, and not an MCL Standard.
j) The value listed is an Action Level for lead at the tap, and not an MCL Stand

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4.5.3.1 Volatile Organic Compounds

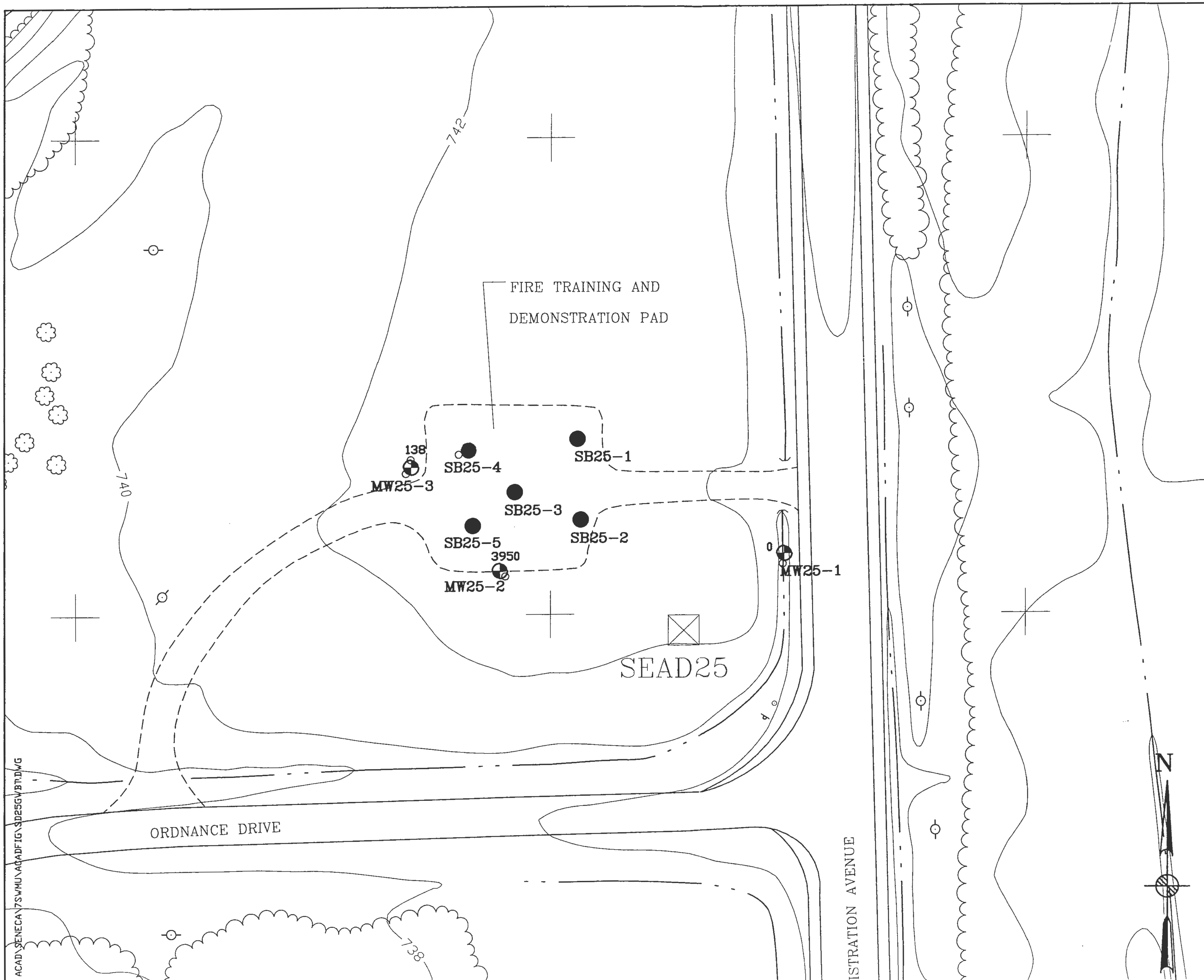
Eleven volatile organic compounds were detected in the groundwater samples collected at SEAD-25. All of these were detected in the groundwater samples collected from monitoring wells MW25-2 and MW25-3. These monitoring wells are located on the west and south sides of the site, respectively. The majority of the compounds were detected in the groundwater sample collected from monitoring well MW25-2, which is located on the south side of the site, near SB25-5, which was the soil boring which contained the highest concentrations of volatile constituents.

As with the soil samples, both BTEX and chlorinated compounds were detected in the groundwater. BTEX is a primary concern, as benzene, toluene, ethylbenzene, and xylene were found at concentrations exceeding the NYSDEC Class GA groundwater standard in the groundwater samples collected from monitoring wells MW25-2 and MW25-3. Figure 4.5-2 shows the BTEX concentrations in the groundwater samples. The maximum concentrations, 780 μg/L of benzene, 560 μg/L of toluene, 110 μg/L of ethylbenzene, and 2500 μg/L of xylene were all found in sample MW25-2.

The bulk of the chlorinated compounds were also detected in sample MW25-2. Chloroform (17 μg/L), 1,2-dichloroethene (25 μg/L), 1,1,1-trichloroethane (36 μg/L), and trichloroethane (10 μg/L) were all found at concentrations exceeding their respective NYSDEC Class GA groundwater standards. Tetrachloroethane, 1,1-dichloroethane, and 1,1-dichloroethene were also detected, but at lower concentrations. The only chlorinated compounds detected in sample MW25-3 were 1,1-dichloroethene, 1,1-dichloroethane, and tetrachloroethane. None of the chlorinated compounds detected in MW25-3 exceeded the NYSDEC Class GA groundwater standards.

4.5.3.2 Semivolatile Organic Compounds

Seven semivolatile organic compounds were detected in the groundwater samples from SEAD-25. All seven were detected in sample MW25-2, and not in MW25-1 or MW25-3. Of the seven compounds, only naphthalene, at 86 μg/L, exceeded the NYSDEC Class GA groundwater standard. Most of the compounds detected have no standard. The concentrations of the compounds with no standard were similar to that of naphthalene. This groundwater sample also had the highest concentrations of volatile organics.



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg No. 720477-02000

FIGURE 4.5-2
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD
BTEX IN GROUNDWATER (ug/L)

SCALE 1" = 50' | DATE MAY 1995 | REV C

4.5.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the three groundwater samples collected at SEAD-25.

4.5.3.4 Herbicides

No herbicides were found in the three groundwater samples collected at SEAD-25.

4.5.3.5 Metals

The four metals iron, magnesium, manganese, and sodium were found in one or more of the groundwater samples analyzed at concentrations above the criteria value. None of these metals are derived from petroleum products, and their presence is likely attributable to natural conditions.

4.5.3.6 Indicator Compounds

None of the 4 groundwater samples analyzed had nitrate/nitrite nitrogen concentrations above the criteria value of 10 mg/L. The maximum nitrate value detected was 0.16 mg/L in the sample MW25-1. TPH was also detected in the samples MW25-2 and MW25-3. The concentrations were similar, 2 mg/L in MW25-2 and 1.6 mg/L in MW25-3. These were the two wells which also contained volatile and semivolatile organic compounds.

4.5.4 Tentatively Identified Compounds

Surface Soils

Four surface soil samples had TIC concentration greater than 50 mg/kg. Surface soil samples SB25-1.1, SB25-3.1, SB25-4.1 and SB25-5.1 had Total TIC concentrations ranging from 60.8 to 919.5 mg/kg. The tentatively identified compounds included decanes and cosanes. The occurrence of elevated TIC concentrations in these samples correlates to the elevated occurrence of VOCs and SVOs in the same samples.

Subsurface Soils

Five subsurface soil samples had TIC concentrations greater than 50 mg/kg. Subsurface soil samples SB25-2.2, SB25-2.3, SB25-2.4, SB25-5.2, and SB25-5.3 had total TIC concentrations ranging from 51.2 to 207.0 mg/kg. The tentatively identified compounds included pentanes, hexanes, decanes, cosanes, benzene, and naphthalenes. The occurrence of these elevated TIC concentrations in these samples correlates to the occurrence of SVOs in the subsurface soil samples collected from soil boring SB25-2 and SB25-5.

4.6 SEAD-26

4.6.1 Introduction

A total of 20 surface soil and 15 subsurface soil samples were collected at SEAD-26. In addition, 1 surface water and 1 sediment sample were collected from the fire training pit. Finally, 4 monitoring wells were installed and sampled as part of the SEAD-26 investigation. The following sections describe the nature and extent of contamination identified at SEAD-26.

4.6.2 Soil

The analytical results for the 9 surface and 28 subsurface soil samples collected as part of the SEAD-26 investigation are presented in Table 4.6-1. The sample location were shown in Figure 2.8-2. The following sections describe the nature and extent of contamination in SEAD-26 soils.

4.6.2.1 Volatile Organic Compounds

Surface Soils

The four volatile organic compounds methylene chloride, acetone, chloroform, and toluene were detected in the surface soil samples collected at SEAD-26. All of these constituents, which are common laboratory and sampling contaminants, were detected in few samples, and at very low concentrations. All of the volatile organics detected in the surface soils were present in concentrations well below their respective TAGM values.

Subsurface Soils

Acetone and 2-butanone were the only VOCs detected in the subsurface soils analyzed. Both of these compounds were detected in one sample only, TP26-2.2, which was collected from depths greater than 5 feet. The reported concentrations of each compound (78 μg/kg of acetone and 19 μg/kg of 2-butanone) were below their respective TAGM values.

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-1 202245	SOIL SEAD-26 0-0.2 10/25/93 SS26-2 202246	SOIL SEAD-26 0-0.2 10/25/93 SS26-3 202247	SOIL SEAD-26 0-0.2 10/25/93 SS26-9 202255 SS26-3DUP	SOIL SEAD-26 0-0.2 10/25/93 SS26-4 202249	SOIL SEAD-26 0-0.2 10/25/93 SS26-5 202251	SOIL SEAD-26 0-0.2 10/25/93 SS26-6 202252	SOIL SEAD-26 0-0.2 10/25/93 SS26-7 202253
	ug/kg	11	11.4%	100	0	11 J	7 J	11 UJ	11 UJ	10 U	6 J	10 U	5 J
	ug/kg	78	5.7%	200	0	10 J	12 UJ	11 UJ	11 UJ	10 U	10 U	10 U	11 U
	ug/kg	6	2.9%	300	0	11 UJ	12 UJ	6 J	11 UJ	10 U	10 U	10 U	11 U
	ug/kg	19	2.9%	300	0	11 UJ	12 UJ	11 UJ	11 UJ	10 U	10 U	10 U	11 U
	ug/kg	3	2.9%	1500	0	11 UJ	12 UJ	11 UJ	11 UJ	10 U	10 U	10 U	11 U
	ug/kg	0	0.0%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	ug/kg	260	2.9%	500	0	55 U	260	56 U	57 U	54 U	52 U	51 U	53 U
	ug/kg	220	8.6%	1900	0	15	220	11	5.7 U	5.4 U	5.2 U	5.1 U	5.3 U
	ug/kg	9.1	8.7%	NA	NA	5.5 U	17 U	5.6 U	5.7 U	5.4 U	5.2 U	5.1 U	5.3 U
	ug/kg	29000	11.4%	NA	NA	5500 U	17000 U	5600 U	5700 U	5400 U	5200 U	5100 U	5300 U
	ug/kg	7600	2.9%	NA	NA	5500 U	17000 U	5600 U	5700 U	5400 U	5200 U	5100 U	5300 U
	ug/kg	120	23.1%	NA	NA	130 U	99 J	110 J	130 UJ	130 U	130 UJ	120 J	130 UJ
	ug/kg	420	23.1%	NA	NA	290 J	330 J	420 J	400 J	130 U	130 UJ	130 UJ	130 UJ
NICS													
	ug/kg	24	2.9%	13000	0	19000 U	4000 U	45000 U	38000 U	450 U	24 J	1100 U	350 U
	ug/kg	590	8.6%	36400	0	19000 U	590 J	45000 U	38000 U	41 J	26 J	1100 U	350 U
	ug/kg	820	11.4%	41000	0	19000 U	4000 U	45000 U	38000 U	180 J	340 U	150 J	350 U
	ug/kg	240	5.7%	6200	0	19000 U	4000 U	45000 U	38000 U	62 J	340 U	1100 U	350 U
	ug/kg	600	14.3%	50000 *	0	19000 U	4000 U	45000 U	38000 U	130 J	340 U	130 J	350 U
	ug/kg	7300	42.9%	50000 *	0	19000 U	4000 U	45000 U	38000 U	1600	340 U	2700	350 U
	ug/kg	1400	20.0%	50000 *	0	19000 U	4000 U	45000 U	38000 U	240 J	340 U	480 J	350 U
	ug/kg	1100	11.4%	50000 *	0	19000 U	4000 U	45000 U	38000 U	230 J	340 U	570 J	350 U
	ug/kg	6200	2.9%	8100	0	19000 U	4000 U	6200 J	38000 U	450 U	340 U	1100 U	350 U
	ug/kg	45000	60.0%	50000 *	0	19000 U	4000 U	45000 U	38000 U	2300	340 U	7000	26 J
	ug/kg	8500	71.4%	50000 *	0	1700 J	720 J	2500 J	3400 J	1900	19 J	6200	26 J
	ug/kg	210	2.9%	50000 *	0	19000 U	4000 U	45000 U	38000 U	450 U	340 U	210 J	350 U
	ug/kg	4500	48.6%	220	4	19000 U	4000 U	45000 U	38000 U	750	340 U	3700	18 J
	ug/kg	4400	54.3%	400	3	19000 U	4000 U	45000 U	38000 U	940	31 J	4300	28 J
alate	ug/kg	930	17.1%	50000 *	0	19000 U	4000 U	45000 U	38000 U	450 U	340 U	1100 U	48 J
	ug/kg	4800	48.6%	1100	2	19000 U	4000 U	45000 U	38000 U	780	90 J	4000	350 U
	ug/kg	3500	48.6%	1100	2	19000 U	4000 U	45000 U	38000 U	690	39 J	3500	350 U
	ug/kg	3900	51.4%	61	8	19000 U	4000 U	45000 U	38000 U	720	46 J	3400	350 U
ne	ug/kg	2600	31.4%	3200	0	19000 U	4000 U	45000 U	38000 U	390 J	44 J	1500	350 U
	ug/kg	1100	11.4%	14	4	19000 U	4000 U	45000 U	38000 U	450 U	340 U	750 J	350 U
	ug/kg	910	31.4%	50000 *	0	19000 U	4000 U	45000 U	38000 U	250 J	42 J	900 J	350 U

tables\SD26SOLF.WK3

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-1 202245	SOIL SEAD-26 0-0.2 10/25/93 SS26-2 202246	SOIL SEAD-26 0-0.2 10/25/93 SS26-3 202247	SOIL SEAD-26 0-0.2 10/25/93 SS26-9 202255 SS26-3DUP	SOIL SEAD-26 0-0.2 10/25/93 SS26-4 202249	SOIL SEAD-26 0-0.2 10/25/93 SS26-5 202251	SOIL SEAD-26 0-0.2 10/25/93 SS26-6 202252	SOIL SEAD-26 0-0.2 10/25/93 SS26-7 202253
	ug/kg	1.4	2.9%	200	0	9.4 U	9.6 U	3.8 U	9.7 U	1.8 U	1.4 J	3.5 U	1.8 U
	ug/kg	5.3	2.9%	900	0	9.4 U	9.6 U	5.3 J	9.7 U	1.8 U	1.8 U	3.5 U	1.8 U
	ug/kg	4.2	2.9%	44	0	18 U	19 U	4.2 J	19 U	3.6 U	3.4 U	6.7 U	3.5 U
	ug/kg	17	22.9%	2100	0	17 J	14 J	4.4 J	19 U	6 J	3.4 U	6.7 U	3 J
	ug/kg	60	5.7%	900	0	35 J	60 J	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
	ug/kg	22	2.9%	2900	0	22	19 U	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
	ug/kg	23	5.7%	1000	0	21 J	23 J	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
	ug/kg	3.5	5.7%	2100	0	18 U	19 U	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
	ug/kg	21	2.9%	10000	0	94 U	96 U	21 J	97 U	18 U	18 U	35 U	18 U
	ug/kg	23	5.7%	NA	NA	18 U	23 J	15 J	17 J	3.6 U	3.4 U	6.7 U	3.5 U
	ug/kg	7.8	5.7%	540	0	5.9 J	7.8 J	3.8 U	9.7 U	1.8 U	1.8 U	3.5 U	1.8 U
	mg/kg	21000	100.0%	15523	5	1750	1560	2050	1640	10900	5830	2650	5490
	mg/kg	13	100.0%	7.5	15	3.3	6.5	6	7.5	9.6	3.8	10.8	4.9
	mg/kg	119	100.0%	300	0	73.9	45.7	18 J	17.3 J	70.1	21.5 J	25.8 J	90.7
	mg/kg	0.97	100.0%	1	0	0.25 J	0.2 J	0.24 J	0.22 J	0.48 J	0.22 J	0.23 J	0.33 J
	mg/kg	0.56	2.9%	1	0	0.56 J	0.68 U	0.47 U	0.53 U	0.51 U	0.44 U	0.5 U	0.55 U
	mg/kg	293000	100.0%	120725	11	293000	284000	271000	285000	48100	44200	213000	222000
	mg/kg	32.4	100.0%	24	4	3.8	3.9	3.9	3.5	17.6	8.9	31.1	10.6
	mg/kg	17.5	100.0%	30	0	2.7 J	3.6 J	2.8 J	3.1 J	9.7	4.6 J	5.7 J	6.6 J
	mg/kg	259	100.0%	25	4	12.8	11.8	10.5	11.6	19.3	16.5	259	19
	mg/kg	70200	100.0%	28986	9	3510	5970	3270	3880	22100	11900	70200	13500
	mg/kg	522	100.0%	30	3	6.8	3.4	3.2	3.7	20.8	8.7	522	58.5
	mg/kg	120000	100.0%	12308	8	7980	8180	7810	9370	7180	15500	12800	18200
	mg/kg	1740	45.7%	759	2	213	212	198	241	398	264	536	365
	mg/kg	0.87	65.7%	0.1	6	0.02 U	0.87	0.04 U	0.38	0.02 J	0.55	0.02 U	0.53
	mg/kg	46.2	77.1%	37	2	12.2 R	13.4 R	56 R	14.1 R	30.3 R	14.8 R	20.1 R	19.4 R
	mg/kg	2090	100.0%	1548	10	1030	649 J	1170	1010	1400	1050	1050	2070
	mg/kg	0.82	71.4%	2	0	0.23 U	0.24 J	0.23 U	0.35 J	0.19 U	0.21 U	0.19 U	0.14 U
	mg/kg	247	100.0%	114	16	224 J	236 J	218 J	238 J	125 J	104 J	212 J	241 J
	mg/kg	31.1	100.0%	150	0	12.2	8.5 J	10.5	9.2	17.3	12.4	11	14.8
	mg/kg	201	77.1%	90	7	96.9 R	35.5 R	105 R	31.3 R	75.9 R	51.5 R	164 R	278 R
	mg/kg	0.56	5.7%	NA	NA	0.54 U	0.56 U	0.56	0.56 U	0.52 U	0.61 U	0.5 U	0.51 U
n	mg/kg	2.2	100.0%	NA	NA	0.85	0.22	0.05	0.12	0.07	0.14	0.04	0.44
	%W/W	97.6				89.6	88.6	88.6	88.4	92.5	96.4	97.6	94.7
carbons	mg/kg	21000	100.0%	NA	NA	76	71	21000	17900	880	117	97	330

tables\SD26SOLF.WK3

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-8 202254	SOIL SEAD-26 0-2 11/17/93 SB26-1.1 204829	SOIL SEAD-26 2-4 11/17/93 SB26-1.2 204830	SOIL SEAD-26 0-2 11/18/93 SB26-2.1 205095	SOIL SEAD-26 0-2 11/18/93 SB26-2.5 205096 SB26-2.1DUP	SOIL SEAD-26 8-10 11/18/93 SB26-2.6 205097	SOIL SEAD-26 10-12 11/18/93 SB26-2.7 205098
S												
	ug/kg	11	11.4%	100	0	12 U	11 U	11 U	11 U	10 U	12 U	12 U
	ug/kg	78	5.7%	200	0	11 U	11 U	11 U	25 U	10 U	13 U	12 U
	ug/kg	6	2.9%	300	0	11 U	11 U	11 U	11 U	10 U	12 U	12 U
	ug/kg	19	2.9%	300	0	11 U	11 U	11 U	11 U	10 U	12 U	12 U
	ug/kg	3	2.9%	1500	0	11 U	11 U	11 U	11 U	3 J	12 U	12 U
	ug/kg	0	0.0%	NA	NA	NA	ND	ND	10 U	10 U	10 U	10 U
	ug/kg	260	2.9%	500	0	54 U	55 UJ	57 UJ	55 U	53 U	63 U	59 U
	ug/kg	220	8.6%	1900	0	5.4 U	5.5 UJ	5.7 UJ	5.5 U	5.3 U	6.3 U	5.9 U
	ug/kg	9.1	8.7%	NA	NA	5.4 U	5.5 UJ	5.7 UJ	5.5 U	5.3 U	6.3 U	5.9 U
	ug/kg	29000	11.4%	NA	NA	5400 U	5500 UJ	5700 UJ	5500 U	5300 U	6300 U	5900 U
	ug/kg	7600	2.9%	NA	NA	5400 U	5500 UJ	5700 UJ	5500 U	5300 U	6300 U	5900 U
	ug/kg	120	23.1%	NA	NA	130 UJ						
	ug/kg	420	23.1%	NA	NA	130 UJ						
ANICS												
	ug/kg	24	2.9%	13000	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	590	8.6%	36400	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	820	11.4%	41000	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	240	5.7%	6200	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	600	14.3%	50000 *	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	7300	42.9%	50000 *	0	140 J	24 J	380 U	31 J	22 J	410 U	390 U
	ug/kg	1400	20.0%	50000 *	0	24 J	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	1100	11.4%	50000 *	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	6200	2.9%	8100	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	45000	60.0%	50000 *	0	310 J	69 J	380 U	52 J	30 J	410 U	390 U
	ug/kg	8500	71.4%	50000 *	0	250 J	56 J	380 U	44 J	48 J	410 U	390 U
	ug/kg	210	2.9%	50000 *	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	4500	48.6%	220	4	130 J	31 J	380 U	360 U	350 U	410 U	390 U
	ug/kg	4400	54.3%	400	3	150 J	42 J	380 U	360 U	27 J	410 U	390 U
halate	ug/kg	930	17.1%	50000 *	0	53 J	360 U	380 U	700	660	410 U	500 U
	ug/kg	4800	48.6%	1100	2	130 J	36 J	380 U	360 U	350 U	410 U	390 U
	ug/kg	3500	48.6%	1100	2	130 J	36 J	380 U	360 U	350 U	410 U	390 U
	ug/kg	3900	51.4%	61	8	130 J	34 J	380 U	360 U	350 U	410 U	390 U
ene	ug/kg	2600	31.4%	3200	0	66 J	360 U	380 U	360 U	350 U	410 U	390 U
e	ug/kg	1100	11.4%	14	4	30 J	360 U	380 U	360 U	350 U	410 U	390 U
	ug/kg	910	31.4%	50000 *	0	100 J	360 U	380 U	360 U	350 U	410 U	390 U

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-8 202254	SOIL SEAD-26 0-2 11/17/93 SB26-1.1 204829	SOIL SEAD-26 2-4 11/17/93 SB26-1.2 204830	SOIL SEAD-26 0-2 11/18/93 SB26-2.1 205095	SOIL SEAD-26 0-2 11/18/93 SB26-2.5 205096 SB26-2.1DUP	SOIL SEAD-26 8-10 11/18/93 SB26-2.6 205097	SOIL SEAD-26 10-12 11/18/93 SB26-2.7 205098
	ug/kg	1.4	2.9%	200	0	1.8 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	2 U
	ug/kg	5.3	2.9%	900	0	1.8 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	2 U
	ug/kg	4.2	2.9%	44	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
	ug/kg	17	22.9%	2100	0	3.5 U	3 J	3.8 U	2.7 J	3.2 J	4.1 U	3.9 U
	ug/kg	60	5.7%	900	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
	ug/kg	22	2.9%	2900	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
	ug/kg	23	5.7%	1000	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
	ug/kg	3.5	5.7%	2100	0	3.5 U	3.5 J	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
	ug/kg	21	2.9%	10000	0	18 U	19 U	20 U	19 U	18 U	21 U	20 U
	ug/kg	23	5.7%	NA	NA	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
	ug/kg	7.8	5.7%	540	0	1.8 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	2 U
	mg/kg	21000	100.0%	15523	5	9400	5560	9040	5230	7900	21000	14200
	mg/kg	13	100.0%	7.5	15	7.5	3.2	5.3	6.5 J	5.3 J	8.8 J	7.6 J
	mg/kg	119	100.0%	300	0	36.1	73.2	43.7	21.1 J	102 J	83.6	90.8
	mg/kg	0.97	100.0%	1	0	0.47 J	0.35 J	0.41 J	0.32 J	0.46 J	0.97 J	0.67 J
	mg/kg	0.56	2.9%	1	0	0.46 U	0.46 U	0.42 U	0.57 U	0.55 U	0.72 U	0.72 U
	mg/kg	293000	100.0%	120725	11	157000	293000	47300	238000	189000	2090	17800
	mg/kg	32.4	100.0%	24	4	15.2	10.3	15.7	8.8	13.9	32.4	21.9
	mg/kg	17.5	100.0%	30	0	8.4	5.9 J	9.5	5.6 J	10.1	17.5	11
	mg/kg	259	100.0%	25	4	22.5	9.7	14.3	10.6	14.3	24.4	24
	mg/kg	70200	100.0%	28986	9	17200	8770	19100	11400	15500	44100	33700
	mg/kg	522	100.0%	30	3	16.1	6.33	8.5	10.3	15.5	10.3	27
	mg/kg	120000	100.0%	12308	8	8460	29100	9160	7790	18100	7210	4700
	mg/kg	1740	45.7%	759	2	297	309	551	442 R	433 R	279 R	712 R
	mg/kg	0.87	65.7%	0.1	6	0.09	0.02 U	0.02 U	0.03 UJ	0.03 UJ	0.05 J	0.03 UJ
	mg/kg	46.2	77.1%	37	2	31.6 R	18.3	23.9	17.5	29.2	46.2	32.4
	mg/kg	2090	100.0%	1548	10	1970	1710	901	882	1710	1490	1960
	mg/kg	0.82	71.4%	2	0	0.15 J	0.13 UJ	0.26 J	0.14 UJ	0.14 UJ	0.32 J	0.16 UJ
	mg/kg	247	100.0%	114	16	183 J	192 J	108 J	163 J	175 J	67.1 J	220 J
	mg/kg	31.1	100.0%	150	0	17.4	12.7	14.4	10.9	15.9	28	27.4
	mg/kg	201	77.1%	90	7	283 R	56	90.6	29.5	54.8	69.3	201
	mg/kg	0.56	5.7%	NA	NA	0.54 U	0.48 U	0.57 U	0.53 U	0.5 U	0.6 U	0.48 U
en	mg/kg	2.2	100.0%	NA	NA	0.09	0.43	0.48	0.05	0.1	0.26	2.2
	%W/W	97.6				92.8	91.2	87.1	91.1	93.6	80.5	84.9
ocarbons	mg/kg	21000	100.0%	NA	NA	260	43	38	42	57	74	52

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-2 11/18/93 SB26-3.1 205099	SOIL SEAD-26 6-8 11/18/93 SB26-3.4 205100	SOIL SEAD-26 10-12 11/18/93 SB26-3.6 205101	SOIL SEAD-26 0-2 11/19/93 SB26-4.1 205102	SOIL SEAD-26 2-4 11/19/93 SB26-4.2 205103	SOIL SEAD-26 6-8 11/19/93 SB26-4.4 205104	SOIL SEAD-26 0-0.7 11/18/93 TP26-1.1 205105	SOIL SEAD-26 5.0+ 11/18/93 TP26-1.2 205106	SOIL SEAD-26 0-0.7 11/18/93 TP26-21 205113
ND														
	ug/kg	11	11.4%	100	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U
	ug/kg	78	5.7%	200	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U
	ug/kg	6	2.9%	300	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U
	ug/kg	19	2.9%	300	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U
	ug/kg	3	2.9%	1500	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U
	ug/kg	0	0.0%	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	ug/kg	260	2.9%	500	0	58 U	61 U	58 U	57 U	56 U	58 U	57 U	57 U	54 U
	ug/kg	220	8.6%	1900	0	5.8 U	6.1 U	5.8 U	5.7 U	5.6 U	5.8 U	5.7 U	5.7 U	5.4 U
	ug/kg	9.1	8.7%	NA	NA	5.8 U	6.1 U	5.8 U	5.7 U	5.8	5.8 U	9.1	5.7 U	5.4 U
	ug/kg	29000	11.4%	NA	NA	5800 U	6100 U	5800 U	5700 U	29000	5800	8100	5700 U	5400 U
	ug/kg	7600	2.9%	NA	NA	5800 U	6100 U	5800 U	5700 U	5600 U	5800 U	5700 U	5700 U	5400 U
	ug/kg	120	23.1%	NA	NA									
	ug/kg	420	23.1%	NA	NA									
NICS														
	ug/kg	24	2.9%	13000	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	590	8.6%	36400	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	820	11.4%	41000	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	240	5.7%	6200	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	600	14.3%	50000 *	0	380 U	22 J	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	7300	42.9%	50000 *	0	380 U	190 J	380 UJ	370 U	370 U	64 J	2500 U	370 U	2400 U
	ug/kg	1400	20.0%	50000 *	0	380 U	45 J	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	1100	11.4%	50000 *	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	6200	2.9%	8100	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	45000	60.0%	50000 *	0	380 U	170 J	380 UJ	24 J	370 U	71 J	2500 U	370 U	300 J
	ug/kg	8500	71.4%	50000 *	0	380 U	130 J	380 UJ	30 J	370 U	64 J	2500 U	370 U	250 J
	ug/kg	210	2.9%	50000 *	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	4500	48.6%	220	4	380 U	65 J	380 UJ	370 U	370 U	28 J	2500 U	370 U	160 J
	ug/kg	4400	54.3%	400	3	380 U	69 J	380 UJ	370 U	370 U	46 J	2500 U	370 U	180 J
alate	ug/kg	930	17.1%	50000 *	0	380 U	400 U	230 J	930	820	380 U	2500 U	370 U	2400 U
	ug/kg	4800	48.6%	1100	2	380 U	42 J	380 UJ	370 U	370 U	33 J	2500 U	370 U	130 J
	ug/kg	3500	48.6%	1100	2	380 U	51 J	380 UJ	370 U	370 U	41 J	2500 U	370 U	190 J
	ug/kg	3900	51.4%	61	6	380 U	55 J	380 UJ	370 U	370 U	40 J	2500 U	370 U	200 J
ne	ug/kg	2600	31.4%	3200	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
e	ug/kg	1100	11.4%	14	4	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U
	ug/kg	910	31.4%	50000 *	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U

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TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-28 0-2 11/18/93 SB26-3.1 205099	SOIL SEAD-26 6-8 11/18/93 SB28-3.4 205100	SOIL SEAD-26 10-12 11/18/93 SB26-3.6 205101	SOIL SEAD-26 0-2 11/19/93 SB26-4.1 205102	SOIL SEAD-26 2-4 11/19/93 SB26-4.2 205103	SOIL SEAD-26 6-8 11/19/93 SB26-4.4 205104	SOIL SEAD-26 0-0.7 11/18/93 TP26-1.1 205105	SOIL SEAD-26 5.0+ 11/18/93 TP26-1.2 205106	SOIL SEAD-26 0-0.7 11/18/93 TP26-2.1 205113
	ug/kg	1.4	2.9%	200	0	2 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U	1.8 U
	ug/kg	5.3	2.9%	900	0	2 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U	1.8 U
	ug/kg	4.2	2.9%	44	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U
	ug/kg	17	22.9%	2100	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	6.4	3.7 U	3.6 U
	ug/kg	60	5.7%	900	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U
	ug/kg	22	2.9%	2900	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U
	ug/kg	23	5.7%	1000	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U
	ug/kg	3.5	5.7%	2100	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U
	ug/kg	21	2.9%	10000	0	20 U	21 U	20 U	19 U	19 U	20 U	19 U	19 U	18 U
	ug/kg	23	5.7%	NA	NA	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U
	ug/kg	7.8	5.7%	540	0	2 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U	1.8 U
	mg/kg	21000	100.0%	15523	5	13700	14400	12900	14300	13800	15300	13100	10000	10000
	mg/kg	13	100.0%	7.5	15	8.3 J	8.4 J	6.7 J	13 J	10.3 J	10.2 J	6.8 J	5.9 J	10 J
	mg/kg	119	100.0%	300	0	77.1	93.2	57.5	87.3	62.4	74.3	105	67.3	38.2
	mg/kg	0.97	100.0%	1	0	0.69 J	0.66 J	0.61 J	0.67 J	0.61 J	0.73 J	0.62 J	0.47 J	0.48 J
	mg/kg	0.56	2.9%	1	0	0.65 U	0.78 U	0.41 U	0.57 U	0.58 U	0.71 U	0.5 U	0.66 U	0.57 U
	mg/kg	293000	100.0%	120725	11	25600	20100	2820	28000	17500	14500	18500	65400	9330
	mg/kg	32.4	100.0%	24	4	20.7	20.9	21.4	22.7	22.2	23.5	20.2	15.2	16.5
	mg/kg	17.5	100.0%	30	0	10.8	7.9 J	11.8	15.8	12	14.8	12.5	8.7 J	10
	mg/kg	259	100.0%	25	4	20.6	18.3	23.2	28.6	18.9	24.1	18	23.5	13.9
	mg/kg	70200	100.0%	28986	9	28400	25900	29600	31700	29000	33200	28300	20400	22200
	mg/kg	522	100.0%	30	3	20.7	14.9	10.5	14.6	11.7	13.1	13.6	11.9	6.5
	mg/kg	120000	100.0%	12308	8	8760	4810	5290	6910	6330	6290	5340	15300	4720
	mg/kg	1740	45.7%	759	2	466 R	561 R	486 R	696 R	541 R	668 R	814 R	433 R	461 R
	mg/kg	0.87	65.7%	0.1	6	0.03 J	0.03 J	0.03 J	0.04 J	0.04 J	0.03 J	0.04 UJ	0.03 UJ	0.01 UJ
	mg/kg	46.2	77.1%	37	2	29.7	29.1	34.7	35.2	32.8	38.5	31.1	28.7	25.5
	mg/kg	2090	100.0%	1548	10	1140	1130 J	1110	1370	1140	1390	950	1180	573 J
	mg/kg	0.82	71.4%	2	0	0.48 J	0.79 J	0.18 UJ	0.37 J	0.58 J	0.28 J	0.25 J	0.57 J	0.31 J
	mg/kg	247	100.0%	114	16	71.6 J	60.9 J	56.8 J	119 J	87.6 J	78 J	60.9 J	110 J	56.7 J
	mg/kg	31.1	100.0%	150	0	22.2	21.8	19.5	20.1	18.6	22.2	18.5	16.3	12.8
	mg/kg	201	77.1%	90	7	84.9	78.2	72.5	84.9	72.4	115	80.7	60.1	59.6
	mg/kg	0.56	5.7%	NA	NA	0.57 U	0.59 U	0.56 U	0.53 U	0.54 U	0.52 U	0.54 U	0.49 U	0.49 U
n	mg/kg	2.2	100.0%	NA	NA	0.14	1.06	0.07	0.75	0.37	1.55	0.32	0.72	0.03
	%W/W	97.6				85.7	82	86.1	88.3	89	85.6	87.7	88.3	91.8
ocarbons	mg/kg	21000	100.0%	NA	NA	69	71	74	90	65	66	87	71	72

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-1 11/17/93 TP26-3.1 204832	SOIL SEAD-26 6.5-7.2 11/17/93 TP26-3.2 204833	SOIL SEAD-26 SURFACE 11/17/93 TP26-4.1 204834	SOIL SEAD-26 FILL 11/17/93 TP26-4.2 204835	SOIL SEAD-26 SURFACE 11/17/93 TP26-5.1 204836
S										
	ug/kg	11	11.4%	100	0	12 U	12 U	12 U	12 U	12 U
	ug/kg	78	5.7%	200	0	12 U	12 U	12 U	12 U	12 U
	ug/kg	6	2.9%	300	0	12 U	12 U	12 U	12 U	12 U
	ug/kg	19	2.9%	300	0	12 U	12 U	12 U	12 U	12 U
	ug/kg	3	2.9%	1500	0	12 U	12 U	12 U	12 U	12 U
	ug/kg	0	0.0%	NA	NA	NA	NA	NA	NA	NA
	ug/kg	260	2.9%	500	0	61 UJ	61 UJ	58 UJ	55 UJ	60 UJ
	ug/kg	220	8.6%	1900	0	6.1 UJ	6.1 UJ	5.8 UJ	5.5 UJ	6 UJ
	ug/kg	9.1	8.7%	NA	NA					
	ug/kg	29000	11.4%	NA	NA	6100 UJ	6100 UJ	5800 UJ	5500 UJ	6000 UJ
	ug/kg	7600	2.9%	NA	NA	6100 UJ	6100 UJ	5800 UJ	5500 UJ	6000 UJ
	ug/kg	120	23.1%	NA	NA	130 U	130 U	130 U	130 U	130 U
	ug/kg	420	23.1%	NA	NA	130 U	130 U	130 U	130 U	130 U
ANICS										
	ug/kg	24	2.9%	13000	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	590	8.6%	36400	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	820	11.4%	41000	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	240	5.7%	6200	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	600	14.3%	50000 *	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	7300	42.9%	50000 *	0	400 U	31 J	31 J	22 J	68 J
	ug/kg	1400	20.0%	50000 *	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	1100	11.4%	50000 *	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	6200	2.9%	8100	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	45000	60.0%	50000 *	0	30 J	79 J	71 J	45 J	150 J
	ug/kg	8500	71.4%	50000 *	0	29 J	64 J	66 J	43 J	110 J
	ug/kg	210	2.9%	50000 *	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	4500	48.6%	220	4	400 U	37 J	33 J	22 J	52 J
	ug/kg	4400	54.3%	400	3	400 U	43 J	38 J	25 J	60 J
alate	ug/kg	930	17.1%	50000 *	0	400 U	400 U	380 U	370 U	390 U
	ug/kg	4800	48.6%	1100	2	400 U	29 J	33 J	21 J	55 J
	ug/kg	3500	48.6%	1100	2	400 U	39 J	35 J	24 J	45 J
	ug/kg	3900	51.4%	61	8	400 U	38 J	31 J	20 J	52 J
ne	ug/kg	2600	31.4%	3200	0	400 U	24 J	23 J	370 U	34 J
e	ug/kg	1100	11.4%	14	4	400 U	400 U	380 U	370 U	390 U
	ug/kg	910	31.4%	50000 *	0	400 U	21 J	23 J	370 U	34 J

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-1 11/17/93 TP26-3.1 204832	SOIL SEAD-26 6.5-7.2 11/17/93 TP26-3.2 204833	SOIL SEAD-26 SURFACE 11/17/93 TP26-4.1 204834	SOIL SEAD-26 FILL 11/17/93 TP26-4.2 204835	SOIL SEAD-26 SURFACE 11/17/93 TP26-5.1 204836
	ug/kg	1.4	2.9%	200	0	2.1 U	2.1 U	2 U	1.9 U	2 U
	ug/kg	5.3	2.9%	900	0	2.1 U	2.1 U	2 U	1.9 U	2 U
	ug/kg	4.2	2.9%	44	0	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	17	22.9%	2100	0	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	60	5.7%	900	0	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	22	2.9%	2900	0	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	23	5.7%	1000	0	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	3.5	5.7%	2100	0	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	21	2.9%	10000	0	21 U	21 U	20 U	19 U	20 U
	ug/kg	23	5.7%	NA	NA	4 U	4 U	3.8 U	3.7 U	3.9 U
	ug/kg	7.8	5.7%	540	0	2.1 U	2.1 U	2 U	1.9 U	2 U
	mg/kg	21000	100.0%	15523	5	4680	15600	11000	11200	15000
	mg/kg	13	100.0%	7.5	15	5.8	5.6	9	7.7	5.6
	mg/kg	119	100.0%	300	0	48.5	94.8	58.1	70.2	94
	mg/kg	0.97	100.0%	1	0	0.28 J	0.76 J	0.49 J	0.5 J	0.73 J
	mg/kg	0.56	2.9%	1	0	0.4 U	0.59 U	0.44 U	0.43 U	0.77 U
	mg/kg	293000	100.0%	120725	11	227000	7500	14100	16300	5330
	mg/kg	32.4	100.0%	24	4	6.9	22.1	17.8	18.4	23.4
	mg/kg	17.5	100.0%	30	0	3 J	10.8	9.9	12	13.3
	mg/kg	259	100.0%	25	4	8.6	18.6	12.4	13.5	23
	mg/kg	70200	100.0%	28986	9	12000	23800	23200	23200	28500
	mg/kg	522	100.0%	30	3	17.4	18.4	10.3	13.8	19.5
	mg/kg	120000	100.0%	12308	8	120000	4480	5020	5130	5250
	mg/kg	1740	45.7%	759	2	1740	657	421	535	694
	mg/kg	0.87	65.7%	0.1	6	0.18	0.02 U	0.03 U	0.03 J	0.06
	mg/kg	46.2	77.1%	37	2	7.6	27.3	26.7	27.3	34.9
	mg/kg	2090	100.0%	1548	10	667	1850	1090	1220	1740
	mg/kg	0.82	71.4%	2	0	0.57 J	0.39 J	0.37 J	0.31 J	0.32 J
	mg/kg	247	100.0%	114	16	247 J	58.9 J	56.4 J	74.8 J	46.8 J
	mg/kg	31.1	100.0%	150	0	17.1	26.8	16	16.8	24.9
	mg/kg	201	77.1%	90	7	130	76	80.7	69.2	91.5
	mg/kg	0.56	5.7%	NA	NA	0.59 U	0.53 U	0.58 U	0.46 U	0.54 U
n	mg/kg	2.2	100.0%	NA	NA	1.8	2.1	0.08	0.03	0.55
	%W/W	97.6				81.5	81.8	85.6	90.3	83.6
ocarbons	mg/kg	21000	100.0%	NA	NA	49	80	68	76	42

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TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 FILL 11/17/93 TP26-5.2 204837	SOIL SEAD-26 0-0.7 11/18/93 TP26-6.1 205107	SOIL SEAD-26 5.0+ 11/18/93 TP26-6.2 205108	SOIL SEAD-26 0-0.7 11/18/93 TP26-7.1 205109	SOIL SEAD-26 5.0+ 11/18/93 TP26-7.2 205110	SOIL SEAD-26 0-0.7 11/19/93 TP26-8.1 205115	SOIL SEAD-26 5.0+ 11/19/93 TP26-8.2 205116
S												
	ug/kg	11	11.4%	100	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
	ug/kg	78	5.7%	200	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
	ug/kg	6	2.9%	300	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
	ug/kg	19	2.9%	300	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
	ug/kg	3	2.9%	1500	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
	ug/kg	0	0.0%	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
	ug/kg	260	2.9%	500	0	59 UJ	56 U	63 U	56 U	61 U	56 U	61 U
	ug/kg	220	8.6%	1900	0	5.9 UJ	5.6 U	6.3 U	5.6 U	6.1 U	5.6 U	6.1 U
	ug/kg	9.1	8.7%	NA	NA							
	ug/kg	29000	11.4%	NA	NA	5900 UJ	5600 U	6300 U	5800	6100 U	5600 U	6100 U
	ug/kg	7600	2.9%	NA	NA	5900 UJ	5600 U	6300 U	7600	6100 U	5600 U	6100 U
	ug/kg	120	23.1%	NA	NA	130 U						
	ug/kg	420	23.1%	NA	NA	130 U						
ANICS												
	ug/kg	24	2.9%	13000	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
e	ug/kg	590	8.6%	36400	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
	ug/kg	820	11.4%	41000	0	390 U	370 U	420 U	42 J	410 U	820 J	400 U
	ug/kg	240	5.7%	6200	0	390 U	370 U	420 U	370 U	410 U	240 J	400 U
	ug/kg	600	14.3%	50000 *	0	390 U	370 U	420 U	25 J	410 U	600 J	400 U
	ug/kg	7300	42.9%	50000 *	0	390 U	95 J	420 U	370 J	410 U	7300	400 U
	ug/kg	1400	20.0%	50000 *	0	390 U	370 U	420 U	61 J	410 U	1400 J	400 U
	ug/kg	1100	11.4%	50000 *	0	390 U	370 U	420 U	40 J	410 U	1100 J	400 U
	ug/kg	6200	2.9%	8100	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
	ug/kg	45000	60.0%	50000 *	0	390 U	250 J	62 J	770	410 U	13000	23 J
	ug/kg	8500	71.4%	50000 *	0	390 U	220 J	61 J	610	410 U	8500	38 J
	ug/kg	210	2.9%	50000 *	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
	ug/kg	4500	48.6%	220	4	390 U	100 J	34 J	280 J	410 U	4500	400 U
	ug/kg	4400	54.3%	400	3	390 U	120 J	37 J	320 J	410 U	4400	400 U
halate	ug/kg	930	17.1%	50000 *	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
e	ug/kg	4800	48.6%	1100	2	390 U	94 J	28 J	300 J	410 U	4800	400 U
	ug/kg	3500	48.6%	1100	2	390 U	120 J	34 J	270 J	410 U	3500	400 U
	ug/kg	3900	51.4%	61	8	390 U	110 J	38 J	270 J	410 U	3900	62 J
ene	ug/kg	2600	31.4%	3200	0	390 U	65 J	420 U	190 J	410 U	2600	400 U
e	ug/kg	1100	11.4%	14	4	390 U	370 U	420 U	370 U	410 U	1100 J	400 U
	ug/kg	910	31.4%	50000 *	0	390 U	56 J	420 U	160 J	410 U	910 J	77 J

TABLE 4.6-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 FILL 11/17/93 TP26-5.2 204837	SOIL SEAD-26 0-0.7 11/18/93 TP26-6.1 205107	SOIL SEAD-26 5.0+ 11/18/93 TP26-6.2 205108	SOIL SEAD-26 0-0.7 11/18/93 TP26-7.1 205109	SOIL SEAD-26 5.0+ 11/18/93 TP26-7.2 205110	SOIL SEAD-26 0-0.7 11/19/93 TP26-8.1 205115	SOIL SEAD-26 5.0+ 11/19/93 TP26-8.2 205116
	ug/kg	1.4	2.9%	200	0	2 U	1.9 U	2.1 U	1.9 U	2.1 U	1.9 U	2.1 U
	ug/kg	5.3	2.9%	900	0	2 U	1.9 U	2.1 U	1.9 U	2.1 U	1.9 U	2.1 U
	ug/kg	4.2	2.9%	44	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	17	22.9%	2100	0	3.9 U	2.8 J	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	60	5.7%	900	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	22	2.9%	2900	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	23	5.7%	1000	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	3.5	5.7%	2100	0	3.9 U	1.6 J	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	21	2.9%	10000	0	20 U	19 U	21 U	19 U	21 U	19 U	21 U
	ug/kg	23	5.7%	NA	NA	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
	ug/kg	7.8	5.7%	540	0	2 U	1.9 U	2.1 U	1.9 U	2.1 U	1.9 U	2.1 U
	mg/kg	21000	100.0%	15523	5	15700	8060	15900	8550	10000	13700	20500
	mg/kg	13	100.0%	7.5	15	6.7	6.6 J	9 J	8.1 J	7.6 J	6.4 J	5.4 J
	mg/kg	119	100.0%	300	0	107	45.7	81.4	43.6	53	69.2	109
	mg/kg	0.97	100.0%	1	0	0.81 J	0.46 J	0.77 J	0.44 J	0.48 J	0.59 J	0.96 J
	mg/kg	0.56	2.9%	1	0	0.55 U	0.63 U	0.63 U	0.68 U	0.78 U	0.44 U	0.78 U
	mg/kg	293000	100.0%	120725	11	9500	116000	6100	40600	79300	42100	4090
	mg/kg	32.4	100.0%	24	4	24.2	12.1	25.1	13.2	14.3	21.7	26.3
	mg/kg	17.5	100.0%	30	0	13.2	7.9 J	14.3	7.1 J	7.1 J	11.1	12.5
	mg/kg	259	100.0%	25	4	27.3	14.5	29.1	17.1	13.1	21.3	21.8
	mg/kg	70200	100.0%	28986	9	32500	17200	38100	18200	18600	27500	26900
	mg/kg	522	100.0%	30	3	23.8	15	13.5	12	16.2	13.1	18
	mg/kg	120000	100.0%	12308	8	5850	9180	6250	4760	26900	8260	4760
	mg/kg	1740	45.7%	759	2	821	487 R	507 R	596 R	573 R	594 R	1260 R
	mg/kg	0.87	65.7%	0.1	6	0.04 J	0.02 J	0.03 J	0.04 J	0.05 J	0.04 J	0.07 J
	mg/kg	46.2	77.1%	37	2	34.2	23	40.6	19.8	20.3	35.4	32.1
	mg/kg	2090	100.0%	1548	10	1330	1050	1570	721 J	964 J	1290	2090
	mg/kg	0.82	71.4%	2	0	0.44 J	0.82 J	0.29 J	0.41 J	0.33 J	0.57 J	0.59 J
	mg/kg	247	100.0%	114	16	55.2 J	101 J	52.6 J	90.7 J	117 J	117 J	64.2 J
	mg/kg	31.1	100.0%	150	0	28.1	13.1	25.4	12.3	15.4	19.6	31.1
	mg/kg	201	77.1%	90	7	96.9	70.3	88.1	50.9	62.7	78	88.2
	mg/kg	0.56	5.7%	NA	NA	0.58 U	0.53 U	0.54 U	0.54 U	0.52 U	0.54 U	0.55 U
n	mg/kg	2.2	100.0%	NA	NA	0.17	0.55	0.53	1.08	0.43	0.12	0.52
	%W/W	97.6				84.9	90.1	78.9	88.4	80.9	88.6	82.3
ocarbons	mg/kg	21000	100.0%	NA	NA	42	86	550	63	72	137	113

Notes:
a) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; Individual semi-VOCs < 50ppm.
b) NA = Not Available
c) U = Compound was not detected.
d) J = the reported value is an estimated concentration.
e) R = the data was rejected in the data validating process.
f) UJ = the compound was not detected; the associated reporting limit is approximate.

\tables\SD26SOLF.WK3

4.6.2.2 Semivolatile Organic Compounds

Surface Soils

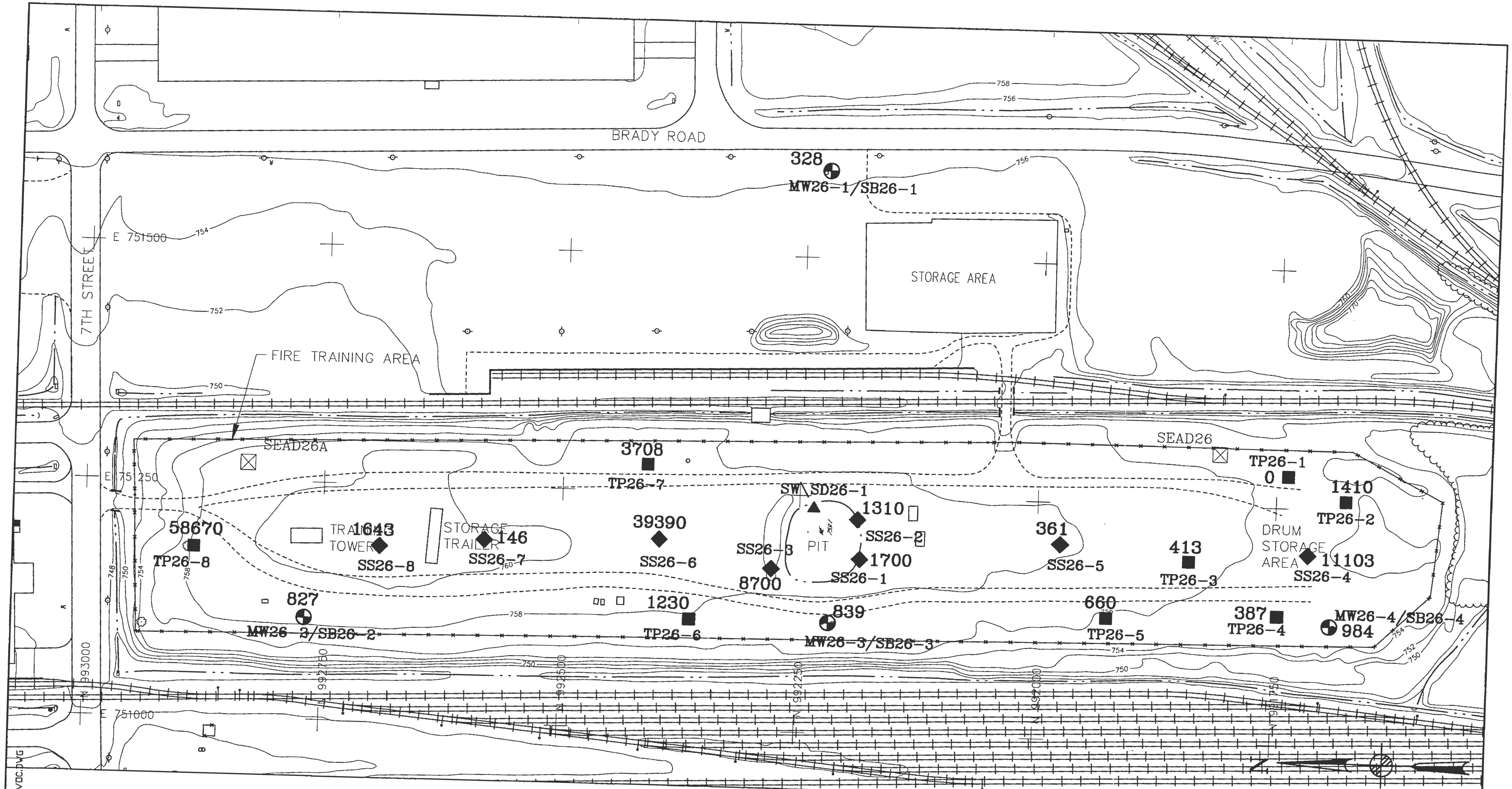
A total of 21 semivolatile organic compounds were found at varying concentrations in the surface soil samples collected at SEAD-26. Figure 4.6-1 shows the total SVO concentrations in the surface soil samples. The semivolatile organic compounds detected can be split into the two general classes: phthalates and PAHs. The phthalates were typically found at low concentrations, and were never found at concentrations exceeding the respective TAGM values. Various PAHs were found at concentrations exceeding the respective TAGM in 7 of the 20 surface soil samples analyzed.

The more noteworthy class of semivolatile organic compounds is the PAHs. PAHs are fuel components, and would be typical of the residues remaining after the burning of fuels. PAHs were far more prevalent than the phthalates, being found in up to 90% of the surface soil samples. There were several TAGM exceedances. The four surface soil samples SS26-4, SS26-6, TP26-7.1, and TP26-8.1, exceeded the 210 μg/kg TAGM for benzo(a)anthracene. Three of these four samples, SS26-4, SS26-6, and TP26-8.1 had concentrations exceeding the 400 μg/kg TAGM for chrysene and the 14 μg/kg TAGM for dibenz(a,h)anthracene. Samples SS26-6 and TP26-8.1 also exceeded the TAGM concentrations for benzo(b)fluoranthene and benzo(k)fluoranthene. The TAGM for benzo(a)pyrene, 61 μg/kg, was exceeded in the four samples described above, and three additional samples, including SS26-8, TP26-2.1, and TP26-6.1, though the highest concentrations were found in samples SS26-6 and TP26-8.1.

The sampling results indicate at least two areas of relatively high concentrations, though relatively low concentrations are present throughout the site. The first area is in the southern end of the site. Sample SS26-4 was collected in this area. The other area is the far north end of the site, where sample TP26-8.1 was collected. By contrast, samples collected in the center of the site, near the pit (SS26-1, SS26-2, and SS26-3) had little or no PAH contamination.

Subsurface Soils

The only subsurface samples to exceed a TAGM were TP26-2.2 and TP26-8.2, though the concentration of benzo(a)pyrene in sample TP26-8.2 (62 μg/kg) just barely exceeded the TAGM (61 μg/kg). Benza(a)pyrene (86J μg/kg) and dibenz(a,h)anthracene (29J μg/kg) were



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR

SURVEY MONUMENT
ROAD SIGN
DECIDUOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL

MONITORING WELL
SOIL BORING
SEDIMENT SAMPLE
827 SURFACE SOIL AND TOTAL SVOCs IN SURFACE SOILS (ug/kg)
SURFACE WATER/SEDIMENT SAMPLE
1230 TEST PIT AND TOTAL SVOCs IN SURFACE SOILS (ug/kg)

50 0 50 100 (feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg No. 720477-02000

FIGURE 4.6-1

SEAD-26 FIRE TRAINING PIT AND AREA TOTAL SVOCs IN SURFACE SOILS (ug/kg)

SCALE 1" = 100' | DATE MAY 1995 | REV C

the only PAH compounds to exceed TAGM values in sample TP26-8.2. In general, few PAHs were found in samples collected at depth. The exceptions were samples SB26-3.4, collected near the center pit at a depth of 6 to 8 feet, SB26-4.4, collected at the southern end of the site at a depth of 6 to 8 feet, TP26-2.2, collected at the southern end of the site at a depth of 5 to 6 feet, TP26-3.2, collected in the southern part of the site at a depth of 6.5 to 7.2 feet, and TP26-8.2, collected in the northern end of the site at a depth of 5 to 6 feet. The results of these samples support the theory of multiple areas of elevated concentrations.

4.6.2.3 Pesticides and PCBs

Surface Soils

Eleven pesticides were found in the surface soil samples collected at SEAD-26. The frequency of detection of these compounds ranged from 5% to 50%. All of the concentrations were very low, well below the respective TAGM values. Most of the pesticides were detected in the surface soil samples SS26-1, SS26-2, and SS26-3, which were collected in the center of the site adjacent to the fire training pit.

Subsurface Soils

No pesticides or PCBs were detected in the subsurface soil samples analyzed.

4.6.2.4 Herbicides

Surface Soils

Five herbicides were detected in the surface soil samples collected at the site. The frequencies of detection ranged from 5% to 15%. Most of the concentrations were very low, with the exception of MCPA, which was detected in sample TP26-2.1 at a concentration of 8100 μg/kg. This sample was collected in the southern end of the site. Elevated concentrations of MCPA (5800 μg/kg) and MCPP (7600 μg/kg) were present in sample TP26-7.1, which was collected in the north-central portion of the site. Most of the other herbicides were detected in the three surface soil samples, SS26-1, SS26-2, and SS26-3.

Subsurface Soils

Dicamba and MCPA were the only herbicides detected in the subsurface soils samples collected at SEAD-26. Dicamba was detected at a concentration of 5.8 μg/kg in subsurface sample SB26-4.2. MCPA was detected at concentrations of 5,800 and 29,000 μg/kg in samples SB26-4.4 and SB26-4.2, respectively. These samples were collected in the southern portion of the site. Herbicides were undetected in the 13 remaining subsurface soil samples.

4.6.2.5 Metals

Surface Soils

A variety of samples were found to contain various metals at concentrations that exceed the associated TAGM values. Of the 24 metals reported, 14 of these were found in one or more samples at concentrations above the TAGM values. Most of the exceedances were minor. These exceedances were for only a few samples, and the maximum concentrations were only slightly above the associated TAGM value.

The metals of note in the surface at this site are arsenic, copper, lead, magnesium, and manganese. Seven samples had arsenic concentrations in excess of the TAGM (7.5 mg/kg), though the maximum concentration of arsenic detected was 13 mg/kg. The highest concentrations were found in soil samples collected from the soil borings SB26-4 and SB26-6.

Copper concentrations exceeded the TAGM (25 mg/kg) in only two samples, with the maximum value detected of 259 mg/kg found in the surface soil in sample SS26-6. No other copper concentrations exceeded the 25 mg/kg TAGM value.

Lead concentrations exceeded the TAGM (30 mg/kg) in only two samples, but the concentrations were well above the TAGM. The surface soil samples SS26-6 (522 mg/kg) and SS26-7 (58.5 mg/kg) had lead concentrations reported well above the TAGM value.

Magnesium concentrations exceeded the TAGM (12,308 mg/kg) in 6 samples. As with copper, most of the exceedances were minor, with the exception of sample TP26-3.1, which had a magnesium concentration of 120,000 mg/kg.

Manganese concentrations exceeded the TAGM (759 mg/kg) in one sample. The most notable occurrence of manganese was 1740 mg/kg found in the surface soil sample TP26-3.1.

In general, while there were a number of metals which exceeded the TAGMs, there was no definite pattern to the exceedances, and there were no surface soil samples which consistently had the highest metals concentration.

Subsurface Soils

The occurrence and distribution of metals in the subsurface soil samples are similar to those observed in the surface soil samples. The metals of note in the subsurface soil samples are Arsenic and Zinc. Arsenic was detected in eight of the fifteen samples analyzed, however, the highest reported concentrations was only 10.3J mg/kg. The TAGM for arsenic in soils is 7.5 mg/kg. Zinc was found at elevated concentrations in five of the subsurface soil samples. The highest concentration reported was 201 mg/kg (in sample SB26-2.7). The TAGM for Zinc in soils is 90 mg/kg.

4.6.2.6 Nitroaromatics

Surface Soils

The two nitroaromatic compounds HMX and 2,4-dinitrotoluene, were detected in several of the surface soil samples collected at SEAD-26. All of the reported concentrations were low. These compounds were identified primarily in the three surface soil samples SS26-1, SS26-2, and SS26-3.

Subsurface Soils

Nitroaromatic compounds were undetected in the subsurface soil samples analyzed.

4.6.2.7 Indicator Compounds

Surface Soils

Soil samples at SEAD-26 were analyzed for nitrate/nitrite nitrogen and TPH. Both analytes were detected in all the samples. All the nitrate/nitrite nitrogen concentrations were very low, with a maximum detected concentration of 2.2 mg/kg in sample SS26-2.7. TPH concentrations were more variable. Most of the concentrations were in the 50- to 150- mg/kg range, but elevated concentrations were detected in samples SS26-3 (21,000 mg/kg), SS26-4 (880 mg/kg), and SS26-7 (330 mg/kg). Figure 4.6-2 shows the TPH concentrations in surface soils.

Subsurface Soils

Nitrate/nitrite nitrogen and TPH were detected in all of the subsurface soil samples analyzed. Nitrate/nitrite nitrogen was detected at concentrations ranging from 0.03 to 2.2 mg/kg. TPH was detected at concentrations below 100 mg/kg in all of the samples except TP26-6.2 (550 mg/kg), TP26-2.2 (230 mg/kg), and TP26-8.2 (113 mg/kg).

4.6.3 Groundwater

Four monitoring wells were installed as part of the SEAD-26 investigation. During the sampling event, monitoring well MW26-2 was found to be dry and therefore was not sampled. The summary chemical analyses are presented in Table 4.6-2. The locations of the wells were shown in Figure 2.8-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-26.

4.6.3.1 Volatile Organic Compounds

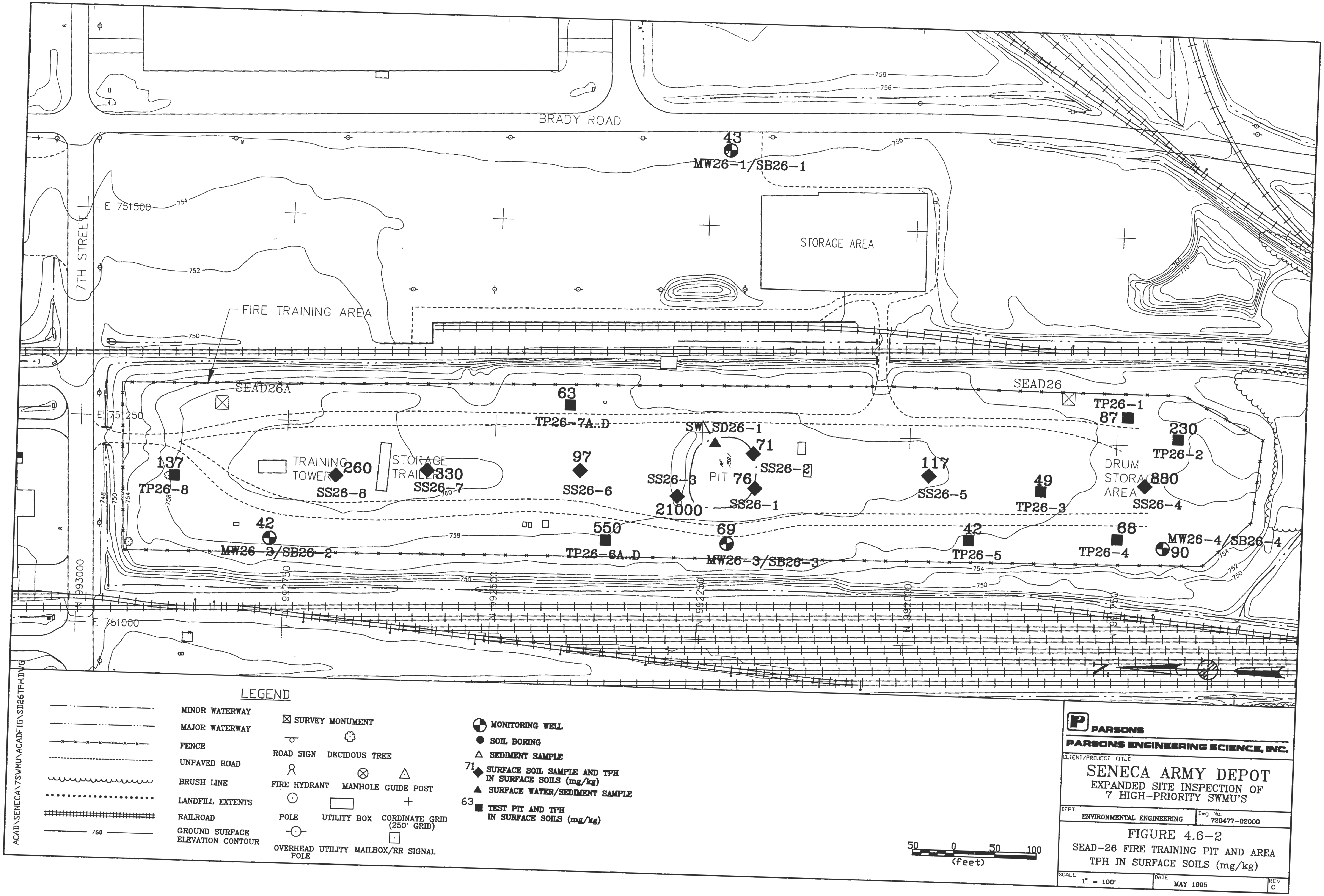
No volatile organic compounds were detected in any of the three monitoring wells sampled at SEAD-26.

4.6.3.2 Semivolatile Organic Compounds

The only semivolatile organic compound detected at SEAD-26 was diethylphthalate, which was detected at very low concentrations in the samples MW26-1 (0.6J μg/L) and MW26-4 (0.5J μg/L). The NYSDEC Class GA groundwater standard for diethylphthalate is 50 μg/L.

4.6.3.3 Pesticides and PCBs

No pesticides or PCBs were found in any of the 3 monitoring wells sampled at SEAD-26.



BRADY ROAD
7TH STREET
E 751500
E 751250
E 751000
N 993000
N 992750
N 992500
N 992250
N 992000
N 991750
STORAGE AREA
FIRE TRAINING AREA
SEAD26A
SEAD26
TRAINING TOWER
STORAGE TRAILER
PIT
DRUM STORAGE AREA
43
MW26-1/SB26-1
63
TP26-7A.D
SW\SD26-1
71
SS26-2
76
SS26-1
SS26-3
21000
137
TP26-8
260
SS26-8
330
SS26-7
97
SS26-6
117
SS26-5
49
TP26-3
TP26-1
87
230
TP26-2
880
SS26-4
42
MW26-2/SB26-2
550
TP26-6A.D
69
MW26-3/SB26-3
42
TP26-5
68
TP26-4
MW26-4/SB26-4
90
758
756
754
752
750
748
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
760
SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
MONITORING WELL
SOIL BORING
SEDIMENT SAMPLE
71 SURFACE SOIL SAMPLE AND TPH IN SURFACE SOILS (mg/kg)
SURFACE WATER/SEDIMENT SAMPLE
63 TEST PIT AND TPH IN SURFACE SOILS (mg/kg)
50 0 50 100
(feet)
ACAD\SENECA\7SWMU\ACADFIG\SD26TPH.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000
FIGURE 4.6-2
SEAD-26 FIRE TRAINING PIT AND AREA TPH IN SURFACE SOILS (mg/kg)
SCALE 1" = 100'
DATE MAY 1995
REV C

TABLE 4.6-2
GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	FREQUENCY OF DETECTION	MAXIMUM	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-26 01/21/94 MW26-1 209256,	WATER SEAD-26 01/22/94 MW26-3 209258 209945	WATER SEAD-26 01/22/94 MW26-4 209260
VOLATILE ORGANICS									
/lphthalate	ug/L	66.7%	0.6	50	NA	0	0.6 J	10 U	0.5 J
LS									
num	ug/L	100.0%	73300	NA	NA	NA	188 J	665	73300
ic	ug/L	66.7%	32.6	25	50	1	0.8 U	1.3 J	32.6
n	ug/L	100.0%	399	1000	2000	0	31.9 J	83.8 J	399
ium	ug/L	33.3%	3.4	3	4	1	0.4 U	0.4 U	3.4 J
um	ug/L	100.0%	199000	NA	NA	NA	115000	194000	199000
nium	ug/L	33.3%	122	50	100	1	2.6 U	2.6 U	122
lt	ug/L	66.7%	62.2	NA	NA	NA	4.4 U	4.4 J	62.2
er	ug/L	33.3%	92	200	1300(g)	0	3.1 U	3.1 U	92
	ug/L	100.0%	145000	300	NA	2	286	858	145000
	ug/L	66.7%	32.9	25	15(h)	1	0.5 U	0.61 J	32.9
esium	ug/L	100.0%	60900	35000	NA	2	16700	36500	60900
anese	ug/L	100.0%	4280	300	NA	3	529	4280	2770
ury	ug/L	66.7%	0.14	2	2	0	0.05 J	0.04 U	0.14 J
l	ug/L	66.7%	163	NA	100	1	4 U	4.7 J	163
sium	ug/L	100.0%	108000	NA	NA	NA	10200	4480 J	108000
ium	ug/L	66.7%	2	10	50	0	0.7 U	0.85 J	2 J
m	ug/L	100.0%	30300	20000	NA	1	30300	11600	14600
dium	ug/L	33.3%	110	NA	NA	NA	3.7 U	3.7 U	110
	ug/L	100.0%	355	300	NA	1	26.7	13.9 J	355
ER ANALYSES									
e/Nitrite-Nitrogen	mg/L	100.0%	3.6	10	10	0	1.18	0.04	3.6
Petroleum Hydrocarbons	mg/L	33.3%	0.41	NA	NA	NA	0.41 U	0.41	0.37 U
	standard units		7.63				7.63	6.8	6.95
fic Conductivity	umhos/cm		775				400	650	775
dity	NTU		5000				4.8	325	5000

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) The value listed is an Action Level for copper, and not an MCL Standard.
h) The value listed is an Action Level for lead at the tap, and not an MCL Standard.

SENECA\7SWMU\TABLES\SD26GWTF.WK3

4.6.3.4 Herbicides

No herbicides were found in any of the 3 monitoring wells sampled at SEAD-26.

4.6.3.5 Metals

The nine metals arsenic, beryllium, chromium, iron, lead, magnesium, manganese, sodium, and zinc were found in one or more of the groundwater samples analyzed at concentrations above the criteria value. Most of the exceedances occurred in only 1 sample, with the exceptions being iron, magnesium, and manganese. Iron was found in 2 of the 3 monitoring wells at concentrations above the criteria value of 300 μg/L. The maximum iron concentration, 145,000 μg/L, was found in the sample collected from monitoring well MW26-4. This high concentration may have been due to silt in the water sample, as evidenced by the very high turbidity (5000 NTU) and the high aluminum concentration (73,300 μg/L) detected in the same well. Magnesium exceeded the NYSDEC Class GA criteria in 2 of the 3 wells sampled, MW26-3, and MW26-4. The maximum concentration detected was 60,900 μg/L in monitoring well MW26-4. As with iron, this high concentration is likely due to silt being present in the groundwater sample. Manganese was found in all 3 groundwater samples at concentrations exceeding the NYSDEC Class GA groundwater standard of 300 μg/L, with the maximum concentration of 4280 μg/L being found in monitoring well MW26-3. Nickel was found in sample MW26-4 at a concentration of 163 μg/L. This concentration exceeded the Federal MCL standard of 100 μg/L, however, this high concentration may also have been due to the sample's high turbidity.

4.6.3.6 Nitroaromatics

No nitroaromatic compounds were detected in any of the 3 monitoring wells sampled at SEAD-26.

4.6.3.7 Indicator Compounds

None of the 3 groundwater samples analyzed had nitrate concentrations above the criteria value of 10 mg/L. The maximum nitrate value detected was 3.6 mg/L in sample MW26-4. TPH was detected in only 1 of the 3 groundwater samples analyzed, MW26-3, at a concentration of 0.41 mg/L.

4.6.4 Surface Water

One surface water sample was collected as part of the SEAD-26 investigation. The summary chemical analyses are presented in Table 4.6-3. The sample location was shown in Figure 2.8-2. The following sections describe the results of these analyses.

4.6.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the surface water sample collected at SEAD-26.

4.6.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the surface water sample collected at SEAD-26.

4.6.4.3 Pesticides and PCBs

One pesticide, endrin aldehyde, was detected in the surface water sample. The concentration of endrin aldehyde was 0.072J μg/L. This sample was collected near surface soil samples SS26-2 and SS26-3, which also contained endrin aldehyde, and may be indicative of localized pesticide contamination. As described below, the sediment sample collected in the same location as this surface water sample also contained pesticides.

4.6.4.4 Herbicides

One herbicide, 2,4-DB was detected in the surface water sample, at a concentration of 2.9 μg/L. There are no criteria for this compound.

4.6.4.5 Metals

The standards for the hardness dependent values were calculated using an average hardness of 300 mg/l, which was derived from calcium and magnesium concentrations at surface water locations in SEADs-4, 13, 26 and 45 where:

$$\text{total hardness} = 2.5(Ca^{+2}) + 4.1(Mg^{+2}).$$

and Ca^{+2} and Mg^{+2} concentrations were values from Tables 4.1-3, 4.6-3, and 4.7-3.

TABLE 4.6−3

SURFACE WATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD−26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	NYS GUIDELINES CLASS D (a)	EPA AWQC ACUTE (b)	EPA AWQC CHRONIC (b)	NO. ABOVE CRITERIA	WATER SEAD−26 11/01/93 SW26−1 202939	WATER SEAD−26 11/01/93 SW200 202944 SW26−1DUP
	ug/L	2.9	NA	NA	NA	NA	2.9	
ATICS								
luene	ug/L	3.5	NA	330	230	0	3.5	
PCB								
yde	ug/L	0.072	NA	NA	NA	NA	0.072 J	
	ug/L	7	360	360	190	0	7 J	
	ug/L	NA	NA	NA	NA	NA	NAJ	
	ug/L	61200	NA	NA	NA	NA	61200	
	ug/L	2940	300	NA	1000	1	2940 J	
	ug/L	2.8	330	330.6	12.9	0	2.8 J	
	ug/L	4530	NA	NA	NA	NA	4530 J	
	ug/L	55.5	NA	NA	NA	NA	55.5	
	ug/L	6.3	4250	3592.5	399.4	0	6.3 J	
	ug/L	2510	NA	NA	NA	NA	2510 J	
	ug/L	4670	NA	NA	NA	NA	4670 J	
	ug/L	7.1	800	296.8	268.9	0	7.1 J	
	ug/L	8.5	22	22	5.2	1	8.5	
LYSES								
−Nitrogen	mg/L	0.03	NA	NA	NA	NA	0.03	NS
um Hydrocarbons	mg/L	4.17	NA	NA	NA	NA	4	4.17

Notes:
a) The New York State Ambient Water Quality Standards and Guidelines for Class "D" Water.
b) EPA Water Quality Criteria Summary (1991), Quality Criteria for Water 1986 Updates # 1 and # 2.
c) Hardness dependent values assume a hardness of 300 mg/l.
d) NA = Not Available
e) U = Compound was not detected.
f) J = the reported value is an estimated concentration.
g) R = the data was rejected in the data validating process.
h) UJ = the compound was not detected; the associated reporting limit is approximate.

ECA\7SWMU\TABLES\SD26SWTF.WK3

The metals iron and cyanide were found in the surface water sample collected at SEAD-26 at concentrations above the associated criteria values. Iron was detected at 2940J μg/L, which exceeds the NYSDEC Class D standard of 1000 μg/L. Cyanide was detected at 8.5 μg/L, which exceeds the EPA water quality criteria.

4.6.4.6 Nitroaromatics

The nitroaromatic compound 2,4-dinitrotoluene was detected in the surface sample at a concentration of 3.5 μg/L. No other nitroaromatic compounds were detected in the surface water sample. This compound was also present in the sediment and surface soil samples collected in the same general area.

4.6.4.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in the surface water sample at a concentration of 0.03 mg/L. TPH was detected at a concentration of 4 mg/L.

4.6.5 Sediment

One sediment sample was collected as part of the SEAD-26 investigation. The summary analytical results are presented in Table 4.6-4. The sample location was shown in Figure 2.8-2. The following sections describe the results of these analyses.

4.6.5.1 Volatile Organic Compounds

The two volatile organic compounds acetone and 2-butanone were detected in the sediment sample collected at SEAD-26. Both compounds were detected at low concentrations, and both are common laboratory contaminants.

4.6.5.2 Semivolatile Organic Compounds

Two semivolatile organic compounds were detected in the sediment sample collected at SEAD-26. Both compounds, 2-methylnaphthalene and phenanthrene were detected at 420 μg/kg, which is below the NYSDEC sediment criteria (for phenanthrene). These compounds are both PAHs, and their presence is consistent with the soils data from the site, and with the identified use of the site for fire training activities.

TABLE 4.6-4

SEDIMENT ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NO. ABOVE CRITERIA	SOIL SEAD-26 0-0.5 11/01/93 SD26-1 202995	SOIL SEAD-26 0-0.5 11/01/93 SD200 203000 SD26-1DUP
TILE ORGANICS									
one	ug/kg	26	NA	NA	NA		NA	26	
utanone	ug/kg	23	NA	NA	NA		NA	23	
BICIDES									
-T	ug/kg	21	NA	NA	NA		NA	21	
OAROMATICS									
	ug/kg	72	NA	NA	NA		NA	72 J	
Dinitrotoluene	ug/kg	660	NA	NA	NA		NA	660 J	
VOLATILE ORGANICS									
ethylnaphthalene	ug/kg	420	NA	NA	NA		NA	420 J	
anthrene	ug/kg	420	1390	NA	NA		NA	420 J	
TICIDES/PCB									
achlor epoxide	ug/kg	6.4	0.3	1.1	1		1	6.4 J	
rin	ug/kg	3.8	NA	13	7.7		0	3.8 J	
DDE	ug/kg	13	500	0.1	10		1	13 J	
n	ug/kg	6.5	10.4	0.5	NA		1	6.5 J	
sulfan II	ug/kg	4.4	0.3	NA	NA		1	4.4 J	
ALS									
inum	mg/kg	1270	NA			NA	NA	1270	
ic	mg/kg	14.6	5			33	1	14.6	
m	mg/kg	26	NA			NA	NA	26 J	
lium	mg/kg	0.15	NA			NA	NA	0.15 J	
um	mg/kg	313000	NA			NA	NA	313000	
mium	mg/kg	2.5	26			111	0	2.5	
lt	mg/kg	2.5	NA			NA	NA	2.5 J	
per	mg/kg	10.9	19			114	0	10.9	
	mg/kg	3170	24000			40000	0	3170	
	mg/kg	8.3	27			250	0	8.3	
nesium	mg/kg	7270	NA			NA	NA	7270	
ganese	mg/kg	190	428			1100	0	190	
ury	mg/kg	0.01	0.11			2	0	0.01 J	
el	mg/kg	10.5	22			90	0	10.5	
ssium	mg/kg	784	NA			NA	NA	784 J	
nium	mg/kg	0.37	NA			NA	NA	0.37 J	
um	mg/kg	231	NA			NA	NA	231 J	
dium	mg/kg	7.6	NA			NA	NA	7.6 J	
	mg/kg	34.3	85			800	0	34.3	
ER ANALYSES									
te/Nitrite-Nitrogen	mg/kg	0.02	NA			NA	NA	0.02	NS
Petroleum Hydrocarbons	mg/kg	22000	NA			NA	NA	20000	22000

NOTES:

a) NYSDEC Sediment Criteria – 1989.
b) LOT = limit of tolerance; represents point at which significant toxic effects on benthis species occur.
c) J = the reported value is an estimated concentration.
d) NS = Not Sampled

4.6.5.3 Pesticides and PCBs

Five pesticides were detected in the sediment sample collected at SEAD-26. The concentrations were low, ranging from 3.8J μg/kg for dieldrin to 13J μg/kg for 4,4'-DDE. Even though these concentrations were low, four of the five compounds were present at concentrations exceeding their respective criteria. Pesticides were also present in the surface water and surface soil samples collected in the same area of the site.

4.6.5.4 Herbicides

The one herbicide 2,4,5-T was detected in the sediment sample collected at the site at a concentration of 21 μg/kg. Herbicides were also detected in the surface water and surface soil samples collected in the same area of the site.

4.6.5.5 Metals

A number of metals were detected in the SEAD-26 sediment sample. Of these, only arsenic was detected in excess of any criteria. The concentration of arsenic was 14.6 mg/kg, which exceeded the NYSDEC sediment criteria for aquatic life of 5 mg/kg. Arsenic was also a contaminant of concern in the site soils.

4.6.5.6 Nitroaromatics

Two nitroaromatic compounds were detected in the sediment samples collected at SEAD-26. The compounds HMX and 2,4-dinitrotoluene were detected at concentrations of 72 μg/kg and 660J μg/kg, respectively. There are no sediment criteria available for these compounds. These compounds were also a concern in other site media.

4.6.5.7 Indicator Compounds

The sediment sample was also analyzed for nitrate/nitrite nitrogen and TPH. Nitrate/nitrite nitrogen was detected at 0.02 mg/kg and TPH was detected at 20,000 mg/kg. The high TPH value, along with the prevalent PAHs at the site are indicative of residues from the burning of petroleum products at the fire training area.

4.6.6 Tentatively Identified Compounds

Surface Soils

Three surface soil samples had total TIC concentrations greater than 50 mg/kg. Surface soil samples SS26-1, SS26-2, and SS26-3 had total TIC concentrations ranging from 284.5 mg/kg (in SS26-2) to 1,043 mg/kg (in SS26-3). An elevated total TIC concentration was also reported in SS26-9 (788.7 mg/kg), the duplicate sample to SS26-3. The primary tentatively identified compounds in these samples were decanes and cosanes. Although none of these 4 surface soil samples (3 samples and 1 duplicate) had reported SVO TAGM exceedance, the SVO detection limits for these samples were very high, possibly due to interferences caused in the laboratory methods from these high TIC concentrations.

Subsurface Soils

All of the total TIC concentrations reported in the subsurface soil samples were below 50 mg/kg.

Sediment

The one sediment sample SD26-1, had a total TIC concentration of 342.5 mg/kg, due primarily to the presence of decanes. Only two SVOs were detected in this sample and neither exceeded a TAGM value.

4.7 SEAD-45

4.7.1 Introduction

A total of 9 surface soil and 5 subsurface soil samples were collected at SEAD-45. In addition, 4 surface water and 4 sediment samples were collected from the drainage swales and low-lying areas at the site. A total of 8 groundwater samples were collected as part of the SEAD-45 investigation. Three groundwater samples were collected from monitoring wells installed as part of this investigation, and 5 groundwater samples were collected from previously installed monitoring wells. The following sections describe the nature and extent of contamination identified at SEAD-45.

4.7.2 Soil

The analytical results for the 9 surface and 5 subsurface soil samples collected as part of the SEAD-45 investigation are presented in Table 4.7-1. The sample locations were shown in Figure 2.9-2. The following sections describe the nature and extent of contamination in SEAD-45 soils.

4.7.2.1 Volatile Organic Compounds

Surface Soils

No VOCs were detected in the surface soil samples collected at SEAD-45.

Subsurface Soils

The only volatile organic compound detected in the subsurface soil samples collected at SEAD-45 was tetrachloroethane. This compound was detected in all five test pit soil samples, which were collected from test pits excavated within the OD mound. The concentrations of tetrachloroethane ranged from 4J to 19 μg/kg, which are all well below the TAGM concentration of 1400 μ/kg. The possible source of the tetrachloroethane is unknown.

4.7.2.2 Semivolatile Organic Compounds

Surface Soils

A total of 20 semivolatile organic compounds were found at varying concentrations in the surface soil samples collected at SEAD-45. In general, the concentrations of semivolatile compounds were low, with only 1 result exceeding a TAGM value. The surface soil sample SS45-2, which was collected west of the OD mound, had a benzo(a)pyrene concentration of 82 μg/kg, which slightly exceeded the TAGM value of 61 μg/kg. Figure 4.7-1 shows the total SVO concentrations in the surface soil samples.

The types of semivolatile compounds detected can be divided into 3 subgroups. The first subgroup are the nitroaromatics, including 2,4- and 2,6-dinitrotoluene. These compounds were detected in two surface soil samples, SS45-5 and SS45-6, which were collected further

TABLE 4.7-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

OUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-45 0-0.2 10/25/93 SS45-1 202506	SOIL SEAD-45 0-0.2 10/25/93 SS45-2 202507	SOIL SEAD-45 0-0.2 10/25/93 SS45-3 202508	SOIL SEAD-45 0-0.2 10/25/93 SS45-4 202509	SOIL SEAD-45 0-0.2 10/25/93 SS45-5 202512	SOIL SEAD-45 0-0.2 10/25/93 SS45-10 202517 SS45-5DUP	SOIL SEAD-45 0-0.2 10/25/93 SS45-6 202511	SOIL SEAD-45 0-0.2 10/25/93 SS45-7 202514
CS													
	ug/kg	19	35.7%	1400	0	12 U	11 U	12 U	11 UJ	12 U	12 U	11 U	11 U
	ug/kg	9400	14.3%	NA	NA	9400	6300	6000 U	5400 U	5900 U	6000 U	5500 U	5700 U
s													
	ug/kg	470	42.9%	NA	NA	130 U	130 U	130 U	130 U	120 J	140 J	130 U	130 UJ
	ug/kg	5800	78.6%	NA	NA	130 U	130 U	100 J	82 J	280 J	290 J	1800	83 J
ene	ug/kg	190	42.9%	NA	NA	130 U	130 U	100 J	100 U	130 UJ	130 UJ	120 J	130 UJ
	ug/kg	330	28.6%	NA	NA	130 U	130 U	130 U	90 J	130 UJ	130 J	330	130 UJ
ne	ug/kg	1400	64.3%	NA	NA	130 U	130 U	98 J	130 U	84 J	80 J	190	130 UJ
itrotoluene	ug/kg	270	7.1%	NA	NA	130 U	130 U	130 U	130 U	130 UJ	130 UJ	130 U	130 UJ
itrotoluene	ug/kg	680	57.1%	NA	NA	130 U	130 U	99 J	130 U	280 J	270 J	590	130 UJ
	ug/kg	190	57.1%	NA	NA	130 U	130 U	130 U	110 J	150 J	140 J	160	130 UJ
GANICS													
	ug/kg	1100	35.7%	NA	NA	410 U	360 U	400 U	360 U	390 U	390 U	21 J	380 U
	ug/kg	30	28.6%	13000	0	410 U	380 U	400 U	360 U	21 J	390 U	360 U	380 U
	ug/kg	30	14.3%	41000	0	410 U	380 U	400 U	360 U	30 J	390 U	380 U	380 U
	ug/kg	700	14.3%	1000	0	410 U	380 U	400 U	360 U	390 U	390 U	41 J	380 U
	ug/kg	14000	50.0%	NA	NA	410 U	380 U	400 U	360 U	160 J	75 J	830	380 U
	ug/kg	35	7.1%	7100	0	410 U	380 U	400 U	360 U	390 U	390 U	360 U	380 U
lamine	ug/kg	1600	35.7%	50000 *	0	410 U	360 U	400 U	360 U	390 U	390 U	110 J	380 U
e	ug/kg	62	57.1%	410	0	410 U	360 U	400 U	20 J	43 J	41 J	55 J	380 U
	ug/kg	46	50.0%	50000 *	0	410 U	380 U	400 U	360 U	38 J	31 J	25 J	380 U
	ug/kg	18	14.3%	50000 *	0	410 U	380 U	400 U	360 U	18 J	390 U	360 U	380 U
ate	ug/kg	6800	50.0%	8100	0	410 U	380 U	400 U	360 U	110 J	31 J	900	380 U
	ug/kg	68	64.3%	50000 *	0	410 U	380 U	400 U	23 J	66 J	44 J	42 J	380 U
	ug/kg	110	71.4%	50000 *	0	410 U	380 U	400 U	35 J	100 J	78 J	79 J	380 U
e	ug/kg	50	42.9%	220	0	410 U	380 U	400 U	360 U	50 J	32 J	31 J	380 U
	ug/kg	68	64.3%	400	0	410 U	380 U	400 U	19 J	68 J	55 J	52 J	380 U
hthalate	ug/kg	740	50.0%	50000 *	0	410 U	380 U	700	430	740	700	360 U	210 J
ne	ug/kg	55	50.0%	1100	0	410 U	380 U	400 U	360 U	55 J	33 J	38 J	380 U
ne	ug/kg	58	35.7%	1100	0	410 U	380 U	400 U	360 U	58 J	18 J	360 U	380 U
	ug/kg	82	42.9%	61	1	410 U	380 U	400 U	360 U	82 J	44 J	45 J	380 U
yrene	ug/kg	52	28.6%	3200	0	410 U	380 U	400 U	360 U	52 J	390 U	360 U	380 U
ne	ug/kg	66	35.7%	50000 *	0	410 U	380 U	400 U	360 U	39 J	27 J	360 U	380 U

TABLE 4.7-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

...UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-45 0-0.2 10/25/93 SS45-1 202506	SOIL SEAD-45 0-0.2 10/25/93 SS45-2 202507	SOIL SEAD-45 0-0.2 10/25/93 SS45-3 202508	SOIL SEAD-45 0-0.2 10/25/93 SS45-4 202509	SOIL SEAD-45 0-0.2 10/25/93 SS45-5 202512	SOIL SEAD-45 0-0.2 10/25/93 SS45-10 202517 SS45-5DUP	SOIL SEAD-45 0-0.2 10/25/93 SS45-6 202511	SOIL SEAD-45 0-0.2 10/25/93 SS45-7 202514
	ug/kg	2.2	35.7%	900	0	2.1 U	2 U	2 U	1.8 U	1.8 J	2 U	1.8 U	1.9 U
	ug/kg	3.2	23.1%	44	0	4.1 U	3.8 U	4 U	2.5 J	3.9 U	3.8 U	3.2 J	3.8 U
	ug/kg	4.2	42.8%	2100	0	4.1 U	3.8 U	4 U	3.2 J	3.9 U	3.4 J	4.2 J	3.8 U
	ug/kg	3.4	30.8%	2100	0	4.1 U	3.8 U	4 U	3.6 U	3.9 U	3.4 J	2.8 J	3.8 U
	ug/kg	2	23.1%	540	0	2.1 U	2 U	2 U	1.5 J	2 U	1.1 J	2 J	1.9 U
	ug/kg	110	7.6%	1000(a)	0	41 U	38 U	40 U	38 U	39 U	110 J	36 U	38 U
	mg/kg	22800	100.0%	15523	15	17300	19400	18900	14900	17600	15600	16300	18000
	mg/kg	8.2	100.0%	7.5	1	5	5.5	5.1	5.1	8.2	6.4	5.5	6.8
	mg/kg	365	100.0%	300	1	122	194	115	143	161	151	160	163
	mg/kg	1.1	100.0%	1	1	0.7 J	0.77 J	0.83 J	0.63 J	0.72 J	0.7 J	0.71 J	0.82 J
	mg/kg	13.1	100.0%	1	12	2.8	2.4	1.1	3.9	9.5 J	9.5 J	8.8	1.6 J
	mg/kg	47000	100.0%	120725	0	8510	10300	21800	47000	26000	47000	23400	6930
	mg/kg	39.3	100.0%	24	14	24.1	39.3	27.4	22.9	26.9	23.8	24.2	24.8
	mg/kg	24.3	100.0%	30	0	10.8	24.3	14.1	12.4	12.9	12.2	11.7	13.1
	mg/kg	1240	100.0%	25	16	79.4	192	55.8	155	538	405	491	69.8
	mg/kg	75700	100.0%	28988	13	25800	75700	30500	26700	31400	30400	28100	29900
	mg/kg	87.8	100.0%	30	12	20.4	15.7	12	34.9	63.6	54.9	63.2	21.9
	mg/kg	9270	100.0%	12308	0	5530	5950	6790	8420	7320	7000	6440	5170
	mg/kg	1380	100.0%	759	5	562	1150	627	530	575	599	555	1050
	mg/kg	4.3	100.0%	0.1	18	0.43	0.63	0.17	0.43	1.5 J	2.1 J	2.4	0.41 J
	mg/kg	51	100.0%	37	8	29.4 R	41.3 R	40.5 R	35.2 R	40.5	36.4	34.2 R	35.1
	mg/kg	3280	100.0%	1548	16	2310	3140	2720	2100	2140	1980	2060	2080
	mg/kg	1.1	0.0%	2	0	0.27 U	0.18 U	0.21 U	0.23 U	0.18 UJ	0.22 UJ	0.18 U	0.22 UJ
	mg/kg	26.2	57.1%	0.5	11	1.3 UJ	1.5 UJ	2.1	1 UJ	3.5 J	2.7 J	4.3	1.2 UJ
	mg/kg	418	100.0%	114	9	67.1 J	100 J	114 J	142 J	110 J	104 J	112 J	136 J
	mg/kg	38	100.0%	150	0	28.6	35.4	30.5	23.7	27.9	25.8	27.3	32.5
	mg/kg	557	100.0%	90	9	148 R	122 R	115 R	208 R	427	361	347 R	126
	mg/kg	8.3	14.3%	NA	NA	0.56 U	0.57 U	0.58 U	0.54 U	0.72 U	0.67 U	0.52 U	0.66 U
...gen	mg/kg	28	100.0%	NA	NA	0.42	0.38	0.05	1.34	0.13	0.06	11.6	6
	%W/W	91.9				80.4	85.7	82.6	91.9	84	84.2	91.6	87.4

...WMU\TABLES\SD45SLF.WK3

TABLE 4.7-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

...UND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-45 0-0.2 10/25/93 SS45-9 202516	SOIL SEAD-45 3 11/08/93 TP45-1 203646-203648	SOIL SEAD-45 3 11/08/93 TP45-11 203656-203658 TP45-1DUP	SOIL SEAD-45 3 11/08/93 TP45-2 203650-203652	SOIL SEAD-45 3 11/08/93 TP45-3 203654	SOIL SEAD-45 3 11/09/93 TP45-4 204026-204028	SOIL SEAD-45 3 11/09/93 TP45-5 204030-204032
...CS												
	ug/kg	19	35.7%	1400	0	12 U	4 J	6 J	8 J	19	2 J	3 J
	ug/kg	9400	14.3%	NA	NA	5900 U	5600 U	5500 U	5800 U	6000 U	6900 U	5600 U
	ug/kg	470	42.9%	NA	NA	130 UJ	250 J	430 J	470 J	240 J	350	200
	ug/kg	5800	78.6%	NA	NA	5800 J	2500 J	1600 J	2700 J	2500 J	4300	1300
...ne	ug/kg	190	42.9%	NA	NA	130 UJ	150 J	170 J	190 J	130 UJ	180	140
	ug/kg	330	28.6%	NA	NA	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 U	180 J
...ne	ug/kg	1400	64.3%	NA	NA	1400 J	330 J	340 J	600 J	400 J	330	280
...itrotoluene	ug/kg	270	7.1%	NA	NA	270 J	130 UJ	130 UJ	130 UJ	130 UJ	130 U	130 U
...itrotoluene	ug/kg	680	57.1%	NA	NA	130 UJ	430 J	430 J	680 J	530 J	480	350
	ug/kg	190	57.1%	NA	NA	130 UJ	130 UJ	140 J	190 J	120 J	110 J	90 J
...GANICS												
	ug/kg	1100	35.7%	NA	NA	390 U	72 J	68 J	1900 U	1100	41 J	36 J
	ug/kg	30	28.6%	13000	0	390 U	30 J	27 J	1900 U	24 J	30 J	370 U
	ug/kg	30	14.3%	41000	0	390 U	19 J	17 J	1900 U	400 U	460 U	370 U
	ug/kg	700	14.3%	1000	0	390 U	370 U	360 U	700 J	400 U	480 U	370 U
	ug/kg	14000	50.0%	NA	NA	390 U	100 J	190 J	14000	84 J	59 J	230 J
	ug/kg	35	7.1%	7100	0	390 U	370 U	360 U	1900 U	400 U	35 J	370 U
...amine	ug/kg	1600	35.7%	50000 *	0	390 U	370 U	30 J	1600 J	20 J	460 U	25 J
...e	ug/kg	62	57.1%	410	0	30 J	62 J	54 J	1900 U	52 J	48 J	42 J
	ug/kg	46	50.0%	50000 *	0	18 J	46 J	38 J	1900 U	38 J	44 J	34 J
	ug/kg	18	14.3%	50000 *	0	390 U	17 J	360 U	1900 U	400 U	460 U	370 U
...te	ug/kg	6800	50.0%	8100	0	390 U	35 J	170 J	6800	27 J	75 J	230 J
	ug/kg	68	64.3%	50000 *	0	30 J	59 J	50 J	1900 U	52 J	68 J	58 J
	ug/kg	110	71.4%	50000 *	0	38 J	110 J	98 J	100 J	90 J	110 J	97 J
...e	ug/kg	50	42.9%	220	0	390 U	32 J	30 J	1900 U	22 J	36 J	32 J
	ug/kg	68	64.3%	400	0	27 J	46 J	44 J	1900 U	37 J	51 J	47 J
...nthalate	ug/kg	740	50.0%	50000 *	0	350 J	85 J	50 J	1900 U	400 U	460 U	370 U
...ne	ug/kg	55	50.0%	1100	0	20 J	38 J	36 J	1900 U	24 J	39 J	42 J
...ne	ug/kg	58	35.7%	1100	0	390 U	28 J	26 J	1900 U	21 J	34 J	23 J
	ug/kg	82	42.9%	61	1	390 U	46 J	41 J	1900 U	28 J	45 J	42 J
...yrene	ug/kg	52	28.6%	3200	0	390 U	37 J	360 U	1900 U	400 U	29 J	26 J
...ne	ug/kg	66	35.7%	50000 *	0	390 U	66 J	58 J	1900 U	34 J	53 J	45 J

TABLE 4.7-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

OUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-45 0-0.2 10/25/93 SS45-9 202516	SOIL SEAD-45 3 11/08/93 TP45-1 203646-203648	SOIL SEAD-45 3 11/08/93 TP45-11 203656-203658 TP45-1DUP	SOIL SEAD-45 3 11/08/93 TP45-2 203650-203652	SOIL SEAD-45 3 11/08/93 TP45-3 203654	SOIL SEAD-45 3 11/09/93 TP45-4 204026-204028	SOIL SEAD-45 3 11/09/93 TP45-5 204030-204032
	ug/kg	2.2	35.7%	900	0	1 J	1.9 J	2.2 J	1.9 J	1.6 J	2.4 U	1.9 U
	ug/kg	3.2	23.1%	44	0	3.8 U R	3.7 U	3.6 U	3.8 U	4 U	2.4 J	3.7 U
	ug/kg	4.2	42.9%	2100	0	3.3 J	3.7 U	3.6 U	3.8 U	4 U	3.2 J	1.9 J
	ug/kg	3.4	30.8%	2100	0	3.8 U R	3.7 U	2.3 J	3.8 U	2.9 J	4.6 U	3.7 U
	ug/kg	2	23.1%	540	0	2 U R	1.9 U	1.9 U	2 U	2 U	2.4 U	1.9 U
	ug/kg	110	7.6%	1000(a)	0	38 U R	37 U	36 U	38 U	40 U	46 U	37 U
	mg/kg	22800	100.0%	15523	15	17800	20100	15500	20800	22800	20600	17300
	mg/kg	8.2	100.0%	7.5	1	6.1	6.8	6.3	7.1	8.2	6 J	5.1 J
	mg/kg	365	100.0%	300	1	202	208	177	201	248	216	174
	mg/kg	1.1	100.0%	1	1	0.79 J	0.9 J	0.8	0.91 J	1.1 J	0.94 J	0.8 J
	mg/kg	13.1	100.0%	1	12	5.5 J	10.4 J	9.6 J	9.5 J	13.1 J	10.9 R	7.4 R
	mg/kg	47000	100.0%	120725	0	22600	42700	31500	26400	32500	36400	32100
	mg/kg	39.3	100.0%	24	14	27.4	31.3	25.7	30.1	35.5	32.1	27.6
	mg/kg	24.3	100.0%	30	0	15	13.2	13.2	12.8	16.9	15.3	12.1
	mg/kg	1240	100.0%	25	16	287	722	555	561	791	1240 J	449 J
	mg/kg	75700	100.0%	28986	13	32500	35700	31900	31500	41300	37600	31600
	mg/kg	87.8	100.0%	30	12	77.7	54.1	73.3	69.4	87.8	74.7	61.9
	mg/kg	9270	100.0%	12308	0	7110	7910	7780	7800	9270	8940	7570
	mg/kg	1380	100.0%	759	5	912	1380	613	605	827	726	600
	mg/kg	4.3	100.0%	0.1	16	1.9 J	3.1 J	1.4 J	3.1 J	4 J	3.8	4.3
	mg/kg	51	100.0%	37	8	42.5	41.8	39.1	40.5	51	48.3	39.2
	mg/kg	3280	100.0%	1548	16	2260	3040	1960	3280	3010	2400	1960
	mg/kg	1.1	0.0%	2	0	0.24 UJ	0.23 UJ	0.15 UJ	0.16 UJ	0.23 UJ	0.27 UJ	0.2 UJ
	mg/kg	26.2	57.1%	0.5	11	1.3 J	3.2 J	4.7 J	5 J	6.6 J	28.2 J	3.9 J
	mg/kg	418	100.0%	114	9	93.4 J	141 J	105 J	116 J	135 J	136 J	122 J
	mg/kg	38	100.0%	150	0	26.9	32.4	26.7	34.4	38	32.6	27.3
	mg/kg	557	100.0%	90	9	383	345	360	390	538	557 J	333 J
	mg/kg	8.3	14.3%	NA	NA	0.7 U	0.7	0.54 U	0.55 U	0.55 U	0.62	0.51 U
ogen	mg/kg	28	100.0%	NA	NA	0.55	27	28	19.5	18.8	9.8	13.3
	%W/W	91.9				85.2	90.3	90.7	88.7	82.9	72.2	89.3

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; Individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) U = Compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.

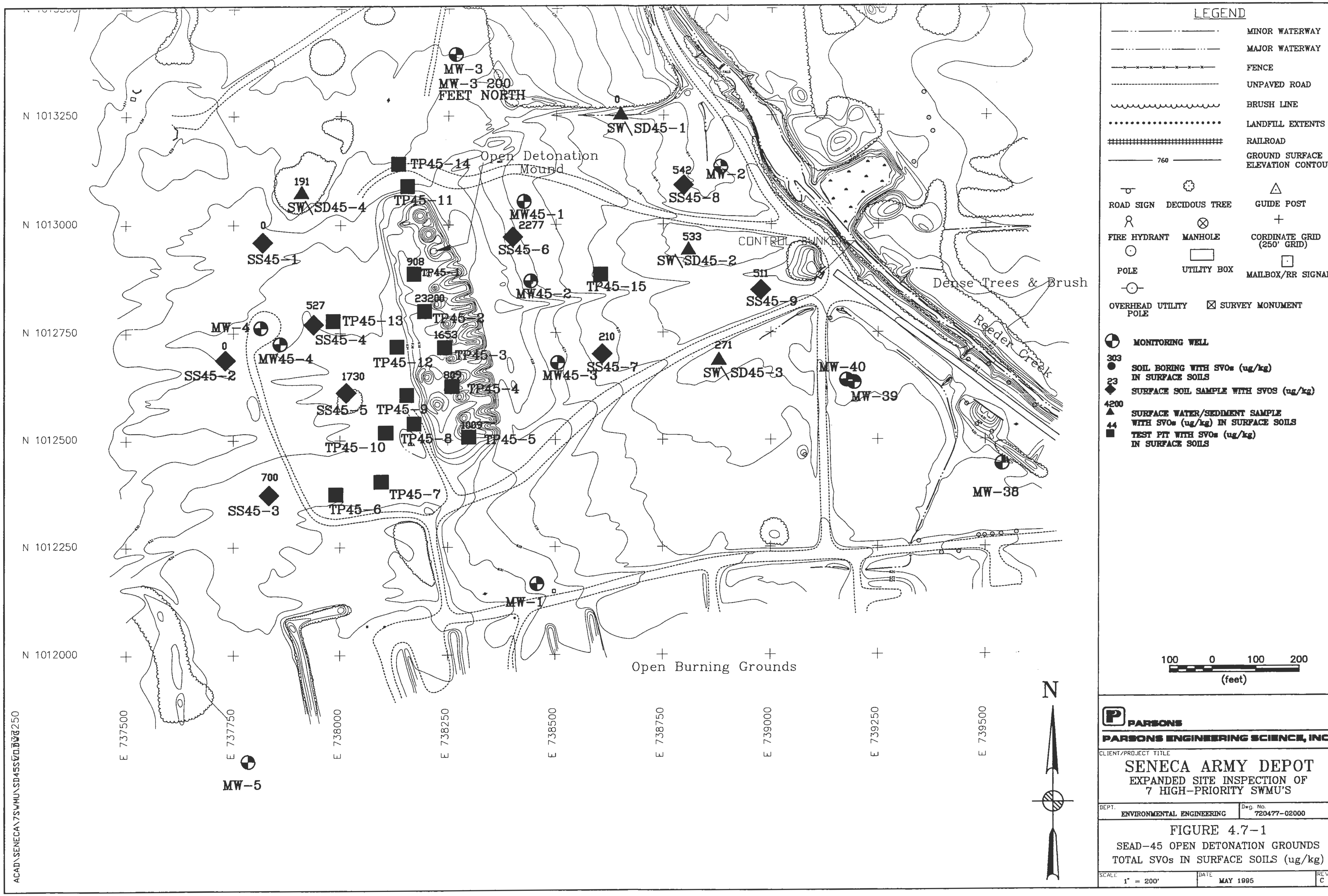


FIGURE 4.7-1
SEAD-45 OPEN DETONATION GROUNDS
TOTAL SVOs IN SURFACE SOILS (ug/kg)

from the OD mound. The extent of the nitroaromatic contamination is discussed further in section 4.7.2.6 of this report.

The next major class of semivolatile organic compounds detected were the PAHs, which make up the majority of the compounds detected. These compounds were fairly prevalent, being detected in a number of samples, but at very low concentrations. These compounds are not a component of the explosives detonated in the OD mound. A likely source of the PAHs is deposition of unburned fuel and other oils from the numerous pieces of heavy construction equipment which are used to reshape the mound before and after detonation activities, and which periodically regrade the entire site.

The third class of semivolatile compounds detected in the soil samples are the phthalates. These compounds were detected at frequencies ranging from 22% for di-n-butylphthalate to 77% for bis(2-ethylhexyl)phthalate. These compounds were generally detected at low concentrations.

Subsurface Soils

The occurrences of PAHs and phthalate compounds are similar to those observed in the surface soil analysis results. PAH and phthalate compounds were detected at low concentrations in all of the subsurface soil samples and none were found at concentrations exceeding TAGM values. The third group of SVOs found in the subsurface soil samples were nitroaromatics. These compounds were detected in all 5 of the test pits. These compounds are discussed further in Section 4.7.2.6of this report.

4.7.2.3 Pesticides and PCBs

Surface Soils

Five pesticides and 1 PCB compound were found in the surface soil samples collected at SEAD-45. The frequency of detection of these compounds ranged from 11% for Aroclor-1254 (a PCB) to 44% for 4,4'-DDE. There was no obvious spatial distribution of the compounds, with the compounds being detected in a variety of the samples. All of the concentrations were very low, well below the respective TAGM values.

Subsurface Soils

Four pesticides were detected in the subsurface soil samples collected at SEAD-45. The frequency of detection ranged from 20% for dieldrin to 60% for endosulfan I. There was no apparent spacial distribution of the pesticide compounds, with the compounds being detected in a variety of the samples. All of the reported concentrations were low and none were detected above TAGM values. PCBs were undetected in the subsurface soil samples analyzed.

4.7.2.4 Herbicides

Surface Soils

The herbicide MCPA was found in two surface soil samples collected at SEAD-45. The surface soil sample SS45-1, located west-northwest of the OD mound, and SS45-2, located west of the OD mound, had concentrations of 9400 μg/kg and 6300 μg/kg, respectively. No other herbicide compounds were reported.

Subsurface Soils

Herbicides were undetected in the subsurface soil samples analyzed.

4.7.2.5 Metals

Surface Soils

A number of the soil samples collected at SEAD-45 were found to contain various metals at concentrations that exceed the associated TAGM values. Of the 24 metals reported, 14 of these were found in one or more samples at concentrations above the associated TAGM values. While several of these exceedances were for only 1 or 2 samples, the majority of the TAGM exceedances were more significant. Of particular note are the metals cadmium, chromium, copper, lead, mercury, silver, and zinc where a large percentage of the samples exceed the criteria value and where the concentrations of the exceedances are generally an order of magnitude or greater above the criteria value. In general, the highest metals concentrations were found in the soil samples collected from the test pits completed directly in the OD mound. Even though the highest metals concentrations were in the test pit soil samples, there were numerous TAGM exceedances in the surface soil samples as well. The highest metals concentrations in the surface soil samples were in the samples SS45-5, collected just west of the OD mound, and SS45-6 and SS45-9, collected east of the OD mound.

Subsurface Soils

The occurrence and distribution of metals which were found above TAGM values in the subsurface soils were similar to those observed in the surface soil samples. In particular, copper, lead, mercury, nickel, silver, and zinc were found in concentrations above TAGM values in all of the subsurface soil samples. Of these metals, copper, mercury and silver were found at concentrations which exceeded the TAGM by an order magnitude in every subsurface soil sample. In addition, cadmium was found in three samples at concentrations which were an order of magnitude above the TAGM value.

The highest cadmium concentration was identified in sample TP45-3, where 13.1 mg/kg was reported. This test pit soil sample was collected from the center of the OD mound. This sample also had elevated concentrations of all the other metals of note, and had the highest detected concentrations of lead and nickel.

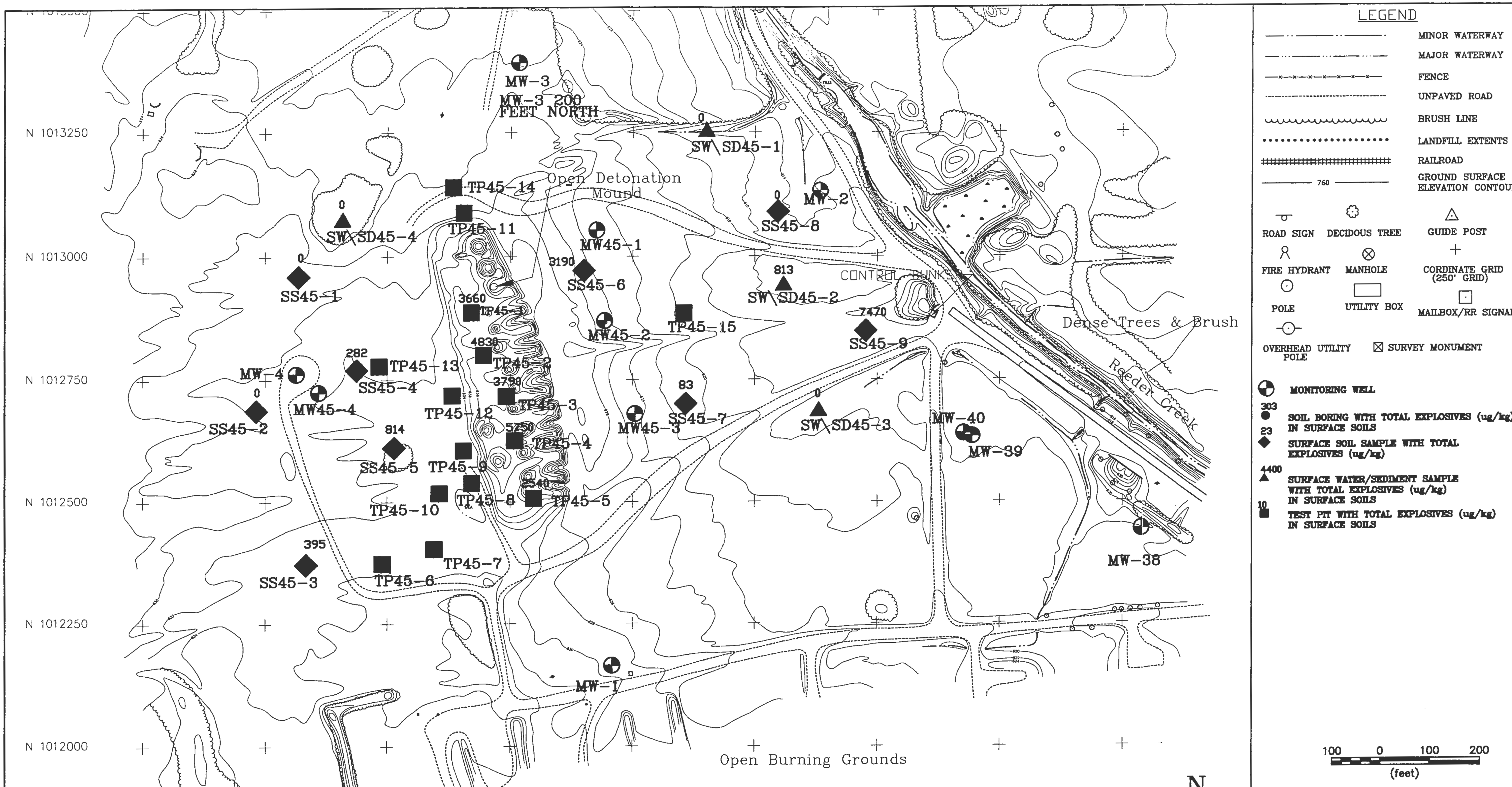
4.7.2.6 Nitroaromatics

Surface Soils

Eight different nitroaromatic compounds were detected in the surface soil samples collected at SEAD-45. As shown in Figure 4.7-2, nitroaromatic compounds were found to be prevalent at the site. The frequencies of detection ranged from 11.1% for 4-amino-2,6-dinitrotoluene to 66.6% for RDX, with several compounds being present in greater than 50% of the surface soil samples. The concentrations were all low, with the maximum concentration being 5800 μg/kg of RDX found in the surface soil sample SS45-9, which was collected at the east end of the site.

Subsurface Soils

The occurrence and distribution of nitroaromatics in the subsurface soil samples were similar to those observed in the surface soil samples. The primary differences noted in the pattern of nitroaromatics in the subsurface soils were higher frequencies of occurrences (100%



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 HIGH-PRIORITY SWMU'S

DEPT. ENVIRONMENTAL ENGINEERING	Dwg. No. 720477-02000

FIGURE 4.7-2

SEAD-45 OPEN DETONATION GROUNDS TOTAL EXPLOSIVES IN SURFACE SOILS (ug/kg)

SCALE 1" = 200'	DATE MAY 1995	REV C

frequency of detection for the compounds HMX, RDX, 2,4,6TNT,and 2-amino-4,6DNT) and, on average, higher reported concentrations.

4.7.2.7 Indicator Compounds

Surface Soils

The SEAD-45 surface soils were analyzed for nitrate/nitrite nitrogen. Concentrations ranged from a low of 0.05 mg/kg in sample SS45-3, to a maximum of 11.8 mg/kg in sample SS45-6.

Subsurface Soils

Nitrate/nitrite nitrogen were detected at elevated concentrations in all of the subsurface soil samples analyzed. The reported concentrations ranged from 9.8 mg/kg in sample TP45-4 to 28 mg/kg in sample TP45-1.

4.7.3 Groundwater

Four monitoring wells were installed as part of the SEAD-45 investigation. Three of these wells, along with 5 preexisting monitoring wells were sampled. The monitoring well MW45-1 was found to be dry upon sampling and therefore, no groundwater sample was collected. The summary analytical results are presented in Table 4.7-2. The locations of the wells were shown in Figure 2.9-2. The following sections describe the nature and extent of the groundwater contamination identified at SEAD-45.

4.7.3.1 Volatile Organic Compounds

Only 1 volatile organic compound, tetrachloroethane, was detected in the 8 groundwater samples collected at SEAD-45. Tetrachloroethane was found in the groundwater sample collected from monitoring well MW-1, at a concentration of 1J μg/L, which is below the NYSDEC Class GA groundwater standard of 5 μg/L.

4.7.3.2 Semivolatile Organic Compounds

The semivolatile organic compound bis(2-ethylhexyl)phthalate was detected in 4 of the 8 groundwater samples analyzed. The maximum value was reported in the groundwater sample

TABLE 4.7-2

GROUNDWATAER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

ND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-45 02/03/94 MW45-2 210258	WATER SEAD-45 02/03/94 MW45-3 210259	WATER SEAD-45 01/26/94 MW45-4 209413	WATER SEAD-45/OD 02/01/94 MW1 210059	WATER SEAD-45/OD 02/02/94 MW2 210193	WATER SEAD-45/OD 02/01/94 MW3 210060	WATER SEAD-45/OD 02/02/94 MW4 210194
S													
	ug/L	1	12.5%	5	5	0	10 U	10 U	10 U	1 J	10 U	10 U	10 U
	ug/L	0.5	12.5%	NA	NA	NA	0.13 UJ	0.13 U	0.13 U	0.5	0.13 U	0.13 U	0.13 U
	ug/L	0.067	12.5%	5	NA	0	0.13 UJ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
ANICS													
late	ug/L	33	50.0%	50	NA	0	23	11 U	11 U	33	11 U	12	11
	ug/L	63300	87.5%	NA	NA	NA	42 U	7510	63300	124 J	828	83.5 J	17700
	ug/L	52.1	87.5%	3	6	7	26.8 J	36.7 J	21.6 UJ	24.3 J	23.1 J	52.1 J	49.6 J
	ug/L	9.5	37.5%	25	50	0	1.4 U	1.8 J	9.5 J	1.4 U	1.4 U	1.4 U	1.7 J
	ug/L	751	100.0%	1000	2000	0	27.2 J	62.1 J	751	56.5 J	50.8 J	25.5 J	195 J
	ug/L	5	37.5%	3	4	1	0.4 U	0.52 J	5	0.4 U	0.4 U	0.4 U	0.87 J
	ug/L	3.8	50.0%	10	5	0	2.9 J	3.2 J	2.1 U	2.2 J	2.1 U	2.1 U	3.8 J
	ug/L	660000	100.0%	NA	NA	NA	232000	211000	660000	118000	94600	91700	152000
	ug/L	106	62.5%	50	100	1	2.6 U	16.1	106	2.6 U	4.1 J	2.6 U	28.9
	ug/L	94.4	50.0%	NA	NA	NA	4.4 U	14.6 J	94.4	4.4 U	5.3 J	4.4 U	11 J
	ug/L	123	62.5%	200	1300(I)	0	3.1 U	11.9 J	123	3.1 U	7.2 J	3.9 J	79.2
	ug/L	113000	100.0%	300	NA	5	48.5 J	14100	113000	207	940	109	27500
	ug/L	75.6	100.0%	25	15(J)	2	0.71 J	9.5	75.6	0.71 J	0.66 J	0.73 J	15.7
	ug/L	77900	100.0%	35000	NA	3	57800	77900	73500	26400	15700	15800	31600
	ug/L	4640	100.0%	300	NA	4	1400	625	4640	4.4 J	23.7	2.9 J	384
	ug/L	0.29	37.5%	2	2	0	0.04 U	0.08 J	0.29	0.04 U	0.04 U	0.04 U	1.8
	ug/L	209	50.0%	NA	100	1	10.2 J	30.7 J	209	4 U	4 U	4 U	43.9
	ug/L	18700	62.5%	NA	NA	NA	9660	18700	13900	910 U	1050 J	904 U	6540
	ug/L	2.5	62.5%	10	50	0	2.5 J	1.9 J	0.7 U	0.99 J	0.7 U	0.7 U	1.9 J
	ug/L	4.6	12.5%	50	NA	0	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.6 J
	ug/L	40000	100.0%	20000	NA	1	40000	18600	17300	10000	13100	3400 J	15800
	ug/L	93.1	37.5%	NA	NA	NA	3.7 U	11.7 J	93.1	3.7 U	3.7 U	3.7 U	29.7 J
	ug/L	321	100.0%	300	NA	1	31.6	81.1	321	15.3 J	23	14 J	164
	mg/L	8.7	100.0%	10	10	0	0.41	0.12	0.02	1.23	0.06	0.15	0.13
	standard units	7.54					NR	7.5	7.31	7.5	7.49	7.53	7.43
	umhos/cm	750					NR	750	600	455	315	340	450
	NTU	9860					0.4	368	9860	9.4	4.4	3.4	193

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) The value listed is an Action Level for copper, and not an MCL Standard.
h) The value listed is an Action Level for lead at the tap, and not an MCL Standard.

collected from monitoring well MW-1 at a concentration of 33 μg/L which is below the NYSDEC Class GA groundwater criteria of 50 μg/L.

4.7.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the 8 groundwater samples collected at SEAD-45.

4.7.3.4 Herbicides

No herbicides were found in the 8 groundwater samples collected at SEAD-45.

4.7.3.5 Metals

The nine metals beryllium, chromium, iron, lead, magnesium, manganese, nickel, sodium, and zinc were found in one or more of the groundwater samples at concentrations above the criteria value. Most of the exceedances occurred in only 1 sample, with the exceptions being iron, magnesium, and manganese. Iron was found in 5 of the 8 monitoring wells at concentrations above the criteria value of 300 μg/L. The maximum iron concentration, 113,000 μg/L, was found in the groundwater sample collected from monitoring well MW45-4. This high concentration may have been due to silt in the water sample, as evidenced by the very high turbidity (9860 NTU) and the high aluminum concentration. Magnesium exceeded the NYSDEC Class GA criteria in 3 of the 8 wells sampled, MW45-2, MW45-3, and MW45-4. The maximum concentration was 77,900 μg/L detected in the groundwater sample collected from monitoring well MW45-3. Manganese was found in 4 of the 8 samples at concentrations exceeding the NYSDEC Class GA groundwater standard of 300 μg/L, with the maximum concentration of 4640 μg/L found in the groundwater sample collected from monitoring well MW45-4. As described above, the high metals concentrations in MW45-4 may have been due in part to high sample turbidities.

4.7.3.6 Nitroaromatics

The nitroaromatic compounds HMX and 1,3-dinitrobenzene were each found in 1 of the 8 groundwater samples collected at SEAD-45. HMX was detected in the groundwater sample collected from monitoring well MW-1 at a concentration of 0.5 μg/L. the nitroaromatic compound 1,3-dinitrobenzene was detected in the groundwater sample collected from monitoring well MW-5 at a concentration of 0.067J μg/L.

4.7.3.7 Indicator Compounds

None of the 8 groundwater samples analyzed had nitrate concentrations above the criteria value of 10 mg/L. The maximum nitrate value detected was 8.7 mg/L in the groundwater sample collected from monitoring well MW-5.

4.7.4 Surface Water

Four surface water samples were collected as part of the SEAD-45 investigation. The summary analytical results are presented in Table 4.7-3. The sample locations were shown in Figure 2.9-2. Three of the surface water samples, SW45-1, SW45-2, and SW45-3, were collected from drainage ditches located downgradient of the OD mound. The last sample, SW45-4, was collected from a low-lying area northwest of the OD mound. The following sections describe the nature and extent of contamination identified in surface water at SEAD-45.

4.7.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the four surface water samples collected at SEAD-45.

4.7.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the four surface water samples collected at SEAD-45.

4.7.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the four surface water samples collected at SEAD-45.

4.7.4.4 Herbicides

No herbicide compounds were found in the four surface water samples collected at SEAD-45.

TABLE 4.7-3

SURFACE WATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

OMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS D (a)	EPA AWQC ACUTE (b)	EPA AWQC CHRONIC (b)	NO. ABOVE CRITERIA	WATER SEAD-45 11/01/93 SW45-1 202940	WATER SEAD-45 11/01/93 SW45-2 202941	WATER SEAD-45 11/01/93 SW45-3 202942
ATICS										
	ug/L	0.49	50.0%	NA	NA	NA	NA	0.13 U	0.45	0.49
	ug/L	2	50.0%	NA	NA	NA	NA	0.24 J	2	0.13 U
	ug/L	37500	100.0%	NA	750	87	4	29000	4370	968
	ug/L	2.3	25.0%	360	360	190	0	1.2 U	1.2 U	1.2 U
	ug/L	439	100.0%	NA	NA	NA	NA	204	82.5 J	33.5 J
	ug/L	1.5	50.0%	NA	130	5.3	0	1.3 J	0.3 U	0.3 U
	ug/L	11.2	25.0%	NA	3.9	1.1	1	3.3 U	3.3 U	3.3 U
	ug/L	194000	100.0%	NA	NA	NA	NA	194000	38500	33800
	ug/L	50.8	75.0%	4270	4270	509	0	45.4	3.4 J	2.5 U
	ug/L	18.2	50.0%	NA	NA	NA	NA	15.2 J	4.9 U	4.9 U
	ug/L	612	100.0%	50	50	30	3	203	119	24.8 J
	ug/L	60400	100.0%	300	NA	1000	4	47700 J	5920 J	1270 J
	ug/L	68.7	100.0%	330	330.6	12.9	2	27.2	10.9	1.9 J
	ug/L	24300	100.0%	NA	NA	NA	NA	24300	4680 J	3280 J
	ug/L	1250	100.0%	NA	NA	NA	NA	841	56.7	21.1
	ug/L	3	100.0%	NA	2.4	0.012	4	0.32	0.5	0.18 J
	ug/L	74.2	100.0%	4250	3592.5	399.4	0	72.7	8.1 J	4.2 J
	ug/L	9670	100.0%	NA	NA	NA	NA	6650	5020	1530 J
	ug/L	4340	100.0%	NA	NA	NA	NA	2810 J	899 J	1080 J
	ug/L	54.9	75.0%	190	NA	NA	0	45.9 J	6.1 J	3.3 U
	ug/L	883	100.0%	800	296.8	268.9	1	226	98.9	23.3
	ug/L	47.7	25.0%	22	22	5.2	1	8.3 U	8.3 U	8.3 U
YSES										
-Nitrogen	mg/L	1.06	100.0%	NA	NA	NA	NA	0.01	0.03	1.06

Notes:
a) The New York State Ambient Water Quality Standards and Guidelines for Class "D" Water.
b) EPA Water Quality Criteria Summary (1991), Quality Criteria for Water 1986 Updates # 1 and # 2.
c) Hardness dependent values assume a hardness of 300 mg/l.
d) NA = Not Available
e) U = Compound was not detected.
f) J = the reported value is an estimated concentration.
g) R = the data was rejected in the data validating process.
h) UJ = the compound was not detected; the associated reporting limit is approximate.

4.7.4.5 Metals

The standards for the hardness dependent values were calculated using an average hardness of 300 mg/l, which was derived from calcium and magnesium concentrations at surface water locations in SEADs-4, 13, 26, and 45 where:

$$\text{total hardness} = 2.5(Ca^{+2}) + 4.1\,(Mg^{+2}).$$

and Ca^{+2} and Mg^{+2} concentrations were values from Tables 4.1-3, 4.6-3, and 4.7-3. The concentrations of CA^{+2} and Mg^{+2} from SEAD 13 were obtained from the 3 Moderately High AOC ESI Report (Parsons ES, August, 1994).

The seven metals aluminum, cadmium, copper, iron, lead, mercury, and zinc were found in three of the four surface water samples at concentrations above the associated criteria value. In addition, cyanide was detected in sample SW45-4 at 47.7 μg/L, which exceeds the NYSDEC Class D, and EPA water quality criteria. The highest concentrations of metals were found in samples SW45-1, collected from the northernmost drainage swale, and SW45-4, collected from the low-lying area northwest of the OD mound. These drainage swales are typically dry, and the water present at the time of sampling was likely due to runoff from recent precipitation. The drainage swales are similar to the drainage swales located at the adjacent Open Burning (OB) Grounds, which were studied in detail (ES, 1994) and found to contain macroinvertebrate life typical of terrestrial environments, and not aquatic environments.

4.7.4.6 Nitroaromatics

The nitroaromatic compounds HMX and RDX were found in 2 of the surface water samples collected from the drainage swales. HMX was detected in samples SW45-2 and SW45-3 at concentrations of 0.45 μg/L and 0.49 μg/L, respectively. RDX was detected in samples SW45-1 and SW45-2 at concentrations of 0.24J μg/L and 2 μg/L, respectively. No other nitroaromatic compounds were detected in the four surface water samples analyzed.

4.7.4.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in all four of the surface water samples collected at SEAD-45, at concentrations ranging from 0.01 mg/L to 1.06 mg/L. The maximum concentration (1.06 mg/L) was detected in the sample SW45-3.

4.7.5 Sediment

A total of four sediment samples were collected as part of the SEAD-45 investigation. The summary analytical results are presented in Table 4.7-4. The sample locations were shown in Figure 2.9-2. Three of the sediment samples, SD45-1, SD45-2, and SD45-3, were collected from the drainage ditches located downgradient of the OD mound. The last sample, SD45-4, was collected from a low-lying area northwest of the OD mounds. The following sections describe the nature and extent of sediment contamination identified at SEAD-45.

4.7.5.1 Volatile Organic Compounds

No volatile organic compounds were detected in any of the four sediment samples collected at SEAD-45.

4.7.5.2 Semivolatile Organic Compounds

A total of 13 semivolatile organic compounds were identified in the 4 sediment samples collected at SEAD-45. Most of the semivolatile organic compounds detected were PAHs, and all were found at low concentrations. The highest concentration detected was 110J μg/kg of pyrene found in the sediment sample SD45-2, which was collected from the middle drainage swale. While low concentrations of SVOCs were found in the samples SD45-2, SD45-3, and SD45-4, no semivolatile organic compounds were detected in the sample SD45-1, which was collected from the northernmost drainage swale.

4.7.5.3 Pesticides and PCBs

Five pesticides and 1 PCB compound were detected in sediment samples collected at SEAD-45. Sample SD45-4, collected in the low-lying area northwest of the OD mound, had the most compounds detected, and at the highest concentrations. The concentrations ranged from 3.2J μg/kg for the pesticide endrin aldehyde, to 580J μg/kg for the PCB Aroclor-1254.

TABLE 4.7–4

SEDIMENT ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD–45 EXPANDED SITE INSPECTION

MPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NO. ABOVE CRITERIA	SOIL SEAD–45 0–0.5 11/01/93 SD45–1 202996	SOIL SEAD–45 0–0.5 11/01/93 SD45–2 202997	SOIL SEAD–45 0–0.5 11/01/93 SD45–3 202998
TICS											
	ug/kg	210	25.0%	NA	NA	NA	NA	NA	130 U	210	130 U
	ug/kg	140	25.0%	NA	NA	NA	NA	NA	130 U	140 J	130 U
oluene	ug/kg	120	25.0%	NA	NA	NA	NA	NA	130 U	120 J	130 U
-Dinitrotoluene	ug/kg	260	25.0%	NA	NA	NA	NA	NA	130 U	260	130 U
ene	ug/kg	83	25.0%	NA	NA	NA	NA	NA	130 U	83 J	130 U
E ORGANICS											
	ug/kg	24	25.0%	NA	NA	NA	NA	NA	420 U	530 U	500 U
zene	ug/kg	40	50.0%	75680	1.5	120	NA	NA	420 U	40 J	500 U
	ug/kg	34	75.0%	1390	NA	NA	NA	NA	420 U	34 J	24 J
halate	ug/kg	25	25.0%	1197(c)	NA	NA	NA	NA	420 U	25 J	500 U
	ug/kg	60	75.0%	NA	NA	NA	NA	NA	420 U	60 J	47 J
	ug/kg	110	75.0%	NA	NA	NA	NA	NA	420 U	110 J	59 J
cene	ug/kg	32	50.0%	NA	13	NA	NA	NA	420 U	32 J	23 J
	ug/kg	50	75.0%	NA	13	NA	NA	NA	420 U	50 J	36 J
nthene	ug/kg	37	50.0%	NA	13	NA	NA	NA	420 U	37 J	28 J
nthene	ug/kg	28	50.0%	NA	13	NA	NA	NA	420 U	28 J	26 J
e	ug/kg	37	50.0%	NA	13	NA	NA	NA	420 U	37 J	28 J
cd)pyrene	ug/kg	32	25.0%	NA	13	NA	NA	NA	420 U	32 J	500 U
rylene	ug/kg	48	25.0%	NA	NA	NA	NA	NA	420 U	48 J	500 U

TABLE 4.7-4

SEDIMENT ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-45 EXPANDED SITE INSPECTION

MPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NO. ABOVE CRITERIA	SOIL SEAD-45 0-0.5 11/01/93 SD45-1 202996	SOIL SEAD-45 0-0.5 11/01/93 SD45-2 202997	SOIL SEAD-45 0-0.5 11/01/93 SD45-3 202998
CB											
	ug/kg	2.7	50.0%	0.3	NA	NA	NA	NA	2.2 U	2.7 J	1.3 J
	ug/kg	7.4	25.0%	195	1.3	7.7	NA	NA	4.2 U	5.3 U	5 U
	ug/kg	12	50.0%	500	0.1	10	NA	NA	4.2 U	4.3 J	5 U
e	ug/kg	3.2	25.0%	NA	NA	NA	NA	NA	4.2 U	5.3 U	5 U
ne	ug/kg	5.7	25.0%	0.06	0.01	0.06	NA	NA	2.2 U	2.7 U	2.6 U
	ug/kg	580	50.0%	NA	0.008	195	NA	NA	42 U	74	50 U
	mg/kg	35000	100.0%	NA			NA	NA	14400	35000	22300
	mg/kg	16.1	100.0%	5			33	0	6.9	4.2	7.3
	mg/kg	308	100.0%	NA			NA	NA	85.4	308	187
	mg/kg	1.4	100.0%	NA			NA	NA	0.62 J	1.4	0.94 J
	mg/kg	25.6	100.0%	0.8			10	2	0.76 J	14.9	5.6
	mg/kg	84400	100.0%	NA			NA	NA	84400	21700	25100
	mg/kg	48.4	100.0%	26			111	0	22.5	48.4	31.4
	mg/kg	19.7	100.0%	NA			NA	NA	11.2	19.7	12.9
	mg/kg	814	100.0%	19			114	3	63.9	814	323
	mg/kg	50500	100.0%	24000			40000	1	25600	50500	32600
	mg/kg	101	100.0%	27			250	0	19.8	101	52.8
	mg/kg	10200	100.0%	NA			NA	NA	9720	10200	7630
	mg/kg	935	100.0%	428			1100	0	458	692	616
	mg/kg	5.3	100.0%	0.11			2	3	0.38	5.3	4.4
	mg/kg	67.7	100.0%	22			90	0	40.1	67.7	41.6
	mg/kg	4680	100.0%	NA			NA	NA	2580	4680	3360
	mg/kg	5.8	75.0%	NA			NA	NA	1.3 U	5.8	3.1
	mg/kg	377	100.0%	NA			NA	NA	208 J	377 J	146 J
	mg/kg	53.7	100.0%	NA			NA	NA	23.9	53.7	37.2
	mg/kg	755	100.0%	85			800	0	104	755	312
SES											
Nitrogen	mg/kg	0.13	100.0%	NA			NA	NA	0.04	0.06	0.13
	%W/W	78.7							78.7	62	66.3

NOTES:

a) NYSDEC Sediment Criteria - 1989.
b) LOT = limit of tolerance; represents point at which significant toxic effects on benthis species occur.
c) Used NYSDEC 1989 guideline for phthalates (bis(2-Ethylhexyl)phthalate.
d) NA = Not Available
e) U = compound was not detected
f) J = the reported value is an estimated concentration
g) UJ = the coumpound was not detected; the associated reporting limit is approximate.

Lower levels of 2 pesticides and Aroclor-1254 were found in the sample SD45-2. Only 1 pesticide was detected in sample SD45-3, and no pesticides or PCBs were detected in sample SD45-1.

4.7.5.4 Herbicides

No herbicides were detected in any of the 4 sediment samples collected at SEAD-45.

4.7.5.5 Metals

A number of metals were detected in the sediment samples collected at SEAD-45. Of these, cadmium, copper, iron, and mercury were detected in excess of the LOT criteria concentrations. Cadmium, detected at concentrations of 14.9 mg/kg in the sample SD45-2, and at 25.6J mg/kg in the sample SD45-4, exceeded the LOT concentration of 10 mg/kg. Copper concentrations in the samples SD45-2, SD45-3, and SD45-4 exceeded the LOT concentration of 114 mg/kg. The iron concentration reported for the sample SD45-2 of 50,500 mg/kg exceeded the LOT concentration of 40,000 mg/kg. The mercury LOT concentration of 2 mg/kg was exceeded by samples SD45-2 (5.3 mg/kg), SD45-3 (4.4 mg/kg), and SD45-4 (2.2J mg/kg). In general, most exceedances occurred in the two more southerly drainage swales (samples SD45-2 and SD45-3) and in the low-lying area northwest of the OD mound.

4.7.5.6 Nitroaromatics

Five nitroaromatic compounds were detected in the sediment samples collected at SEAD-45. The five nitroaromatic compounds RDX, Tetryl, 2,4,6-trinitrotoluene, 2-amino-4,6-dinitrotoluene, and 2,4-dinitrotoluene were all detected in the sediment sample SD45-2 only. This sediment sample was collected from the drainage area between the OD mound and Reeder Creek.

4.7.5.7 Indicator Compounds

Sediment samples at SEAD-45 were analyzed for nitrate/nitrite nitrogen. The concentrations detected ranged from 0.04 to 0.13 mg/kg.

4.7.6 Tentatively Identified Compounds

The total concentrations of tentatively identified compounds (TIC) were below 50 mg/kg in all of the samples collected at SEAD-45.

5.0 HEALTH AND ENVIRONMENTAL CONCERNS

This section will identify the source areas, release mechanisms, potential exposure pathways and the likely human and environmental receptors at each of the seven AOCs. Prior to identifying these items, an exposure pathway summary is presented.

The SEDA is a government-owned installation under the jurisdiction of the U.S. Army Material Command (AMC). The facilities include storage areas and warehouses, munitions destruction and deactivation facilities, and administration building. The Army has no plans to change the use of this facility or to transfer the ownership.

If the property is to change ownership in the future, the Army will notify all appropriate regulatory agencies and will perform any additional investigations and remedial actions to assure that any changes in the intended use is protective of human health and the environment in accordance with CERCLA. Also, Army regulations (Regulation 200-1, paragraph 12-5, Real Property Transactions), requires the Army to perform an Environmental Baseline Study (EBS) prior to a transfer of Army property. The EBS is an inventory and a comprehensive evaluation of the existing environmental conditions and consists of scope definition, survey, sampling, investigative and risk assessment.

5.1 EXPOSURE PATHWAY SUMMARIES

A preliminary exposure pathway summary was developed for each of the seven AOCs. The pathway summary combines both site conditions and expected behavior of the detected chemicals in the environment into a preliminary understanding of the site. The pathways were developed by evaluating the physical aspects of environmental conditions and the effect these conditions may have on the migration potential of the detected chemicals.

The proper framework of an exposure pathway involves a source, transport medium, exposure point, and an exposure route. A pathway is considered incomplete if one or more of these components is not present with the exception of the transport medium, which may be absent in the case of direct exposures. Therefore, if there is not a complete pathway, there is no risk from that theoretical pathway. This is designated on the Exposure Path Summary figures as NA. A pathway is an unlikely risk if there is only a remote possibility of an exposure above the appropriate criteria.

Ingestion of dust was not evaluated as a pathway because the quantity of compounds ingested as dust would be insignificant when compared to the quantity ingested as soil or inhaled as dust.

5.2 SEAD-4

5.2.1 Potential Source Areas and Release Mechanisms

Operations at the Munitions Washout Facility included dismantling and removing explosives from munitions by steam cleaning; this operation produced explosive solids and wastewater. The facility was active between 1948 and 1963. Subsequently the munitions washout building was razed and only a grassy field exists in its former locations. The suspected source areas are the former munitions washout building, the leach field, and the settling pond; the latter two of which received wastewater discharge from drainage pipes associated with the former building. These areas have the potential to contain various explosive compounds and heavy metals.

The primary release mechanism from the former munitions washout building is surface water runoff and infiltration of precipitation. Wind is also a release mechanism from impacted soil, although this is not expected to be significant as the site is vegetated or paved. The primary release mechanism from the suspected leach field is infiltration. For the settling pond, infiltration to groundwater is the primary release mechanism. At the pond, surface water flow is a release mechanism only if the water level in the pond rises above the level of the PVC discharge pipe. If this were to occur, the PVC discharge pipe would release surface water directly to the ground west of the pond where it would infiltrate to the groundwater. Surface water flow from normal precipitation events is not expected to be sustained over the 3000 foot distance to Indian Creek, which is located west and downgradient of the site. Surface water flow from SEAD-4 to Indian Creek may be sustained during periods of long storm events or during spring snow melt events.

5.2.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.2-1. The potential for human exposure is directly affected by the accessibility to the site. Within the boundaries of SEDA, human and vehicular access to the site is restricted since this facility is located within the confines of the ammunition storage area.

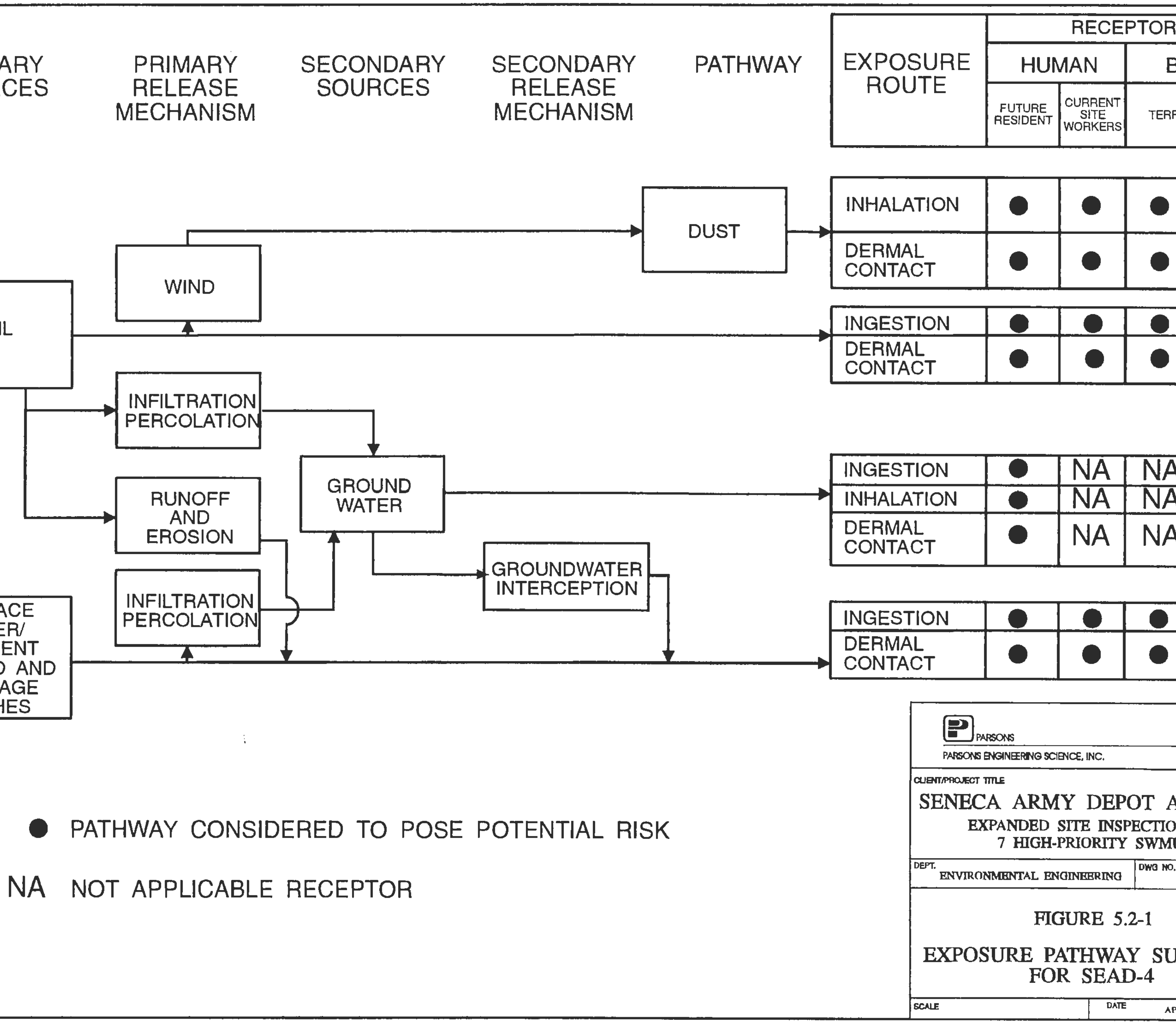


FIGURE 5.2-1

EXPOSURE PATHWAY SU
FOR SEAD-4

There are four primary receptor populations for potential releases of contaminants from the Munitions Washout Facility:

1. SEDA personnel or other people who may visit the Munitions Washout Facility;
2. Future on-site residents;
3. Terrestrial biota on or near the Munitions Washout Facility; and
4. Aquatic biota on or near the Munitions Washout Facility.

The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.2.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off migrates to the low-lying areas on the site and to the east-and west-bounding drainage swale around most of the site. In the western portion of the site, most of the surface water is directed into the settling pond. Surface soils eroded from the site are deposited within the on-site drainage swales and settling pond as sediment.

The primary human receptors of the surface water and sediment impacts are site visitors and future residents. Visitors to the site could experience dermal exposure from wading in the settling pond and would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. This site is currently inactive. SEDA workers would only visit the site for security reasons. Deerhunting is conducted during the fall season within the SEDA in a controlled manner at assigned locations that include this site. Hunters would only walk through the site. Also, workers and hunters may be exposed to impacts from ephemeral drainage in the swales. Future residents could come in contact with surface water and sediment.

The primary environmental receptors of any impacted surface water and sediment are the biota of the low-lying areas and settling pond. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., the settling pond) or eat aquatic biota may also be affected.

5.2.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. This pathway is considered to pose an unlikely risk of exposure to visitors to the site.

Dermal contact with soil is a potential exposure pathway for future on-site residents, on-site visitors and workers, and terrestrial biota.

5.2.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

Ingestion of, inhalation of, and dermal contact with groundwater are potential exposure pathways for future on-site residents. This assumes that the residents will obtain their water supply from wells installed on-site. The groundwater beneath the Munitions Washout Facility is not currently used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there would be direct exposure to the groundwater from the site under current uses to site workers and visitors and terrestrial and aquatic biota. Groundwater beneath the site flows to the west. The potential groundwater contribution to the surface water (i.e., the settling pond) could result in the exposures identified for surface water and sediments above.

5.2.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust are considered to be potential exposure pathways for future on-site residents, site workers and visitors, and terrestrial biota.

5.2.3 Summary of Affected Media

A total of 17 surface soil samples and 25 subsurface soil samples were collected at SEAD-4. To evaluate the extent of surface water runoff impacts, 4 surface water and 9 sediment samples were collected from the pond and the drainage swales on-site. Additionally, 5 groundwater samples were collected as part of this investigation. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were presented in Section 4.0.

Surface Soils

Surface soils at the site have been impacted primarily by semivolatile organic compounds and metals. Other constituents that were detected, but are considered to pose little impact, include volatile organic compounds, pesticides and PCBs, herbicides, nitroaromatics and nitrate/nitrite nitrogen. Only small numbers of these constituents exceed or slightly exceed their respective TAGMs.

A total of 19 semivolatile organic compounds were found at varying concentrations in the surface soil samples analyzed. The compounds benzo(a)anthracene, chrysene, benzo(a)pyrene, and dibenz(a,h)anthracene were reported in three surface soil samples at concentrations exceeding the associated TAGM values. The first three compounds were found at maximum concentrations of 1100 μg/kg, 1000 μg/kg, and 880 μg/kg, respectively in surface soil sample SB4-9.1, located southeast of the loading dock at building 2084. The maximum concentration of the dibenz(a,h)anthracene, 32 μg/kg, was found in surface soil sample SB4-5.1, located southwest of the former Munitions Washout Facility building.

Of the 24 metals reported in the surface soils, 18 of these were found in one or more samples at concentrations above the TAGM value. While the majority of these exceedances were found in only one or two samples, or were only marginally above the TAGM value, several metals were identified at concentrations which were significantly above the TAGM value. Of particular note are the metals chromium, copper, and zinc, where a large percentage of the samples exceeded the TAGM value and the concentrations of the exceedances are generally an order of magnitude or greater above the TAGM value. The highest concentrations of these metals (Cr at 4870 mg/kg, Cu at 3410 mg/kg, and Zn at 1010 mg/kg) were found in surface soil samples west and south of the settling pond, in and near the area where the sediment previously dredged from the pond is located. These findings suggest that the migration of metals due to surface water runoff may be a likely transport mechanism.

Subsurface Soils

Subsurface soils at SEAD-4 have been impacted primarily by metals. TAGM exceedances for antimony, copper, chromium, and zinc were observed at significant concentrations (up to an order of magnitude above their respective TAGMs) in two subsurface soil samples. The remaining organic and inorganic constituents which were detected in the subsurface soil samples were considered to pose little impact due to their detection at concentrations which were below or only slightly above their respective TAGM values.

Groundwater

Groundwater at the site appears to have been impacted by metals. Other constituents that were detected include semivolatile organic compounds and nitrate/nitrite nitrogen. These latter constituents were considered to pose little impact because they are either present at low concentrations only a small number of samples exceed or slightly exceed their respective TAGMs. Constituents that were not detected on-site include volatile organic compounds, pesticides and PCBs, herbicides, and nitroaromatics.

The seven metals antimony, beryllium, cadmium, iron, magnesium, manganese, and sodium were found in one or more of the groundwater samples at concentrations above the criteria value. Other than antimony and beryllium, the five remaining metals are not considered to represent a significant health risk. Beryllium was detected in one well, MW4-3 at a concentration 6.3 ppb, which is over the NYSDEC GA groundwater classification of 3 ppb.

Surface Water

Three metals, aluminum, copper and iron, were found in three of the four surface water samples at concentrations above the most stringent state or federal criteria value. In addition, one nitroaromatic compound (1,3-dinitrotoluene) was detected in the sample from the vertical pipe at the suspected leach field. Constituents that were not detected on-site and have been eliminated from further consideration include: volatile organic compounds, semivolatile organic compounds, pesticides and PCBs, and herbicides. Nitrate/nitrite nitrogen was detected below the Class GA groundwater standard and federal MCL standard, each being 10 mg/L.

Sediment

Sediment at the site has been impacted primarily by semivolatile organic compounds, pesticides, PCBs, and metals. Other constituents that were detected, but are considered to pose little impact, include volatile organic compounds, herbicides and nitrate/nitrite nitrogen. These latter constituents are either present at low concentrations and/or only a small number of samples exceed or slightly exceed their respective TAGMs. Nitroaromatics were not detected in the sediments at SEAD-4.

A total of nine semivolatile organic compounds were identified in nine sediment samples. The maximum SVO concentration reported was for bis(2-ethylhexyl)phthalate where 3600

μg/kg was found in sample SD4-8 collected in the drainage swale north of the suspected leachfield. The three sediment samples collected from this swale (SD4-7, SD4-8, and SD4-9) had the highest total SVO concentrations of the nine samples analyzed. A wide distribution of SVOs including Polynuclear Aromatic Hydrocarbons (PAHs) were detected at low concentrations in sample SD4-4, collected from the southern drainage swale.

Seven pesticide or PCB compounds were identified at concentrations above the criteria value in one or more of the nine sediment samples. Aroclor-1254 was found in seven of the nine sediment samples at concentrations ranging from 29 μg/kg to 430 μg/kg (in sample SD4-8). The compounds 4,4'-DDE and alpha-chlordane were found at low concentrations in four of the nine samples.

A variety of metals were found at concentrations above the NYSDEC Limit of Tolerance values. Of these metals, chromium and copper appear in a large number of samples and/or at concentrations greater than the criteria value. Their maximum concentrations are 4170 mg/kg and 2640 mg/kg, respectively. Two sediment samples collected from the pond (SD4-2 and SD4-3) had concentrations of chromium, copper, and zinc that exceeded the NYSDEC sediment criteria values for protection of aquatic life. Generally, surface water runoff appear to be the likely mechanism for the distribution and concentration of metals in the pond and portions of the northern and southern drainage swales.

5.3 SEAD-16

5.3.1 Potential Source Areas and Release Mechanisms

The Abandoned Deactivation Furnace was used to destroy obsolete and unserviceable small arms munitions by incineration. There were no pollution or dust control devices installed on the furnace. Thus, the suspected sources from the munitions incineration activities at the site are interior locations in the Deactivation Furnace building (including its associated piping) and nearby surface soils.

Airborne emissions from the furnace combined with wind dispersion may have resulted in the deposition of particulates containing explosive compounds and/or metals to the soils in the vicinity of SEAD-16. Surface water runoff across the site is a primary release mechanism as is infiltration into the ground which could potentially impact groundwater. Although interior portions of the building are known to contain standing water, infiltration into the ground of this water is not considered a release mechanism because the floor of the building is concrete.

Wind-blown dust is considered to be a secondary release mechanism as there are many unpaved or unvegetated areas of the site including a dirt roadway that traverses the site near the Deactivation Furnace building.

5.3.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.3-1. The potential for human exposure is directly affected by the accessibility to the site. Within SEDA, human and vehicular access to the site is restricted by a chain-link fence with a locking gate. Since this facility is within the ammunition storage area further access is restricted.

There are three primary receptor populations for potential releases of contaminants from the Abandoned Deactivation Furnace:

1. Future on-site residents;
2. SEDA personnel and other people who might occasionally visit the Abandoned Deactivation Furnace; and
3. Terrestrial biota on or near the Abandoned Deactivation Furnace.

Aquatic biota are not present because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.3.2.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

Surface water run-off patterns are not well defined on-site as there are few well defined drainage swales or depressions. However, surface water appears to flow to small low-lying areas on the site. In the paved western portion of the site, a significant portion of surface water would be expected to accumulate temporarily on the relatively flat asphalt surface, although this water would likely drain to the west once the accumulation was large enough. In the eastern portion of the site, surface water accumulates in small depressions, and due to the lack of significant mechanisms to influence the direction of surface water flow, most of it would likely evaporate or infiltrate into the ground. The only possible influence would come from two small swales which appear to direct surface water to the southeast and

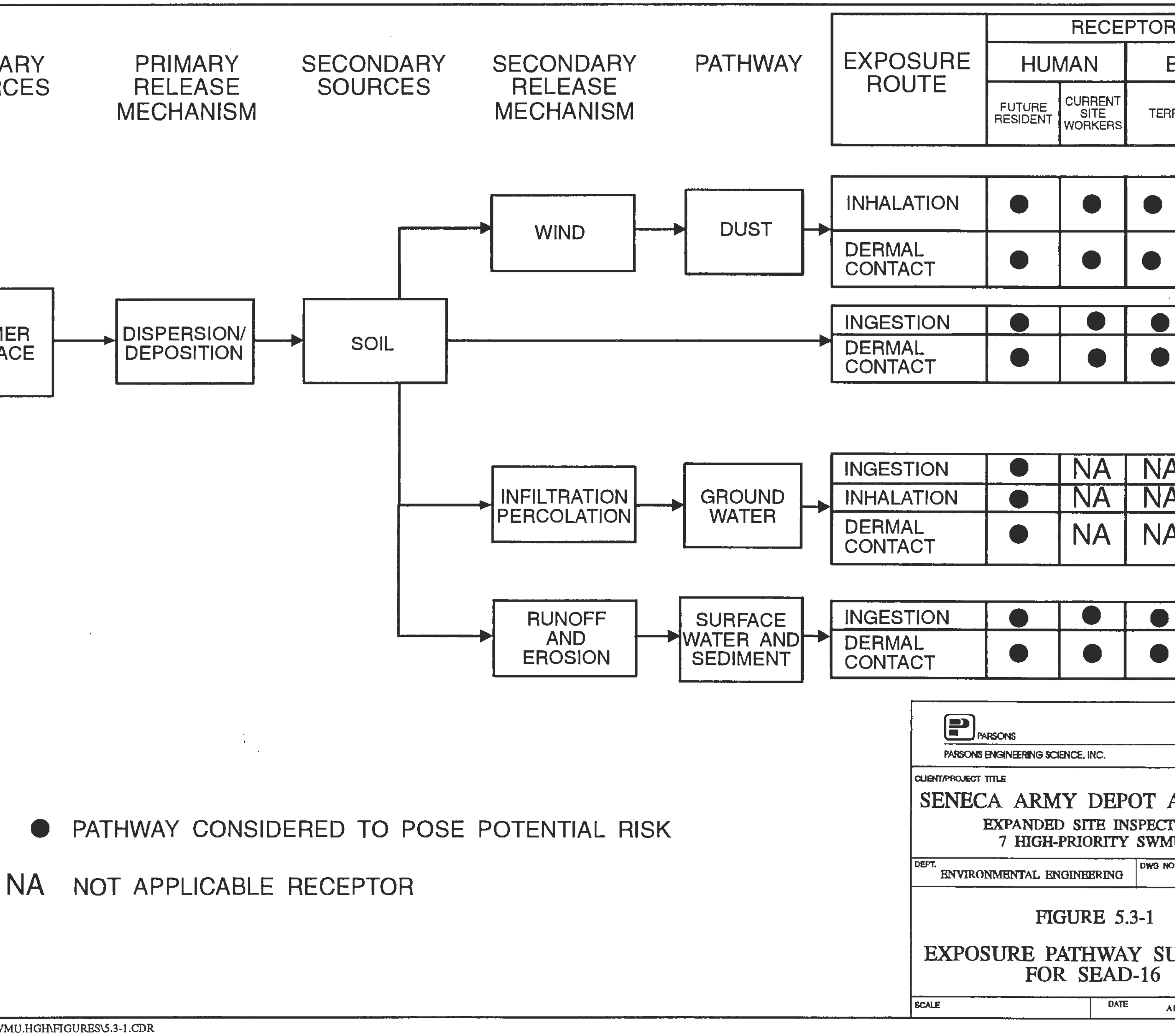


FIGURE 5.3-1

EXPOSURE PATHWAY SU
FOR SEAD-16

northwest. Surface soil erosion from the eastern portion of the site is expected to be low since the grade is not steep, while on the western portion no erosion of surface soil is likely to occur as it is protected by a layer of asphalt.

Interior portions of the deactivation furnace building are known to contain "surface water" (i.e., standing water that has pooled on the concrete floors). It is likely that some surface water from around the outside of the building has been diverted into the low-lying portions within the building; on the east side of the building there is a concrete ramp which was water-filled and leads to the interior of the building.

It is possible that a SEDA worker or visitor may be exposed to water in the building or drainage in the two small swales in the eastern portion of the site during a site visit. Terrestrial biota that drink from, and come in contact with, impacted surface waters located inside the abandoned deactivation furnace building may also be affected. Future residents could ingest or come in contact with surface water and sediment.

5.3.2.2 Dust Inhalation and Dermal Contact

Impacted fugitive dust may be released by vehicle traffic through the area or by high winds. The primary human receptors of fugitive dust emissions from SEAD-16 are SEDA personnel, site visitors and future on-site residents.

5.3.2.3 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with, and inadvertent ingestion of, soil is a potential pathway for current site workers and visitors.

5.3.2.4 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the Abandoned Deactivation Furnace is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to current on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

5.3.3 Summary of Affected Media

During the investigation of this site, a total of 16 surface soil samples were collected from the area surrounding the Abandoned Deactivation Furnace building. To evaluate the nature and the extent of impacts inside the building, 8 soil samples were collected from soil-like materials which were transported onto, or settled onto, the surfaces within the building. Two water samples were collected from standing water present in the building, and 9 building material and furnace scale samples were collected to determine if asbestos materials were present. Three monitoring wells were also installed on-site and sampled as part of this program. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were presented in Section 4.0.

Surface Soils

Surface soils at the site have been impacted primarily by semivolatile organic compounds, metals, and nitroaromatics. Other constituents that were detected include volatile organic compounds, pesticides and PCBs, herbicides, and nitrate/nitrite nitrogen. These latter constituents were determined to pose little impact because only a small number of samples exceed or slightly exceed their respective TAGMs.

A total of three semivolatile organic compounds were found at concentrations above the associated TAGM values in one or more of the soil samples. These three compounds are benzo(a)anthracene, chrysene, and benzo(a)pyrene. The maximum concentrations of these compounds were found in two of the surface soil samples (SS16-1 and SS16-2) collected from and eastern perimeters of the Abandoned Deactivation Furnace Building. Based upon the distribution of the samples, the soils to the north and east of the building appear to have the highest concentrations of SVOs, however, the concentrations of only a few compounds exceed the associated TAGM value.

Eighteen of the 21 metals detected in the surface soil analyses were found in one or more samples at concentrations exceeding their associated TAGM values. Of the 21 metals detected, 5 of these antimony, copper, lead, mercury, and zinc were found at concentrations that greatly exceed their associated TAGM values. Significant TAGM exceedances for these elements were found in 11 of the 16 surface soil samples analyzed.

Three nitroaromatic compounds (tetryl, 2-amino-4,6-dinitrotoluene, and 2,4-dinitrotoluene) were identified in one or more of the 16 surface soil samples collected at the site. The two former compounds were detected only once in two different samples. The latter compound (2,4-dinitrotoluene) was the most prevalent, it was detected in 9 of the 16 surface soil samples. The maximum concentration of this compound was detected in surface soil sample SS16-14 (1200 μg/kg).

Floor Samples

The floor samples collected from within the Abandoned Deactivation Furnace have been impacted primarily by semivolatile organic compounds, metals, nitroaromatics and nitrate/nitrite nitrogen. Other constituents that were detected include volatile organic compounds, pesticides and PCBs and herbicides. These latter constituents were determined to pose little impact because only a small number of samples exceed or slightly exceed their respective TAGMs.

Seven SVOs were detected at concentrations which exceeded TAGMs in the floor samples analyzed: Phenol, benzo(a)anthracene, chrysene, benzo(b) and benzo(k)fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene. The highest concentrations of these SVOs were found in floor samples FS16-3 and FS16-7. In general, all eight floor samples had a wide range of SVOs detected at low to very high concentrations.

Eight metals were detected at concentrations which significantly exceeded their associated TAGM values. Antimony, barium, cadmium, copper, lead, mercury, silver, and zinc were each found at significant levels in at least one of the following floor samples: FS16-1, FS16-2, FS16-3, FS16-7 or FS16-8. The highest concentrations of most of these metals were found in floor samples FS16-2 and FS16-3.

The nitroaromatic compounds 2,4,6-TNT and 2,4-DNT were found in the floor samples analyzed. 2,4,6-TNT was found in only one floor sample (FS16-1) at a concentration of 170 μg/kg. 2,4-DNT was found in five floor samples at concentrations ranging from 72J to 3100J μg/kg.

Nitrate/nitrite nitrogen was found at concentrations which were between one and three orders of magnitude greater in floor samples FS16-1 (151 mg/kg), FS16-2 (13.7 mg/kg), and FS16-6

(104 mg/kg) than in any of the remaining soil samples (surface and floor) collected at SEAD-16.

Groundwater at the site has not been significantly impacted by any of the constituents analyzed. Although metals were detected above the criteria value in two of the three wells, it is likely that the high metal concentrations are likely due to the high sample turbidity. Other constituents that were detected include semivolatile organic compounds, nitroaromatics and nitrate. These latter constituents were determined to pose little impact because they are present at low concentrations and/or only a small number of samples exceed or slightly exceed their respective TAGMs. Constituents that were not detected on-site include volatile organic compounds, pesticides, PCBs, and herbicides.

No significant concentrations of contaminants were detected in the standing water samples from inside the building, although a variety of metals were detected at low concentrations in the samples.

Asbestos was detected in 5 of the 15 building material and soil samples analyzed. Chrysotile was found in all of the samples and amosite in only two.

5.4 SEAD-17

5.4.1 Potential Source Areas and Release Mechanisms

The Existing Deactivation Furnace has been active from 1962 to the present. Air pollution equipment was added to the building in 1970, and was further upgraded in 1989. This facility has not operated since the 1989 upgrade, pending approval of the RCRA Trial Burn Plan (TBP). Ammunition is detonated safely within the confines of the steel retort furnace. The residue from the furnace is transferred by a conveyor to an approved hazardous waste container and allowed to cool. When cooled, the scrap metal is disposed in barrels for transfer to the DRMO. The suspected source at the Existing Deactivation Furnace is the munitions incineration that may have impacted the area around the furnace and/or the surface soils surrounding the building. These areas have the potential to contain various residual explosive compounds and heavy metals.

The primary release mechanism from the site is airborne dispersion and/or volatile emissions which may have resulted in the deposition of particulates containing explosive compounds and/or metals into the soil in and around SEAD-17. Surface water runoff across the site is a secondary release mechanism as well as infiltration into the ground which could potentially impact groundwater. Wind-blown dust is also considered to be a secondary release mechanism as there is an unpaved roadway that surrounds the Existing Deactivation Furnace building.

5.4.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.4-1. The potential for human exposure is directly affected by the accessibility to the site. Within SEDA, human and vehicular access to the site is not restricted.

There are three primary receptor populations for potential releases of contaminants from the Existing Deactivation Furnace:

1. Future on-site residents
2. SEDA personnel or visitors who may go to the Existing Deactivation Furnace; and
3. Terrestrial biota on or near the site.

Aquatic biota are not present because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

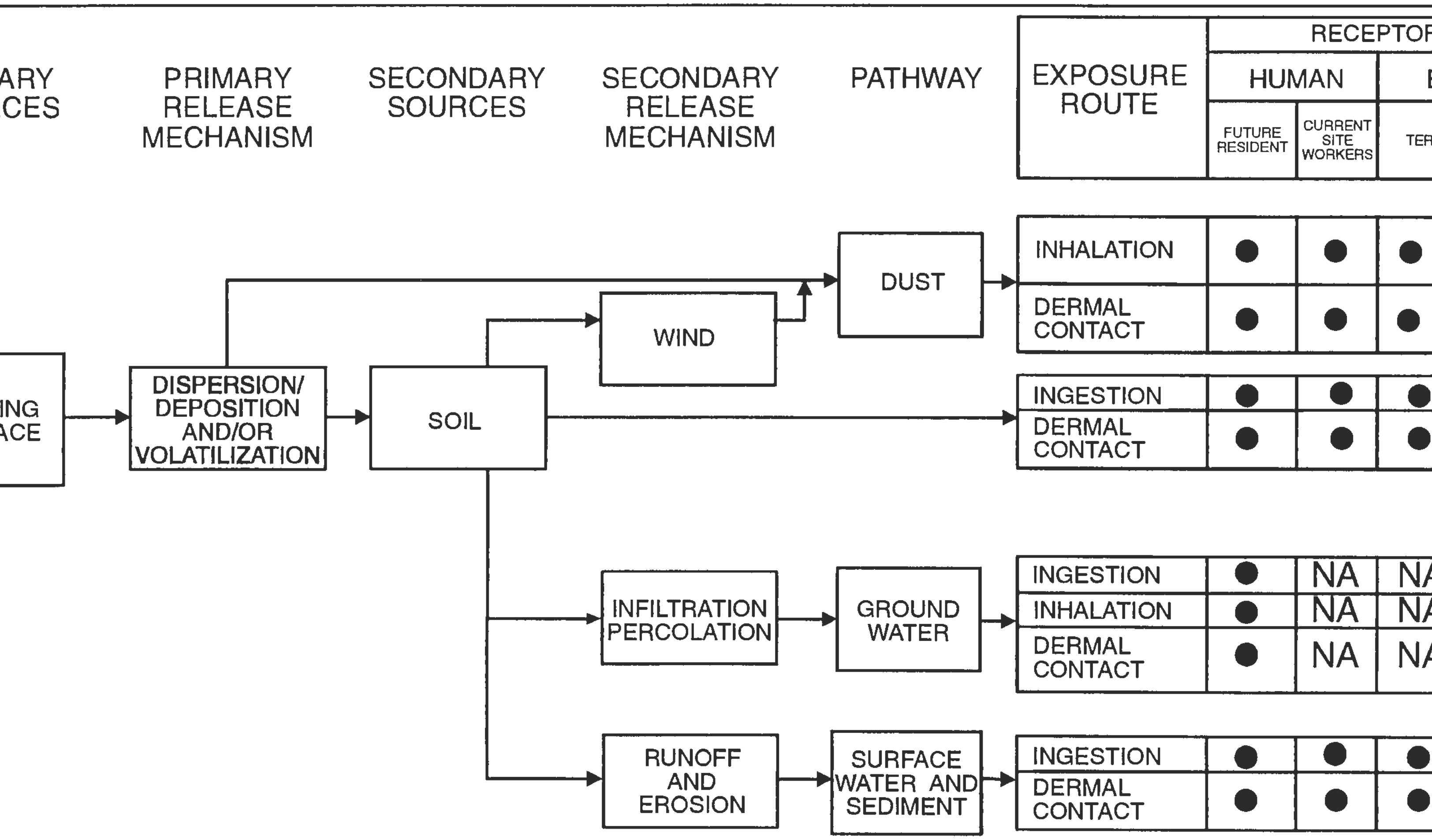
5.4.2.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

Surface water run-off flows off-site via the drainage swales that are located around the site. Surface soils eroded from the site may be deposited as sediment within the on-site drainage swales.

Ingesting and coming in contact with impacted surface water and sediment are potential exposure routes for future on-site residents and terrestrial biota. SEDA workers and visitors could come in contact with or unintentionally ingest impacted surface water and sediment.

5.4.2.2 Dust Inhalation and Dermal Contact with Dust and/or Volatile Emissions

Although the Existing Deactivation Furnace is currently inactive pending RCRA permit approval, this facility is expected to eventually become an active facility. Impacted dust and/or volatilized compounds may be released from the land on-site due to vehicle traffic through



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT A
EXPANDED SITE INSPECT
7 HIGH-PRIORITY SWMU

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO.

FIGURE 5.4-1

EXPOSURE PATHWAY SU
FOR SEAD-17

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the area, high winds or disturbance of the soils during site use. The dust could be inhaled by or come in contact with future on-site residents, SEDA workers and visitors, and terrestrial biota.

5.4.2.3 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with, and inadvertent ingestion of, soil is a potential pathway for current site workers and visitors.

5.4.2.4 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the Existing Deactivation Furnace is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. Ingestion, inhalation, and dermal contact with groundwater from SEAD-17 are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

5.4.3 Summary of Affected Media

A total of 27 surface soil samples were collected from the area surrounding the Existing Deactivation Furnace. In addition, 5 subsurface soil samples were collected from 4 soil borings. Four monitoring wells were installed and sampled. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were previously presented in Section 4.0.

Surface Soils

Surface soils at the site have been impacted primarily by metals. Other constituents that were detected include volatile organic compounds, semivolatile organics, pesticide and PCBs, herbicides, nitroaromatics and nitrate/nitrite nitrogen. These latter constituents were determined to pose little impact because only a small number of samples exceed or slightly exceed their respective TAGMs.

Eighteen of the 24 analyzed metals were found in one or more surface soil samples at concentrations exceeding their associated TAGM values. Significant TAGM exceedances were noted for cadmium, copper, lead, and zinc. The highest concentrations of these compounds were 14.3 mg/kg of cadmium, 654 mg/kg of copper, 3150 mg/kg of lead, and 1530 mg/kg, of zinc.

Subsurface Soils

Only eight metals were found at concentrations only slightly above TAGM values in the 5 subsurface samples analyzed.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed. While metals were detected above the criteria value in one of the four wells (the upgradient well), it appears that the high metal concentrations are most likely due to the high sample turbidity. Other constituents that were detected in groundwater include nitroaromatics and nitrate/nitrite nitrogen. These latter constituents were determined to pose little impact because a small number of samples exceed or slightly exceed their respective criteria values. Constituents that were not detected in groundwater on-site include volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, and herbicides.

5.5 SEAD-24

5.5.1 Potential Source Areas and Release Mechanisms

The Abandoned Powder Burning Pit was active during the 1940s and 1950s. Although operating practices at this site are unknown. The primary source of contaminants considered for this site were black powder, M10 and M16 solid propellants, and probably explosive containing sawdust (generated during munitions washout operations). The suspected secondary sources are the soils that comprise the U-shaped berm and the surface soils within the bermed area that constitute the pad. These areas have the potential to contain various explosive compounds and heavy metals. Additional secondary sources considered were groundwater beneath SEAD-24 and the surface water and sediment in neighboring drainage swales.

The primary release mechanisms from the soils that comprise the berm as well as the soils within the bermed area are surface water runoff, infiltration of precipitation, and wind (dispersion and deposition). Infiltration and percolation through, and runoff and erosion of, secondary source soils, interception of groundwater to surface water bodies or drainage ditches, and wind are considered secondary release mechanisms.

5.5.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.5-1. The potential for human exposure is directly affected by the accessibility to the site. Within SEDA, human and vehicular access to the site is not restricted.

There are four primary receptor populations for potential releases of contaminants from the Abandoned Powder Burning Pit:

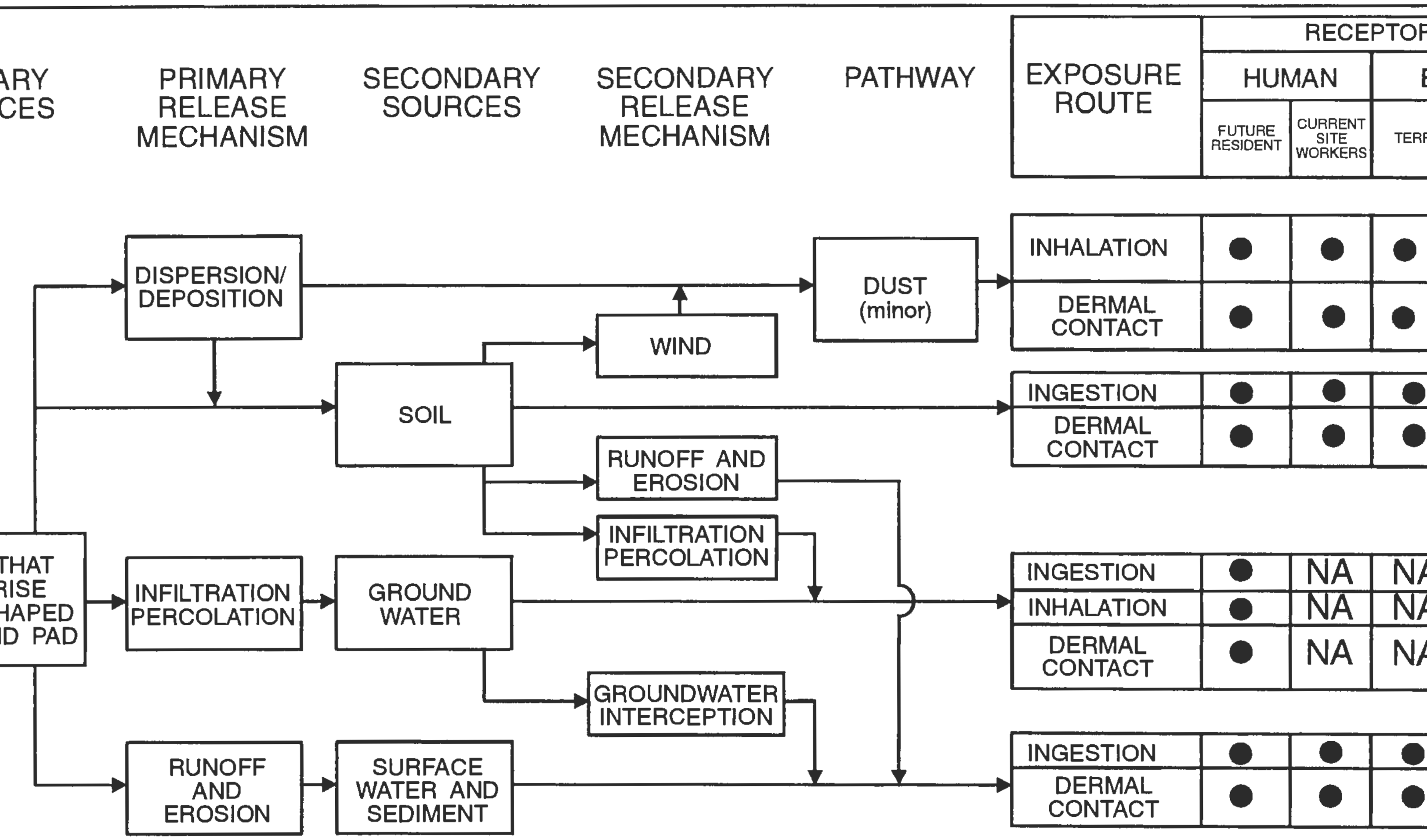
1. Future on-site residents;
2. SEDA personnel and visitors who may go on or near the Abandoned Powder Burning Pit;
3. Terrestrial biota near the Abandoned Powder Burning Pit; and
4. Aquatic biota in Kendaia Creek.

The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.5.2.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

Surface water run-off is not well defined on-site, but generally migrates to the low-lying areas. Based on land surface topography, the surface water on-site is likely to drain west into a small wetland area and a poorly defined north-south trending drainage swale. Surface water in the wetland drains north via the swale, passes through a conduit under West Kendaia Road, and eventually is discharged into Kendaia Creek which flows west to Seneca Lake. Surface soils eroded from the site may be deposited as sediment in the wetland and the associated drainage swale.

The primary environmental receptors of any impacted surface water and sediment are the aquatic biota of the swampy area and possibly Kendaia Creek. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the surface water and sediment. Terrestrial biota that drink from and come in contact with impacted surface waters may also be affected. Although Seneca Lake is a potential environmental receptor, it is only



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIE

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT A
EXPANDED SITE INSPECT
7 HIGH-PRIORITY SWMU

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO.

FIGURE 5.5-1

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FOR SEAD-24

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a consideration if exposures are demonstrated in Kendaia Creek and impacts to the lake through surface water, sediment or biota, are expected.

Human receptors of impacted surface water and sediment include future on-site residents by way of ingestion and dermal contact and current SEDA personnel and visitors who may come in contact with the surface water and sediment. Inadvertent ingestion of surface water and sediment by SEDA personnel and visitors was considered a potential risk of exposure at SEAD-24.

5.5.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with, and inadvertent ingestion of, soil is a potential pathway for current site workers and visitors.

5.5.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the Abandoned Powder Burning Pit is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors, terrestrial biota, and aquatic biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

Groundwater beneath the site flows generally to the west, although there may be a northwesterly component to the flow in the northern portion of the site near Kendaia Creek. The potential groundwater contribution to the surface water (i.e., Kendaia Creek) could result in the exposures identified for surface water and sediments above.

5.5.3 Summary of Affected Media

A total of 17 surface soil samples and 10 subsurface soil samples were collected at SEAD-24. Three groundwater well were installed and sampled as part of this investigation. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were previously presented in Section 4.0.

Surface Soils

Several constituents including VOCs, SVOs, pesticides and PCBs, herbicides, metals, nitroaromatics and TPH were detected at this site, but only 3 SVOs and 15 metals were present in concentrations exceeding their respective TAGM soil guidance value. All 3 SVO TAGM exceedances were in one sample, SS24-1, and all were at low concentrations. The only other organic of note was 2,4-dinitrotoluene, a nitroaromatic, which was present in several surface soil samples and was detected at a maximum concentration of 4,400 μg/kg. No TAGM value currently exists for this compound, however, a TAGM value does exist for a similar isomer, 2,6-dinitrotoluene. The TAGM value for 2,6-dinitrotoluene is 1,000 μg/kg. Of the 15 metals, arsenic, cadmium, copper, lead, nickel, and zinc were found at the highest concentrations which significantly exceeded their respective TAGMs. Several of these elements were also found in numerous surface soil samples at concentrations which exceeded TAGM values.

Arsenic was detected at concentrations above the TAGM 7.5 mg/kg in 11 of the surface soil samples collected. The highest concentration, 56.8 mg/kg, was detected in the surface soil sample SS24-6.

Cadmium was detected in concentrations exceeding the TAGM value in only one sample, SS24-12. The concentration of 8.2 mg/kg exceeded the TAGM value of 1 mg/kg.

Copper was detected in concentrations exceeding the TAGM value of 25 mg/kg in 11 of the surface soil samples analyzed. Most of these exceedances were only slightly above the TAGM value (i.e., in the 25 to 30 mg/kg range). The exception was sample surface soil SS24-9, which had a copper concentration of 324 mg/kg, however, the copper concentration in the duplicate sample of SS24-9, SS24-13, was 34.5 mg/kg, suggesting that the exceedance is not widespread.

Lead concentrations exceeded the TAGM value of is 30 mg/kg, in 13 of the surface soil samples analyzed. The maximum concentration of lead, 422 mg/kg, was found in the surface soil sample SS24-5. All other detected lead concentrations were below 100 mg/kg.

Nickel concentrations exceeded the TAGM value of 37 mg/kg in eight of the soil samples collected. The only anomalously high concentration of nickel was 535 mg/kg, found in the surface soil sample SS24-12.

Zinc concentrations exceeded the TAGM value of (90 mg/kg) in 13 samples. The highest concentrations were 566 mg/kg in SS24-5 and 1180 mg/kg in sample SS24-12.

Subsurface Soils

The results of the subsurface soil analyses indicate that only a small number of insignificant impacts have occurred to this media. Seven inorganic elements were the only constituents detected at concentrations above TAGM values however, all were found at levels which only slightly exceeded their respective TAGMs. All of the remaining constituents detected in the subsurface soil samples were found at concentrations below TAGM values.

In general, the distribution of the metals which were found at concentrations above TAGMs is limited to the surface soils at the site.

Groundwater

There is no evidence to indicate that groundwater has been adversely impacted by any of the constituents tested for under this investigation. No organic constituents were detected. Some elevated metals concentrations were found (iron, magnesium, and manganese) but these are attributed to high turbidities in the samples. Iron, magnesium and manganese are not considered to represent significant health threats.

5.6 SEAD-25

5.6.1 Potential Source Areas and Release Mechanisms

The Fire Training and Demonstration Pad has been in use since the late 1960s. In the past it was used for fire control training. Currently the pad is not used. The suspected source area is the pad on which burning took place. This area has the potential to contain various petroleum (volatile and semivolatile) compounds and possibly heavy metals resulting from fire training exercises. Soil, surface water and sediment are considered as secondary sources as well as pathways of exposure. If infiltration of precipitation occurs then groundwater would also become a pathway.

The primary release mechanisms from the Fire Training and Demonstration Pad are direct deposition of chemicals used during fire training exercises and volatilization, dispersion and deposition of particulates from fires used for training purposes and surface water runoff and erosion. Secondary release mechanisms are surface water runoff and erosion, infiltration, wind (dust) and/or volatilization.

5.6.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.6-1. The potential for human exposure is directly affected by the accessibility to the site. Within SEDA, human and vehicular access to the site is not restricted.

There are three primary receptor populations for potential releases of contaminants from the Fire Training and Demonstration Pad:

1. Future on-site residents;
2. SEDA personnel who might work on or near the Fire Training and Demonstration Pad and visitors who may go there; and
3. Terrestrial biota near the site.

There are no aquatic biota because there are no ponds or streams on-site. The exposure pathways and media of exposure are described below as they may effect the various receptors.

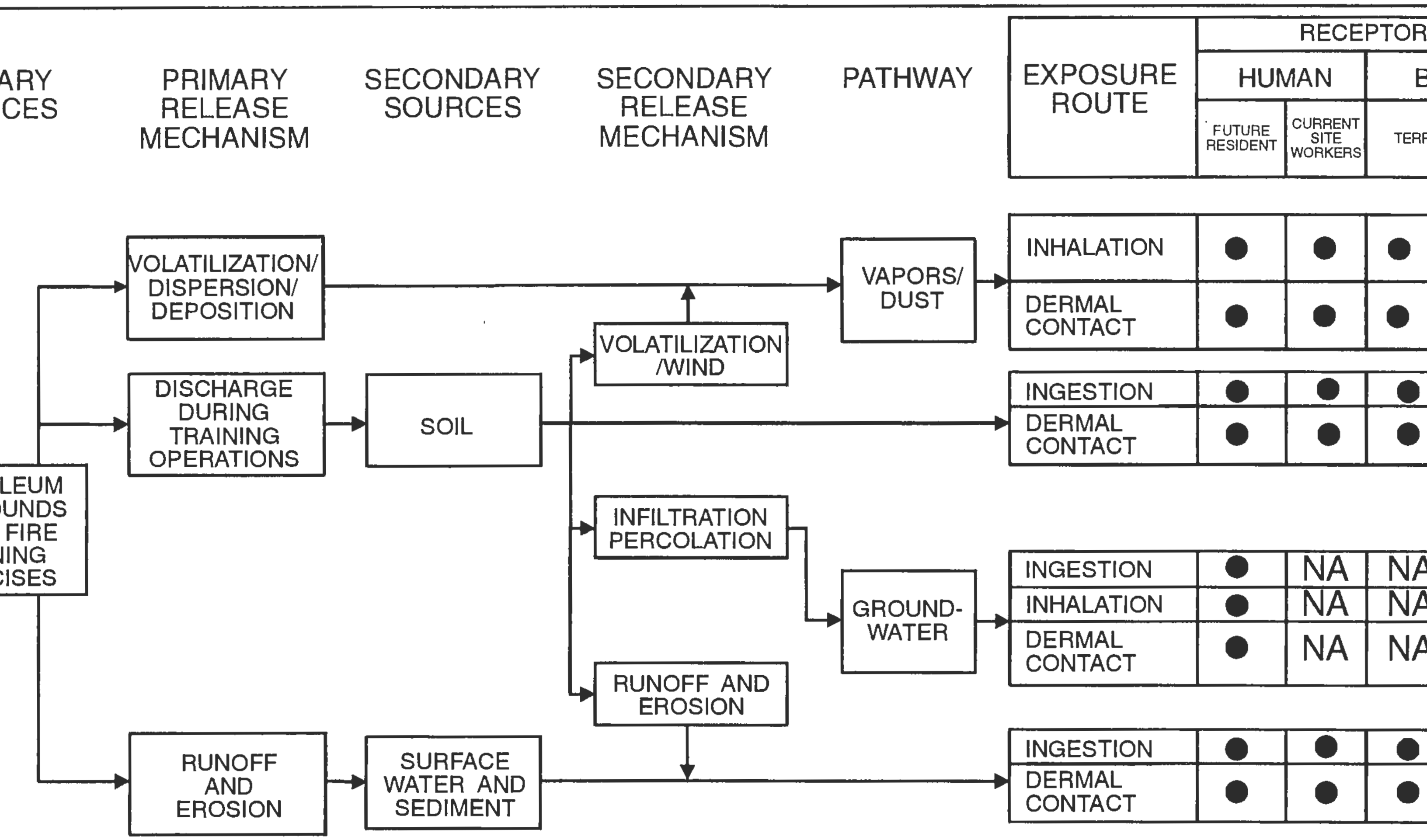
5.6.2.1 Ingestion and Dermal Exposure to Surface Water Runoff and Sediment

Surface water run-off flows off-site via the drainage swales that are present approximately 100 feet to the east and south along roads, and approximately 325 feet to northwest of the pad. Surface soils eroded from the site may be deposited as sediment within the on-site swales.

Ingesting and coming in contact with impacted surface water and sediment are potential exposure routes for future on-site residents, especially children, and terrestrial biota. SEDA workers and visitors could also come in contact with, or unintentionally ingest, impacted surface water and sediment at SEAD-25.

5.6.2.2 Inhalation of and Dermal Contact with Dust and/or Volatile Emissions

Impacted dust and/or volatile organic compounds may be released from the Fire Training and Demonstration Pad due to high winds or vehicle traffic through the area. Fugitive dusts would not be expected to be transported beyond the SEDA boundary. As with fugitive dusts, volatilized contaminants would not be expected to migrate off-site in significant concentrations due to dilution with the air. Therefore, the dust and/or volatile emissions could be inhaled by or come in contact with future on-site residents, SEDA workers and visitors, and terrestrial biota.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT A

EXPANDED SITE INSPECT

7 HIGH-PRIORITY SWM

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FIGURE 5.6-1

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5.6.2.3 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with, and unintentional ingestion of, soil is a potential pathway for current site workers and visitors.

5.6.2.4 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the Fire Training and Demonstration Pad is not used as a drinking water source and connection to other potable groundwater aquifers is unlikely since no private drinking water wells are known to exist within the confines of the facility. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

5.6.3 Summary of Affected Media

A total of 6 surface soil and 11 subsurface soil samples were collected from six soil borings at SEAD-25. Three groundwater wells were installed and sampled as part of this investigation. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were previously presented in Section 4.0.

Surface Soils

There is evidence that surface soils on the burning pad have been impacted by a variety of constituents. Volatile organic compounds, primarily benzene, toluene, ethylbenzene and xylenes (BTEX) with lesser amounts of chlorinated compounds, are present in the surface soils in the western half of the burning pad. Two samples had xylene concentrations in excess of the TAGM soil guidance value, 2 samples had acetone concentrations in excess of the TAGM value, and 1 sample had methylene chloride concentrations in excess of the TAGM value. In addition, benzene was present in sample SB25-3.1 at a concentration that exceeded the TAGM value. Three PAHs were found in SB25-6.1 sample at concentrations exceeding the TAGM value. While a variety of samples were found to contain metals at concentrations that exceed the associated TAGM or site background values, most of the concentrations exceeded the TAGM value only slightly. Lead, the only exception, exceeded the TAGM concentration in samples that also contained elevated concentrations of BTEX and PAHs suggesting that leaded petroleum may have been used. Elevated TPH concentrations correspond with the presence of BTEX and PAHs.

Subsurface Soils

The occurrence and distribution of BTEX compounds in the subsurface soil samples were similar to those found in the surface soils. BTEX compounds were detected at varying concentration in 7 of the 11 subsurface soil samples analyzed. Xylene was detected at concentrations which exceeded TAGM in each of the two subsurface soil samples collected from soil boring SB25-5. Toluene and ethylbenzene were also detected above TAGM in subsurface soil sample SB25-5.2 (collected from the 2 to 4 foot depth interval). Methylene chloride and acetone were the only additional VOCs detected at concentrations which exceeded TAGM values. These compounds were found at elevated concentration only in sample SB25-5.3, which was collected from the 4 to 6 foot depth intervals of soil boring SB25-5.

Groundwater

There is evidence that groundwater in the western portion of the pad has been impacted by similar constituents as the soil from this area. A total of 9 volatile organic (BTEX and chlorinated compounds) and semivolatile organic compounds were detected in groundwater immediately west and south of the pad at concentrations that exceeded the NYSDEC class GA groundwater standard; the highest concentrations were detected on the southern side. No pesticide, PCB or herbicide compounds were detected. Metals released as a result of site activities are not believed to have adversely impacted groundwater. Only iron, magnesium, manganese and sodium were detected at concentrations exceeding the standards. These metals are not considered to represent a health threat. TPH was detected in groundwater samples collected from wells on the western and southern sides of the pad. NYSDEC does not currently have a TPH groundwater guidance value, however, TPH is considered to be an indicator of petroleum impacts.

5.7 SEAD-26

5.7.1 Potential Source Areas and Release Mechanisms

The Fire Training Pit and the surrounding area has been in use from 1977 to the present. A bentonite layer was installed in the pit in 1982 or 1983. Presently, the Fire Training Pit and the surrounding area are active. The pit is used one to two times a year for fire fighting training, which involves igniting and extinguishing petroleum fuels. The suspected source areas at the site are the Fire Training Pit, the areas surrounding the pit where burned vehicles are located, and the drum storage area in the southern end of the site. These areas have the potential to contain various petroleum (volatile and semivolatile) organic compounds and possibly heavy metals.

The primary release mechanisms from the Fire Training Pit and surrounding areas are direct deposition of chemicals used during fire training exercises and dispersion and deposition and/or volatile emissions into the air. Surface water runoff, infiltration of precipitation and wind are considered as secondary release mechanisms. At the pit, surface water flow is a concern if the water level in the pit rises above the level of the low berm that defines it. If an overflow were to occur, the surface water from the pit would flow radially away.

5.7.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.7-1. The potential for human exposure is directly affected by the accessibility to the site. Within SEDA, human and vehicular access to the site is restricted by a locked chain-link fence.

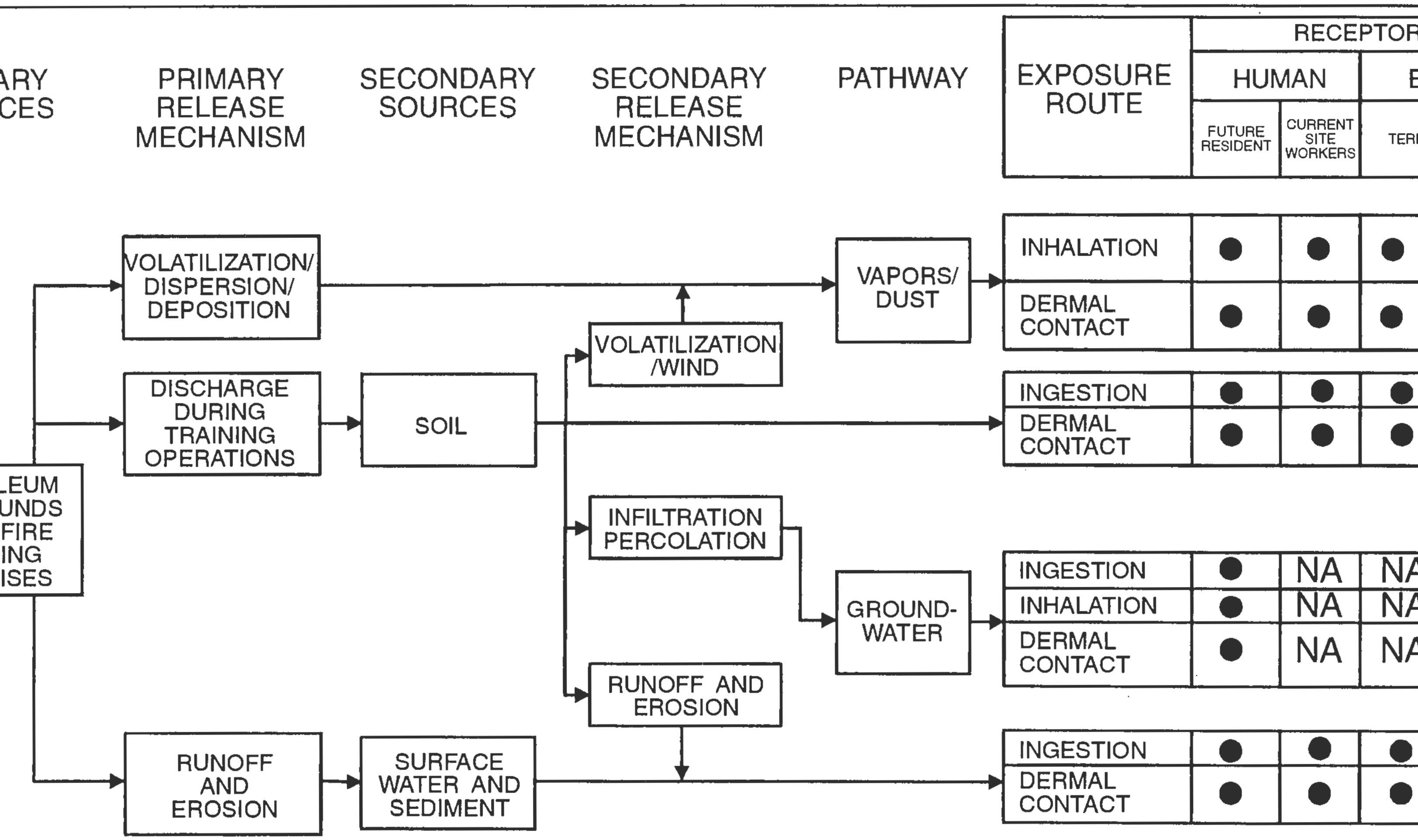
There are three primary receptor populations for potential releases of contaminants from the Fire Training Pit:

1. Future on-site residents
2. SEDA personnel and visitors who may go on or near the Fire Training Pit; and
3. Terrestrial biota on or near the site.

Aquatic biota are not present because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.7.2.1 Ingestion and Dermal Exposure to Surface Water Runoff and Sediment

Surface water run-off is not well defined on-site. Rainfall is contained within the confines of a low (approximately 1-foot) berm that surrounds the Fire Training Pit. Outside this area, surface water collects in shallow depressions to form puddles and some water eventually flows down the steep scarps that surround the elevated Fire Training Pit and surrounding area.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT A
EXPANDED SITE INSPECTI
7 HIGH-PRIORITY SWMU

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO.

FIGURE 5.7-1

EXPOSURE PATHWAY SU
FOR SEAD-26

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Surface soils may erode from the site and may be deposited as sediment at the base of the scarp that surrounds the site.

Ingesting and coming in contact with impacted surface water and sediment are potential exposure routes for future on-site residents, especially children, and terrestrial biota. SEDA workers and visitors could come in contact with, or unintentionally ingest, impacted surface water and sediment.

5.7.2.2 Inhalation of and Dermal Contact with Dust and/or Volatile Emissions

Impacted dust and/or volatile organic compounds may be released from the Fire Training Pit and the surrounding area due to high winds, vehicle traffic through the area, or periodic burn events. Fugitive dusts would not be expected to be transported beyond the SEDA boundary. As with fugitive dusts, volatile compounds would not be expected to migrate off-site in significant concentrations. Therefore, the dust and/or volatile emissions could be inhaled by or come in contact with future on-site residents, SEDA workers and visitors, and terrestrial biota.

5.7.2.3 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with, and unintentional ingestion of, soil is a potential pathway for current site workers and visitors.

5.7.2.4 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the Fire Training Pit is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

5.7.3 Summary of Affected Media

A total of 20 surface soil and 15 subsurface soil samples were collected at SEAD-26. In addition, 1 surface water and 1 sediment sample were collected from the Fire Training pit. Finally, 3 groundwater samples were collected. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were previously presented in Section 4.0.

Surface Soils

While a number of organic compounds (volatile organics, herbicides, nitroaromatics, semivolatile organics, and pesticide/PCBs) were detected, only semivolatile organics were detected in concentrations exceeding TAGM values.

All of the semivolatiles which exceeded TAGMs were PAHs. The four surface soil samples SS26-4, SS26-6, TP26-7.1, and TP26-8.1 exceeded the 210 μg/kg TAGM for benzo(a)anthracene. Three of these four samples, SS26-4, SS26-6, and TP26-8.1 had concentrations exceeding the 400 μg/kg TAGM for chrysene and the 14 μg/kg TAGM for dibenz(a,h)anthracene. Surface soil samples SS26-6 and TP26-8.1 also exceeded the TAGM concentrations for benzo(b)fluoranthene and benzo(k)fluoranthene. The TAGM for benzo(a)pyrene, which is 61 μg/kg, was exceeded in the four samples described above, and four additional samples, including SS26-8, TP26-2.1, and TP26-6.1 though the highest concentrations were found in samples SS26-6 and TP26-8.1.

It was observed that the majority of SVO TAGM exceedances occurred in surface soil samples. In addition, the sampling results indicate that at least two areas are of interest. The first area is in the southern end of the site. Sample SS26-4 was collected in this area. The other area is the far north end of the site, where sample TP26-8.1 was collected. By contrast, samples collected in the center of the site, near the pit (SS26-1, SS26-2, and SS26-3) had little or no PAHs.

The metals of note in the surface soil samples at this site are arsenic, copper, lead, magnesium, and manganese. Seven samples had arsenic concentrations in excess of the TAGM value of 7.5 mg/kg, though the maximum concentration of arsenic detected was only 13 mg/kg. The highest concentrations were found in soil samples collected from the soil borings SB26-4 and SB26-6. Copper concentrations exceeded the TAGM value of 25 mg/kg in only two samples, with the maximum value detected of 259 mg/kg found in the surface soil in sample SS26-6. No other copper concentrations exceeded the 25 mg/kg TAGM value. Lead concentrations exceeded the TAGM value of 30 mg/kg in only two samples. The surface soil samples SS26-6 (522 mg/kg), and SS26-7 (58.5 mg/kg) had lead concentrations above the TAGM value. Magnesium concentrations exceeded the TAGM value of 12,308 mg/kg in 6 surface soil samples. As with copper, most of the exceedances were minor, with the exception of sample TP26-3.1, which had a magnesium concentration of 120,000 mg/kg. Manganese concentrations exceeded the TAGM value of 759 mg/kg in only one sample. The highest reported concentration was 1740 mg/kg found in the surface soil sample TP26-3.1.

Subsurface Soils

As described above, the bulk of the organic compound TAGM exceedances were in samples collected from surface soils. The only subsurface soil samples to exceed a semivolatile organic compound TAGM were TP26-2.2 and TP26-8.2, though the concentration of benzo(a)pyrene in sample TP26-8.2 (62 μg/kg) just barely exceeded the TAGM value of 61 μg/kg. In general, few PAHs were found in samples collected at depth.

Also of note at this site was the herbicide MCPA which was detected in sample SB26-4.2 at a concentration of 29,000 μg/kg. No TAGM value currently exists for this analyte.

In general, while there were a number of metals which exceeded the TAGMs, there was no definite pattern to the exceedances, in either the subsurface or surface soil samples, and there were no samples that consistently had the highest metals concentration, suggesting there is no definable source of metals.

Groundwater

No VOCs, pesticides, PCBs, herbicides, and nitroaromatic compounds were detected in the groundwater samples. Diethylphthalate was the only SVO detected, and only at concentrations well below the NYSDEC Class GA groundwater standards. Several metals concentrations exceeded the standards, including arsenic, beryllium, lead, and zinc, but these concentrations were likely due to silt suspended in the samples, as evidenced by the high turbidities. The well downgradient of the fire training pit contained a detectable concentration of TPH (0.41 mg/L). The detection limit for TPH in water is 0.4 mg/L.

Surface Water

The surface water in the fire training pit contained one pesticide compound, one herbicide compound, eleven metals, one nitroaromatic compound, cyanide and TPH. Only iron and cyanide were present in concentrations exceeding EPA AWQC.

Sediment

The sediment sample collected in the fire training pit contained PAHs, pesticides, an herbicide compound, metals and TPH. Four of the pesticide compounds and arsenic were detected at concentrations exceeding the standards. Similar compounds were found in both the surface water and sediment samples. Many of these compounds were also detected in soils in other portion of the site.

5.8 SEAD-45

5.8.1 Potential Source Areas and Release Mechanisms

The Open Detonation Grounds has been in use since 1941 to the present and has been operating under RCRA interim status. The RCRA Subpart X permit application has been submitted and is pending regulatory approval. The mound is composed of glacially-derived soil which is moved via a bulldozer in support of open detonation operations. The primary sources of contaminants at SEAD-45 are the ordnance which is detonated within The suspected source area at the site and the soils that comprise the detonation mound. This area has the potential to contain various explosive compounds and heavy metals.

The primary release mechanisms at SEAD-45 are dispersion of dust and/or volatiles into the air, infiltration and percolation through the soils of the site and runoff and erosion of the suspected source areas. Secondary release mechanisms are infiltration and percolation through, and surface water runoff and erosion of, secondary source soils. It has been established in previous investigations at the adjacent Open Burning Grounds that the till has a relatively low permeability and thus leaching of explosive compounds and metals is not considered to be as significant a release mechanism compared to surface water runoff and erosion. If the contaminants were leached to the groundwater, interception into Reeder Creek also could become a secondary release mechanism.

Since the constituents of concern are believed to be primarily in surface soils, the movement of explosive compounds and metals with fugitive dust may constitute a release mechanism. Volatilization of tri- and di-nitrotoluene compounds from primary and secondary sources may also constitute less significant a release mechanism.

5.8.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.8-1. Within SEDA, vehicular access to the site is restricted by a locked gate at the entrance to the Open Burning and Open Detonation Grounds. Since this area is within the ammunition storage area, pedestrian access is restricted.

There are four primary receptor populations for potential releases of contaminants from the Open Detonation Grounds:

1. Future on-site residents;
2. SEDA personnel who work on or near the Open Detonation Grounds and visitors to the site;
3. Terrestrial biota on or near the Open Detonation Grounds; and
4. Aquatic biota in Reeder Creek.

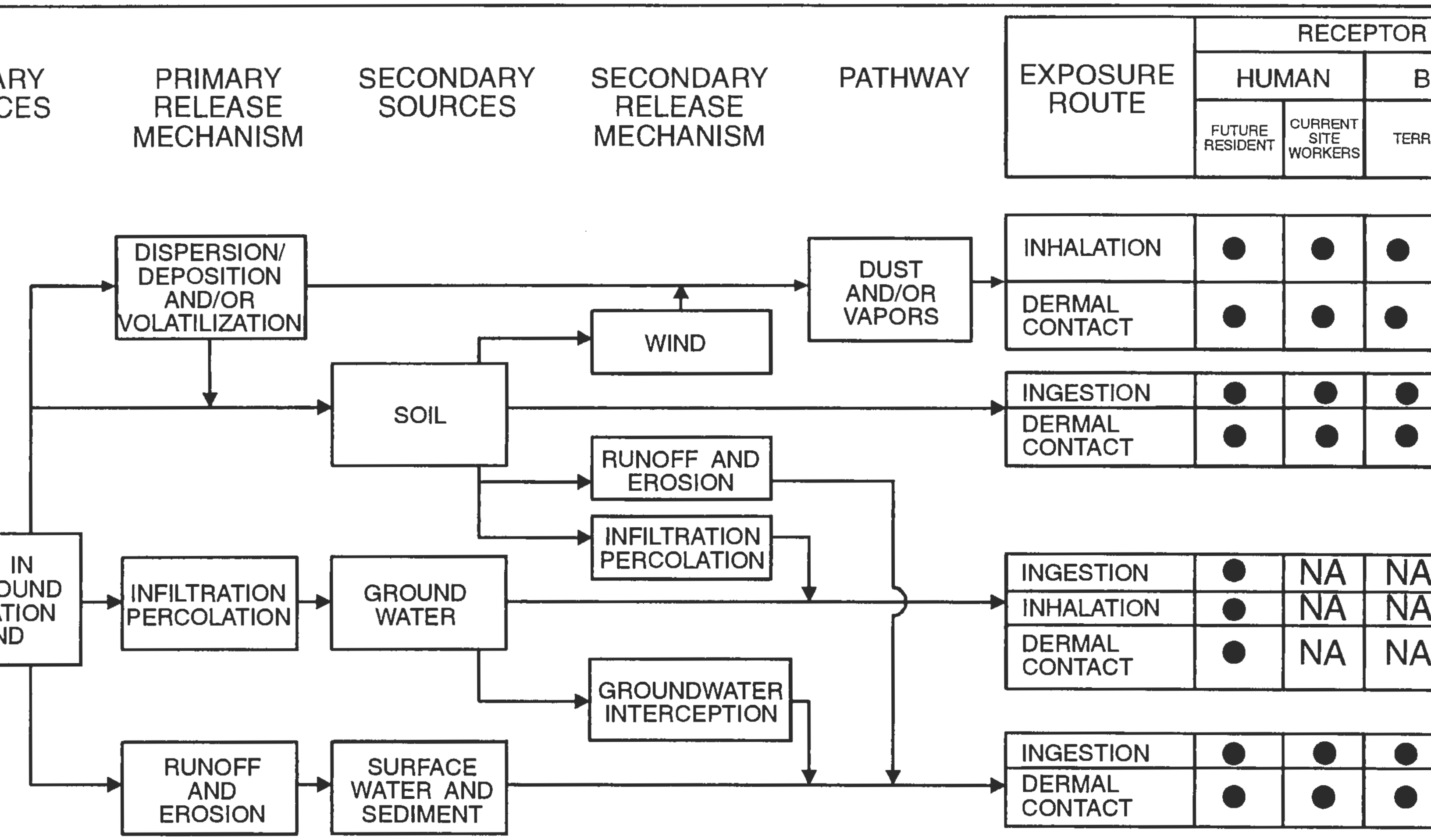
The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.8.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off flows to the wetlands and drainage swales on-site which discharge to Reeder Creek. Two small wetlands are located east of the detonation mound and one to the northwest of it. Surface soils eroded from the site are deposited as sediment within the on-site drainage swales and wetlands.

The primary environmental receptors of any impacted surface water and sediment are the aquatic biota of the on-site wetlands and Reeder Creek. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the surface water and sediments. Terrestrial biota that drink from impacted surface waters and come in contact with surface water and sediment may be affected.

The human receptors are future on-site residents, especially children, who could ingest or come in contact with the surface water and sediment; people who eat fish and other aquatic organisms from downstream portions of Reeder Creek; and SEDA personnel and visitors who may come in contact with the surface water and sediment on site. SEDA personnel and visitors could unintentionally ingest the surface water and sediment from on-site or from Reeder Creek.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIEN

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT A
EXPANDED SITE INSPECTIO
7 HIGH-PRIORITY SWMU

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO.

FIGURE 5.8-1

EXPOSURE PATHWAY SU
FOR SEAD-45

SCALE | DATE | APP

MU.HGH\FIGURES\5.8-1.CDR

5.8.2.2 Inhalation of Fugitive Dust and/or Volatile Emissions

Contaminated fugitive dusts and/or volatilized contaminants may be released from the Open Detonation Grounds due to high winds, vehicle traffic through the area, or disturbance of the soils during site use. The strict controls on access to the SEDA facility make exposure of other people to fugitive dust and/or volatile emissions a remote possibility. These emissions would not be expected to be transported in significant quantities beyond site boundaries, which are a minimum of one half mile away from the site. Therefore, the dust or volatilized contaminants could be inhaled by, or come in contact with, future on-site residents, SEDA workers and visitors, and terrestrial biota.

Volatilization of the tri- and dinitrotoluene compounds may result in low-level exposure of SEAD personnel working on or near the site. Since these compounds are semivolatile compounds, they would not be expected to migrate off-site in significant concentrations.

5.8.2.3 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and unintentional ingestion of, soil is a potential pathway for current site workers and visitors.

5.8.2.4 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the Open Detonation Grounds is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

Groundwater beneath the site flows generally toward Reeder Creek and may be recharging the creek. The potential groundwater contribution to the surface water could result in the exposures identified for surface water and sediments above.

5.8.3 Summary of Affected Media

A total of 9 surface soil and 5 subsurface soil samples were collected at SEAD-45. In addition, 4 surface water and 4 sediment samples were collected from the drainage swales and low-lying areas at the site. Finally, 8 groundwater samples were collected. The impacts to these media are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were previously presented in Section 4.0.

Surface and Subsurface Soils

Surface soil samples have been impacted primarily by explosives and metals, and to a lesser extent by semivolatile organic compounds. While there were 21 SVOs detected, the only TAGM exceedance was in sample SS45-2. The concentration of benzo(a)pyrene was 82J μg/kg, which slightly exceeds the TAGM of 61 μg/kg. The SVOs may be due to the air emissions of the heavy equipment used at the site or the result of incomplete combustion of organics during a burn of a detonation event.

Eight explosives were detected, though the concentrations were low. There are no TAGM values for explosives.

A number of the soil samples collected at SEAD-45 (both surface and subsurface) were found to contain various metals at concentrations that exceeded the associated TAGM or site background values. Of the 24 metals reported, 16 of these were found in one or more samples at concentrations above the associated TAGM values. While several of these exceedances were for only 1 or 2 samples, the majority of the TAGM exceedances were more significant. Of particular note are the metals cadmium, chromium, copper, lead, mercury, silver, and zinc where a large percentage of the samples exceeded the criteria value and where the concentrations of the exceedances are generally an order of magnitude or greater above the criteria value.

Twelve of the 14 soil samples analyzed had cadmium concentrations above the criteria value of 1 mg/kg. The highest cadmium concentration was identified in sample TP45-3, where 13.1 mg/kg was reported. This test pit soil sample was collected from the center of the OD mound. This sample also had elevated concentrations of all the other metals of note, and had the highest detected concentrations of lead and nickel. In general, the highest metals concentrations were found in the soil samples collected from the test pits completed directly in the OD mound. The exception was chromium, where the highest concentration (39.3 mg/kg) was found in the surface soil sample SS45-2, collected west of the OD mound. Even though the highest metals concentrations were in the test pit soil samples, there were TAGM exceedances in the surface soil samples as well. The highest metals concentrations in the surface soil samples were in the samples SS45-5, collected just west of the OD mound, and SS45-6 and SS45-9, collected east of the OD mound.

Groundwater

Organics detected in groundwater were tetrachloroethane, HMX, 1,3-dinitrobenzene, and bis(2-ethylhexyl)phthalate. All were present at concentrations well below the NYSDEC Class GA groundwater standards. Eight metals, beryllium chromium, iron, lead, magnesium, manganese, sodium and zinc were present in one or more samples at concentrations exceeding the groundwater standards. Most of the high concentrations were in well MW45-4, which had a turbidity of 9860 NTU and are likely the result of suspected silt in the water.

Surface Water

Two explosives, HMX and RDX were detected in two of the surface water samples. Metals were detected in the surface water, with aluminum, cadmium, copper, iron, lead, mercury, zinc and cyanide all present in at least one sample at concentrations exceeding the most stringent AWQC.

Sediment

Several nitroaromatic, SVOs, and pesticide/PCBs were detected in sediment, primarily at low concentrations. There are no appropriate standards for comparison for organics because the NYSDEC sediment criteria apply to wetlands that support aquatic life. Cadmium, copper, iron, and mercury were all detected in sediment at concentrations exceeding the LOT criteria.

6.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

6.1 CHEMICAL DATA QUALITY

Completeness

Completeness is defined as the percentage of measurements that have been judged to be valid measurements. Completeness of the chemical data was evaluated by comparing the sum of analysis results that were considered to be valid to the total number of analyses results that were performed. For this analysis each datapoint was considered to comprise one measurement. The total number of measurements was obtained as the product of the number of analytes and the number of samples. The percentage of completeness ranged from 99.0 to 99.9% at the seven high priority AOCs. This exceeded the QA objective established in the workplan of 90%.

Representativeness

The samples were representative of conditions at upgradient and downgradient locations for surface soil, groundwater, surface water, and sediment. Test pits and borings were installed at locations that had the greatest potential to be sources of contamination. The representativeness of all the samples was maintained by following the sampling protocols described in the workplan, decontaminating equipment between samples, and collecting the appropriate QC field samples. To evaluate representativeness, several of the completed field forms were audited. The work recorded on the forms complied with the protocol. The rinsate sample results indicate the sampling equipment was being decontaminated. Sixteen rinsates and duplicates were obtained for the ESIs at the seven AOCs which each represents 6% of the total samples. This exceeded the QA objective of 5% for rinsates and duplicates. One VOC trip blank was sent with each cooler that contained samples for VOC analysis which met the QA objective.

Accuracy

A measurement's accuracy is evaluated by comparing the measured value to an accepted reference or true value. The accuracy is dependent on the matrix, method of analysis, and the compound or element being analyzed. Accuracy, expressed as percent recovery, was evaluated by comparing the results of a sample and a matrix spike sample analysis. Accuracy was also evaluated using recoveries of surrogate compounds spiked into the samples.

Accuracy evaluations were performed during the data validation process for the TCL compounds in accordance with the standard procedures for validation in Standard Operating Procedure No. HW-6 (Revision No. 8) titled CLP Organics Data Review and Preliminary Review. The QC limits for the TCL compounds were from the NYSDEC CLP Analytical Services Protocol, December 1991 with updates. The QC limits for herbicides and explosives analyses were from Methods 8150 and 8330, respectively as described in SW-846. Accuracy of the TAL elements and compounds were evaluated by comparing the spiked sample recoveries to the QC limits in the NYSDEC CLP Analytical Services Protocol, December 1991 with updates and using the data validation procedures in Standard Operating Procedure No. HW-2 (Revision No. 11) titled Evaluation of Metals Data for the Contract Laboratory Program (CLP).

Precision

Precision was measured by analyzing field duplicates and laboratory duplicates such as sample duplicates, matrix spike duplicates, and laboratory blank duplicates. Precision was most frequently expressed as relative percent difference (RPD).

The evaluation of precision was incorporated into the data validation process by following the data validation procedures in HW-2 and HW-6 for duplicates of samples, matrix spike samples, and blanks prepared by the laboratory.

Sample duplicates prepared in the field were evaluated using criteria from the validation procedures for EPA Region I, titled Laboratory Data Validation, Functional Guidelines for Evaluating Organics Analyses, February 1, 1988. The QC limits for duplicate analyses of organic compounds were 30% for aqueous samples and 50% for solid samples. The QC limits for inorganic compounds (metals and cyanide) were 50% for aqueous samples and 100% for solid samples.

RPDs of duplicate analyses that did not meet the criteria caused the analytical result for a sample and its duplicate to be qualified as an estimated value (J qualifier).

The precision of the organics data was very good based on a comparison of the field duplicates. Metals data that did not meet the criteria were more prevalent, probably due to soil matrix effects.

Comparability

The data are comparable because similar methodologies were used for sampling, chemical analysis, data validation, and reporting units of concentration. All the chemical analysis data for these investigations have been analyzed by Aquatec Laboratories, Inc. using NYSDEC Contract Laboratory Protocols for Level III and IV data. All the soils data are reported on a dry weight basis.

Traceability

The quality of the chemical data can be substantiated by linking the results to authoritative standards and describing the history of each sample from collection to analysis.

Aquatec used calibration standards obtained from AccuStandard, Inc., Restek, Supelco, and Ultrascientific. These companies can trace their standards back to standards from the National Institute of Standards and Technology. The laboratory keeps on file data packages of certificate for all standards purchased from these companies. Aquatec also purchases pure compounds from Aldrich, Chemserve, and the Department of the Navy to prepare their own standards.

When Aquatec used these standards to prepare working standards, the supplier, lot number, and expiration data of the calibration standards were recorded in a logbook along with information on the preparation and concentration of each working standard.

ES recorded field data on forms and in notebooks and completed Chain-of-Custody forms for all the samples sent to Aquatec. ES recorded the following types of information: soil boring logs, well installation details, well development data, equipment calibration, groundwater sampling data, and data on sampling of soil, surface water, and sediment. ES maintained a Chain-of-Custody form for every sample sent to Aquatec. The airbill receipts were also kept on record in a file.

When Aquatec received samples, they were logged into the laboratory management system where an internal chain-of-custody record was maintained.

As part of the data validation process, all the samples were traced from sample collection to report analysis by the laboratory. This ensured that all the samples obtained in the field were received by Aquatec, analyzed, reported, and validated. Only one sample, a rinsate labelled TP45-1R, had been sent to Aquatec, but not analyzed. ES had requested Aquatec to not analyze this sample.

6.2 DATA QUANTITY OBJECTIVES

Field Work

The amount of field work proposed in the workplan and performed at each of the 7 AOCs for the Expanded Site Inspections are presented in Table 6.2-1. This section describes why changes were made to the field program presented in the workplan.

The workplan stated that each seismic refraction profile would be 120 feet long resulting in 480 feet of profiles per SEAD. Each profile was actually 115 feet long for a total length of 460 feet per SEAD.

More linear feet of geophysical surveys using GPR and EM-31 were performed at SEAD-4, SEAD-24, and SEAD-45 than proposed in the workplan. Due to the new information in the aerial photographs and resulting changes in the investigation at SEAD-4, the geophysical surveys were expanded. At SEAD-25, the bermed area was larger than anticipated. The proposed area for the survey of 225 by 225 feet was expanded to 300 by 450 feet. At SEAD-45, the workplan stated that the EM-31 geophysical surveys would be performed on the mound where the open detonation pits were located and GPR would be used at anomalies. It was determined that walking on the mound was too dangerous; therefore, the EM-31 survey was performed in an area 800 by 800 feet that was centered on the mount but excluded the mound and pits. GPR surveys were performed at five locations where anomalies were detected by the EM-31.

The purpose of the seismic refraction surveys was to estimate the direction of groundwater flow through each SEAD under investigation. The location of the monitoring wells would then be adjusted so that there would be an upgradient and a downgradient monitoring well at each SEAD. All the proposed well locations in the workplan were correctly located except at SEAD-24. The results of the seismic data indicated groundwater flowed in a westerly direction instead of in a northwesterly direction. Therefore, MW24-3 was moved to the downgradient side of the pit. For this investigation, the downgradient wells are MW24-2 and MW24-3. Well MW24-1 is still the upgradient well.

TABLE 6.2 – 1
COMPARISON OF PROPOSED FIELD WORK TO ACTUAL FIELD WORK

SENECA ARMY DEPOT
7 AOCs

	SEAD – 4	SEAD – 16	SEAD – 17	SEAD – 24	SEAD – 25	SEAD – 26	SEAD – 45
Geophysical Surveys							
Seismic Refraction	480/460	480/460	480/460	480/460	480/460	480/460	–
GPR	4800/11800	–	–	1800/7985	–	10400/10400	NS/5310
EM – 31	5450/10900	–	–	5175/12720	–	–	NS/55600
Explorations							
Soil Borings	10/10	–	4/4	5/5	6/6	4/4	–
Test Pits	8/8	–	–	–	–	8/8	15/15
Monitoring Wells	5/5	3/3	4/4	3/3	3/3	4/4	4/4
Samples Analyzed							
Surface Soil	7/7	16/16	23/23	12/12	–	8/8	9/9
Subsurface Soil from Borings	30/27	–	12/9	15/15	18/17	12/11	–
Subsurface Soil from Test Pits	8/8	–	–	–	–	16/16	5/5
Groundwater	5/5	3/3	4/4	3/3	3/3	4/3	9/8
Surface Water	2/2	–	–	–	–	1/1	4/4
Sediment	9/9	–	–	–	–	1/1	4/4
Standing Water	1/1	2/2	–	–	–	–	–
Floor Debris & Furnace Scale	–	10/10	–	–	–	–	–
Building Materials	–	5/7	–	–	–	–	–
Propellants	–	3/0	–	–	–	–	–
Oil	–	–	–	–	–	1/0	–

NOTES:
1. NS stands for not specified in the Work Plan.
2. The numbers for the proposed field work are from the Work Plan. They reflect the changes made to the field program at SEAD – 4 as decribed in a letter to Mr. Kamal Gupta of NYSDEC from Mr. Michael Duchesneau of ES dated November 15, 1993.
3. The data in the body of the table, such as "14/10", represent "proposed/actual" numbers.

H:\ENG\SENECA\7SWMU.HGH\TABLES\TBL62–1.WK3

The well construction design was modified when bedrock was less than 8 feet deep. The sand pack around the screen was installed to 1 foot above the screen instead of 2 feet. The bentonite seal was 0.5 to 1 foot thick instead of 2 to 3 feet thick.

The number of subsurface soil samples collected from borings for chemical analysis were less than proposed at SEAD-4, SEAD-17, SEAD-25, and SEAD-26. The split spoon sampler hit refusal on shallower-than-expected bedrock in at least one boring at each of these SEADs. The depth of refusal in these borings was in the range of 3 to 4 feet.

Groundwater was collected from all but two of the wells installed for this investigation at the 7 AOCs. The wells MW26-2 and MW45-1, had no groundwater in them.

Two extra building material samples were obtained from Building S-311 at SEAD-16 for asbestos analysis. No samples of propellants in abandoned pipes at SEAD-16 were obtained because no pipes with propellant residues could be located.

An oil sample was not obtained from SEAD-26 as proposed because there was no oil floating on the water in the fire training pit.

Sample Analyses

Analysis Methods

The analysis methods proposed in the workplan were used to analyze the samples.

Analyses Performed

The type of analysis performed on the samples from each SEAD did not vary from the workplan except at SEAD-26. Seventeen of the samples from SEAD-26 were additionally analyzed for explosives. Twenty samples at SEAD-26 were not analyzed for methyl tert-butyl ether as proposed in the workplan.

Quantitation Limits

The determintaiton of an analytical quantitation limit is established by NYSDEC in the Analytical Services Protocol (ASP) which is routinely updated. As more information is obtained, the quantitation limits are re-established based upon statistical analyses of this data. During the performance of this project, quantitation limits were updated and there are some slight differences between the Contact Required Quantitation Limits (CRQLs) in the workplan and that reported in the chemical analysis data sheets.

The reporting limits and CRQLs are presented in Appendix G of this report. The slight variations between reporting limits and CRQLs are because reporting limits are on a wet weight basis, i.e., "as received" and CRQLs are based on a dry weight basis. When the reporting limits are corrected to a dry weight basis, the volatiles, semivolatiles, pesticides, PCBs, and herbicides generally met or were lower than the CRQLs. In the few instances where the reporting limit, corrected to dry weight, exceeded the CRQL for that analyte the reason why this occurred was because either the sample size was less than the recommended amount of sample in the analysis or interferences from other analytes or other materials were in the sample matrix.

7.0 RECOMMENDATION FOR FUTURE ACTION

7.1 INTRODUCTION

The expanded site inspections completed at the 7 AOCs provide information on the nature and extent of impacts present at each of the sites. This section is designed to provide a brief overview of the findings and to propose recommendations for future action at the 7 high priority sites.

7.2 SEAD-4: MUNITIONS WASHOUT FACILITY LEACHFIELD

The results of the ESI conducted at SEAD-4 indicate that impacts to the surface soils and the surface water and sediment have occurred at this site. The surface site soils have been impacted by the release of heavy metals. In particular, the three metals chromium, copper, and zinc were identified in surface soils at concentrations above the TAGM values. Metal concentrations appear in the area of the former munitions washout facility building location, and in the area of the pond located on the west side of the site. Sediment samples collected from the drainage ditches surrounding the site, and from the pond on the west side of the site, also detected the presence of heavy metals. The results of the subsurface soil samples collected from borings completed at SEAD-4 suggest that the heavy metals are limited to the surface soils. In addition to impacts from heavy metals, sediment samples collected from the northern drainage ditch also detected the presence of semivolatile organic compounds and pesticides/PCBs. While other sediment samples also had SVOs present, the concentrations were generally an order of magnitude or lower compared to the drainage ditch. Nitroaromatic compounds do not appear to be of concern at SEAD-4.

The results of the groundwater sampling program at SEAD-4 indicate that antimony, beryllium, cadmium, and chromium have impacted the groundwater system at this site. Elevated concentrations of these metals were identified in the some of the four groundwater samples collected.

Based upon the results of the ESI conducted at SEAD-4 it appears that a threat may exist due to the presence of heavy metals and that an RI/FS should be conducted to fully define the impacts to site soils, groundwater, sediment, and surface water.

7.3 SEAD-16: BUILDING S-311 ABANDONED DEACTIVATION FURNACE

The ESI conducted at SEAD-16 indicates that impacts to the surface soils from the release of heavy metals and SVOs have occurred at this site. In particular, the four metals copper, lead, mercury, and zinc were identified in surface soil samples at concentrations above the TAGM values. Elevated SVO levels were also reported for some samples, although the concentrations were randomly distributed with no consistent pattern evident. The distribution of samples with elevated heavy metal concentrations also appears to be somewhat random at the site. Nitroaromatic compounds, and in particular 2,4-dinitrotoluene, were identified in the majority of the soil samples collected at SEAD-16. While the concentrations were generally low, this compound was identified in more than half of the soil samples collected. No TAGM value currently exists for this compound.

Within the building, elevated metal and SVO constituents have been identified. Asbestos was also identified within some of the building materials sampled. The analysis of the standing water present in the building does not suggest that constituents have partitioned into the surface water within the building.

The results of the groundwater investigation at SEAD-16 identified levels of chromium, copper, lead, and zinc in some of the groundwater samples collected at SEAD-16. It is difficult to ascertain if groundwater has been impacted at this site as the analytical results have been skewed by high sample turbidities.

Based upon the results of the ESI conducted at SEAD-16 a threat may exist due to the metals present in the surface soils and within the building. It is recommended that an RI/FS be conducted to fully define the impacts to site soils and the extent of migration in the groundwater.

7.4 SEAD-17: BUILDING 367 EXISTING DEACTIVATION FURNACE

The ESI conducted at SEAD-17 indicates that impacts to the surface soils, from the release of heavy metals and SVOs, have occurred at this site. In particular, the three metals copper, lead, and zinc were consistently identified in surface soil samples at concentrations above the TAGM values. The distribution of both SVOs and heavy metals appears to be random with no defined source area.

The results of the groundwater investigation at SEAD-17 identified elevated levels of iron, lead, magnesium, manganese and sodium in some of the groundwater samples collected at SEAD-17. It is difficult to ascertain if groundwater has been impacted at this site as the analytical results have been skewed by high sample turbidities in several of the groundwater samples.

The results of the ESI suggests that a threat may exist due to the presence of heavy metals in surficial soils. However, it does not appear that these constituents are migrating off-site. It is recommended that an RI/FS be performed to fully define the impacts to site surficial soils.

7.5 SEAD-24: ABANDONED POWDER BURNING PIT

The ESI conducted at SEAD-24 indicates that impacts to the surface soils, from the heavy metal arsenic, have occurred. The metal arsenic has been identified as a metal of concern because of its consistent occurrence at levels above the TAGM and the localized distribution on the east and north sides of the pad. Total Petroleum Hydrocarbons (TPH) were also reported at low mg/kg concentrations. NYSDEC does not currently have a TAGM value for TPH.

The groundwater investigation completed at SEAD-24 indicates that no adverse impacts to the groundwater have occurred.

The results suggest that a localized threat may exist due to the presence of arsenic, a Class A human carcinogen, in surficial soils. It is recommended that a removal action be performed in conjunction with some limited investigative work to fully define the observed surficial soil impacts and to eliminate this threat.

7.6 SEAD-25: FIRE TRAINING AND DEMONSTRATION PAD

The ESI conducted at SEAD-25 indicates that impacts, from the release of BTEX compounds, to the surface and subsurface soils has occurred at this site. The BTEX compounds were found in a number of soil samples above the associated TAGM values, and individual samples also exceeded the NYSDEC TAGM criteria for total VOCs of 5 mg/kg. Based upon the results of this ESI, the BTEX concentrations appear to be limited to the central and western portion of the pad.

The groundwater investigation completed at SEAD-25 indicates that chlorinated and BTEX compounds are present in the groundwater at concentrations above the NYS AWQS Class GA groundwater standard. Class GA standards are used to specify the quality of groundwater which would be suitable to be used as a source of drinking water.

The results suggest that a threat may exist due to the presence of volatile and semivolatile organics in the soil and groundwater. It is recommended that an RI/FS be conducted at this site to further define the nature and extent of these constituents in the environment and the degree to which they may be migrating in the groundwater.

7.7 SEAD-26: FIRE TRAINING PIT AND AREA

The ESI conducted at SEAD-26 indicates that two localized areas of surficial soils have been impacted by the release of semivolatile organic compounds. Several PAH's were identified in surface soils at levels in excess of the associated TAGM values. Total Petroleum Hydrocarbons (TPH) were also reported for surface soil samples collected around the pit at elevated values. NYSDEC currently does not have TAGM values for TPH. The sediment sample collected from within the Fire Training Pit also had an elevated TPH concentration although this was expected since petroleum fuels have been and continue to be burned, for fire training purposes, at this site.

The groundwater investigation completed at SEAD-26 indicated that arsenic, beryllium, chromium, lead, nickel, and zinc have impacted the groundwater. Elevated concentrations of these metals were found in several of the groundwater samples, however, these results appear to have been skewed by high sample turbidities.

Semivolatile organic compounds were detected at concentrations above TAGM values in several of the surface and subsurface soil samples analyzed. This site is considered to pose a threat due to the occurrence of the semivolatile organic compounds associated with the fire training pit. It is recommended, therefore, that an RI/FS be performed at this AOC to fully define the impacts to site soils, groundwater, sediment and surface water.

7.8 SEAD-45: OPEN DETONATION FACILITY

The ESI conducted at SEAD-45 indicates that impacts to the surface soils and sediment, from the release of heavy metals and nitroaromatic compounds, and to a lesser extent by semivolatile compounds, has occurred at this site. Surface soils collected from around the Open Detonation mound show an irregular distribution of elevated levels of nitroaromatic compounds and heavy metals. The results of the soil sampling within the mound itself show elevated concentrations of semivolatile organic compounds, heavy metals, and nitroaromatic compounds.

The groundwater investigation completed at SEAD-45 indicated that antimony, beryllium, chromium, lead, and nickel have impacted the groundwater at SEAD-45. Elevated concentrations of these metals have been found in some or all of the groundwater samples analyzed.

Due to the presence of heavy metals in the OD mound and the drainage ditches of the mound, as well as the presence of several metals at concentrations above TAGM or MCL standards, it appears that a threat may exist. Therefore, an RI/FS is recommended for this site in order to fully define the impacts to the site's soils, groundwater and sediments.